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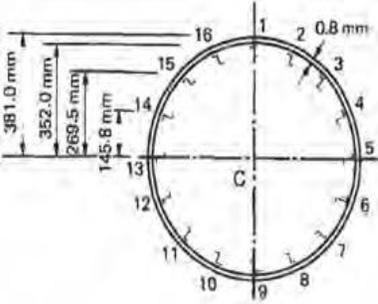
Unit-I

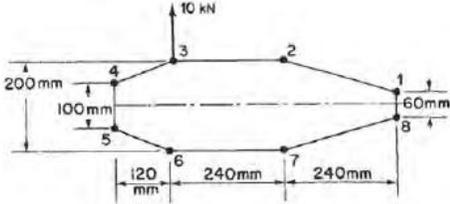
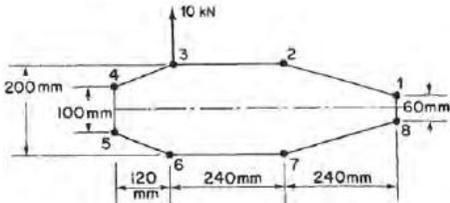
S.NO	QUESTION	BLOOM'S
1.	Explain structural Stiffness, Aerodynamic characteristics in structural design criteria	II
2.	Explain the physical properties of engineering materials	II
3.	Explain the principal structural components of an aircraft	II
4.	Discuss about Design for durability	II
5.	Discuss about Damage tolerance	II
6.	Discuss about Stretching	II
7.	Discuss about Extension of life	II
8.	Discuss the design requirements of airframe structural design	II
9.	Explain optimization of an airframe structures	II
10.	Discuss the sizing scenario in airframe structural design	
11.	Describe the important roles of the Structural stiffness of a high speed aircraft	I
12.	Describe the important roles of the Aerodynamic characteristics of a high speed aircraft	I
13.	Describe the important roles of the Load analysis of high speed aircraft of a high speed aircraft	I
14.	Explain preliminary and detail significance of an airframe structural design.	II
15.	List out and explain the properties of engineering materials for use in the manufacture of an aircraft in detail.	I
16.	Explain the block diagram of design phases of an aircraft.	II
17.	Explain the structural design phases of an aircraft	II
18.	Discuss about preliminary design phase	II
19.	Discuss about the detail design phase of an aircraft	II
20.	Explain about the structural index of an aircraft	II

Unit-II

S.NO	QUESTION	BLOOM'S
1.	Discuss the mechanical properties and allowable bases of aircraft materials	II
2.	Discuss about Dynamic gust loads	II
3.	Describe maneuver construction of flight envelope	I
4.	Discuss airplane weight data and stiffness data	II
5.	Explain the distribution of weight on fuselage	II
6.	Explain various flight loads in brief	II
7.	Discuss Air worthiness requirements	II
8.	Explain about the flight loads acting on an aircraft	II
9.	Explain different failure theories in detail.	II
10.	Explain fuselage configuration	II
11.	Explain the importance of the following while designing the structure of an aircraft (a) Major aircraft weights. (b) Weight distribution	II
12.	Explain about the pressure loads acting on an aircraft	II
13.	Explain about the Landing gear loads acting on an aircraft	II
14.	Describe about the limit loads and ultimate loads acting on an aircraft	II
15.	Describe about the atmospheric loads acting on an aircraft	I
16.	Distinguish between the fore body loads and aft body loads acting on an aircraft	II
17.	Explain about the wind loads acting on an aircraft	II
18.	Explain about v-n diagram in detail	II
19.	Describe about the Empennage loads acting on an aircraft	I
20.	Describe about the propulsion loads acting on an aircraft	I

Unit-III

S.NO	QUESTION	BLOOM'S TAXONOMY LEVEL
1.	<p>A Fuselage has a circular cross-section as shown in figure 1. The cross-sectional area of each stringer is 100 mm² and the fuselage is subjected to bending moment of 200 kNm applied in the vertical plane of symmetry, at this section. Determine the direct stress distribution.</p> 	VII
2.	<p>A thin cylindrical shell, 2.5 m in diameter is composed of plates 12.5 mm thick. The yield stress of for the material is 300 N/mm². Determine the internal pressure which would cause yielding according to the following theories of failure.</p> <p>(a) Maximum shear stress, (b) Maximum strain energy, (c) Maximum shear strain energy. Poisson's ratio=0.25</p>	VII
3.	<p>A shaft is subjected to a maximum torque of 10 kNm and a maximum bending moment of 7.5 kNm at a particular section. If the allowable equivalent stress in simple tension is 160 MN/m², Determine the diameter of the shaft according to:</p> <p>(a) Maximum shear stress theory, (b) Strain energy theory and (c) Shear strain energy theory. Poisson's ratio is 0.24.</p>	VII
4.	Explain critical load conditions	II
5.	<p>A bending moment M applied to a solid shaft carries a maximum direct stress sigma at elastic failure. Determine the numerical relationships between M and twisting moment T, which acting alone on the shaft, will produce elastic failure, according to each of the following theories of failure:</p> <p>(a) Maximum shear stress. (b) Maximum strain energy.</p>	VII

	(c) Shear strain energy. Poisson's ratio = 0.3	
6.	<p>A shaft is subjected to a maximum torque of 10 k Nm and a maximum bending moment of 7.5 k Nm at a particular section. If the allowable equivalent stress in simple tension is 160 MN/m², Determine the diameter of the shaft according to:</p> <p>(a) Maximum shear stress theory, (b) Strain energy theory and (c) Shear strain energy theory. Poisson's ratio is 0.24</p>	VII
7.	<p>The thin-walled single cell beam as shown in below figure has been idealized into a combination of direct stress carrying booms and walls carrying only shear stress. The section supports a vertical shear load of 10 kN acting in the vertical plane through booms 3 and 6. Boom areas: $B_1 = B_8 = 200 \text{ mm}^2$, $B_2 = B_7 = 250 \text{ mm}^2$, $B_3=B_6=400 \text{ mm}^2$, $B_4 = B_5=100 \text{ mm}^2$. Determine the distribution of shear flow around the section.</p> 	VII
8.	<p>The thin-walled single cell beam as shown in below figure has been idealized into a combination of direct stress carrying booms and walls carrying only shear stress. The section supports a vertical shear load of 10 kN acting in the vertical plane through booms 3 and 6. Boom areas: $B_1 = B_8 = 200 \text{ mm}^2$, $B_2 = B_7 = 250 \text{ mm}^2$, $B_3=B_6=400 \text{ mm}^2$, $B_4 = B_5=100 \text{ mm}^2$. caluculate the Moment of inertia about X- axis and Y- axis.</p> 	III
9.	<p>A hollow mild steel rod having 100 mm external diameter and 50 mm internal diameter is subjected to a twisting moment of 8 k Nm and a bending moment of 2.5 k Nm. Determine the principal stresses would produce the same</p> <p>(a) Maximum strain energy. (b) Maximum shear strain energy, as that produced by the principal stresses acting together. Take Poisson's ratio = 0.25.</p>	VII
10.	<p>A hollow mild steel rod having 100 mm external diameter and 50 mm internal diameter is subjected to a twisting moment of 8 k Nm and a bending moment of 2.5 k Nm. calculate the direct stress which, acting</p>	III

	<p>alone, would produce the same</p> <p>(b) Maximum strain energy.</p> <p>(b) Maximum shear strain energy, as that produced by the principal stresses acting together. Take Poisson's ratio = 0.25.</p>	
11.	<p>Determine the deflection of the free end of a cantilever 2000 mm long having a channel section identical to that in Example 20.3 and supporting a vertical, upward load of 4.8 kN acting through the shear centre of the section. The effective direct stress carrying thickness of the skin is zero while its actual thickness is 1 mm. Young's modulus E and the shear modulus G are 70 000 and 30 000 N/mm², respectively.</p>	VII
12.	<p>A Fuselage has a circular cross-section as shown in figure 1. The cross-sectional area of each stringer is 100 mm² and the fuselage is subjected to bending moment of 200 k Nm applied in the vertical plane of symmetry, at this section. Determine the direct stress distribution.</p>	VII
13.	<p>The fuselage as shown in below Figure is subjected to a bending moment of 100 kNm applied in the vertical plane of symmetry. If the section has been completely idealized into a combination of direct stress carrying booms and panels carrying only shear stress determine the direct stress in each boom.</p>	VII
14.	<p>The fuselage as shown in below Figure is subjected to a bending moment of 100 kNm applied in the vertical plane of symmetry. If the section has been completely idealized into a combination of direct stress carrying booms and panels carrying only shear stress .Calculate the Moment of inertia & centroid in each boom.</p>	III

<p>15.</p>	<p>Idealize the box section shown in Fig. Into an arrangement of direct stress carrying booms positioned at the four corners and panels which are assumed to carry only shear stresses. Determine the distance of the shear centre from the left-hand web.</p>	<p>VII</p>
<p>16.</p>	<p>Determine the shear flow distribution in the web of the tapered beam shown in Fig. at a section midway along its length. The web of the beam has a thickness of 2 mm and is fully effective in resisting direct stress. The beam tapers symmetrically about its horizontal centroidal axis and the cross-sectional area of each flange is 400 mm²</p>	<p>VII</p>
<p>17.</p>	<p>The landing gear supporting structure is shown in the form of a truss in figure. Determine the forces in each member.</p>	<p>VII</p>

18.	Explain about buckling strength of the column	II
19.	Explain about single cell box beams	II
20.	Explain about Multi cell box beams	II

Unit-IV

S.NO	QUESTION	BLOOM'S TAXONOMY LEVEL
1.	Describe the role and significance of fasteners and fittings	I
2.	Describe the lug analysis	I
3.	Explain about the Spliced joints	II
4.	Explain about the Gusset joints	II
5.	Write a short note Welded joints	I
6.	Write a short note Braced joints	I
7.	Explain about the Brazed joints	II
8.	Write a short note Bolted joints	I
9.	Describe about the fasteners load distribution	I
10.	Explain the method of fastener selection	II
11.	Explain fatigue design considerations	II
12.	Explain the advantages and disadvantages of riveted joints	II
13.	Write a short note on semi tubular rivets, blind rivets, hi-lok fastener and taper fastener	I
14.	Explain the causes and methods of reduction of stress concentration	II
15.	Describe the role and significance of fasteners and fittings.	I
16.	Explain Shim control and its requirements	II
17.	Explain briefly about fastener load distribution and By-pass load with sketches.	II
18.	Write short notes semi tubular rivets, blind rivets and Hi-Lok fastener	I
19.	Explain the advantages and disadvantages of Bonded joints	I
20.	Write short notes Hi-Lok fastener and Taper fastener	I

Sl.NO	UNIT-1 Questions	Blooms Level
1.	Explain about product cycle.	2
2.	Explain the role of computers in manufacturing industry.	2
3.	Explain any two display devices.	2
4	Briefly describe the Winchester disk device used in computers.	1
5	What are the various input devices? Explain in detail.	2
6	Explain the image drawing technique used in graphics display	2
7	Explain mechanical and Aeronautical engineering applications for cad.	2
8	Describe about the working principles, advantages and limitations of the following output devices: i) Raster Display ii) Refresh display	1
9	What are various output Devices? Explain in detail?	2
10	Explain various types of plotters?	2
11	Briefly describe the types of storage devices used in computers.	1
12	Explain Memory Types	2
13	Explain the terms CAD and CAM? What are the advantages of CAD and CAM?	2
14	What is the basic structure of CAD/CAM? Explain about various storage devices?	2
15	Explain the function of CPU.	2
16	Briefly explain the working of refresh display and DVST.	2
17	Explain Hard copy device?	2
18	Explain Basic structure of Hardware?	2
19	Explain Memory Types and Storage Devices?	2
20	Explain different types of Pen Plotters?	2

Sl.NO	UNIT- 2 Questions	Blooms Level
1.	Explain different types of coordinate systems with a neat sketch.	2
2.	Define transformation geometry for rotation.	1
3.	Explain Anti-Aliasing Lines.	2
4	Explain Concatenated Transformation? Scale and Rotate a point (3 1) by scaling factor of 2 and Rotation angle of 45° .	2
5	Briefly explain the various graphic transformations required for manipulating the geometric information?	2
6	Explain Scaling and Rotation about origin	2
7	Explain the importance of clipping. Give the details of method used for line clipping?	2
8	Explain the method of back face removal. Give its advantages and disadvantages with reference to hidden line removal	2
9	Explain DDA Algorithm?	2
10	Explain Bresenham's Algorithm?	2
11	Explain Rotation about an Arbitrary Point?	2
12	Explain any two Hidden Surface Removal Algorithm?	2
13	What is concatenated Transformation and also Explain Homogeneous Representation?	2
14	Explain various 2D Transformations?	2
15	Discuss about reflection transformation. Explain reflection through a plane, line and a point.	2
16	Explain any one Clipping Techniques with pictorial representation?	2
17	Explain the Z-buffer algorithm for hidden surface removal.	2
18	Explain concept of Clipping with help of Cohen-Sutherland Clipping Algorithm in 2D and Sutherland-Hodgman Polygon – Clipping Algorithm in 2D.	2
19	Explain Mathematics of Projection and Z Buffer Algorithm?	2
20	Explain Homogeneous Representation and Derive transformation matrix for Rotation about an Arbitrary Point?	2

Sl.NO	UNIT-3 Questions	Blooms Level
1.	Identify various requirements for geometric modeling?	1
2.	Write short notes on display control facilities.	1
3.	Explain curve representation for a circle with implicit and parametric forms	2
4	Explain and give implicit and Parametric equations of any two Analytic curves?	2
5	Explain Parametric and Non Parametric Equations?	2
6	Explain Geometric Construction Models?	2
7	Explain Hermite Cubic Spline?	2
8	Explain Bezier Curve Representation?	2
9	Explain any one Synthetic Curve Representation?	2
10	Explain Bernestein Polynomials?	2
11	A cubic Bezier Curve is defined by the control points as (20,20), (60,80), (120,100) and (150,30). Find the equation of the curve and its midpoint.	3
12	Explain in brief various types of curves used in geometric modeling?	2
13	Explain in detail i) Ruled Surface ii) Coons Surface iii)Lofted Surface	2
14	Explain various Geometric Construction Methods?	2
15	Explain Wireframe entites?	2
16	Compare different Modelling Methods?	5
17	Explain Non uniform Rational B-Spline?	2
18	Explain i) Surface of Revolution ii)Ruled Surfaces	2
19	Explain any one synthetic surfaces?	2
20	Explain various Modelling Facilities Desired?	2

Sl.NO	UNIT-4 Questions	Blooms Level
1.	Explain Layers?	2
2.	Explain Basic Geometric Commands?	2
3.	Explain Various Display Control Commands?	2
4	List out various Basic Editing Commands. Explain Offset command?	1&2
5	Explain Dimensioning with a neat sketch?	2
6	What is the importance of layers in drafting? Explain with an example.	2
7	What are the various types of display control commands? Explain windowing and panning with a neat sketch.	2
8	Discuss about dimension families and explain about each command?	2
9	Discuss basic geometric commands in Auto cad.	2
10	What are display control commands, Explain ? and Discuss about basic editing commands?	2
11	Explain Constraint Based Modelling?	2
12	Explain with examples the following terms i) Chamfer ii)Rectangular Pattern iii)Circular Pattern iv) Offset	2
13	Explain the following facilities available for Modelling i) Line ii)Spline iii)Rectangle iv)Point, Hole Centre v) Polygon vi) Mirror	2
14	Explain the following facilities available for Modelling i) Extrude ii) Shell iii) Rib iv)Loft	2
15	Explain the following facilities available for Modelling i) Sweep ii)Fillet iii)Coil iv)Arc	2

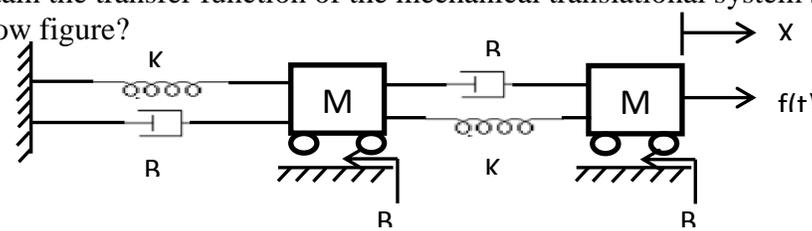
16	Explain the methods related to generation of ARC?	2
17	Explain the methods related to generation of Circle?	2
18	Differentiate between Copy and Mirror Commands?	4
19	Differentiate between MOVE and PAN Commands?	4
20	Explain different types of Array commands with neat sketch?	2

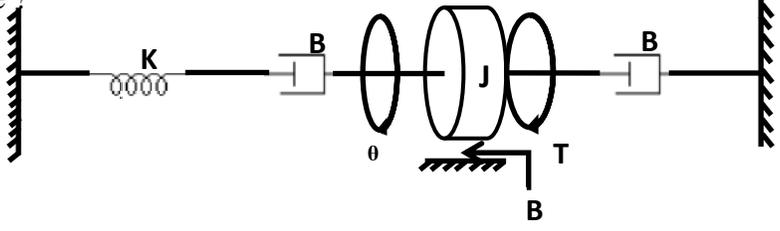
Subject: CONTROL THEORY- APPLICATION TO FLIGHT CONTROL SYSTEMS

QUESTION BANK

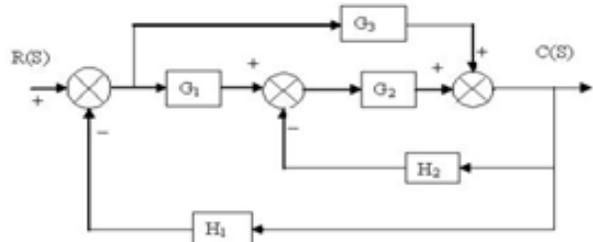
UNIT- I CONTROL SYSTEMS- MODELING, PERFORMANCE– TIME, FRQUENCY AND S-

DOMAIN DESCRIPTION

S.NO	QUESTIONS	BLOOMS LEVEL
1.	Explain control system?	2
2.	Define open loop control system	1
3.	Define closed loop control system.	1
4.	Write the force balance equations of ideal mass element, dashpot	1
5.	Write the analogous electrical elements in force- voltage analogy for one example	1
6.	Explain open loop & closed loop control systems by giving suitable Examples & also highlights their merits & demerits.	2
7.	Explain the difference between Open loop and Closed loop systems?	2
8.	Explain the classification of control systems?	2
9.	Explain the traffic control systems using open loop and closed loop systems?	2
10.	Explain the temperature control system using open loop and closed loop systems?	2
11.	Predict Human being is an example of closed loop system. Justify your answer?	2
12.	Explain advantages and disadvantages of open loop and closed loop systems?	2
13.	Obtain the transfer function of the mechanical translational system shown below figure? 	3

14.	Find the transfer function of mechanical rotational system for given below figure ? 	3
15.	Explain advantages and disadvantages of open loop and closed loop systems?	2
16.	The dynamic behavior of the system is described by the equation, $dC/dt+10C+40e$, where 'e' is the input and 'C' is the output. Determine the transfer function of the system?	3
17.	Find out the transfer function $C(s)/R(s)$ of a system having differential equation, $9\{d^2c(t)/dt^2\} + 12\{dc(t)/dt\}+c(t)=r(t)+2r(t-1)$.?	3
18.	Explain the position control with the suitable example?	2
19.	Explain the first and second order system?	2
20.	Explain the Fourier and Laplace transforms?	2

UNIT- II FEEDBACK CONTROL

S.NO	QUESTIONS	BLOOMS LEVEL
1.	Explain the concept of feedback control system?	2
2.	Explain the application of feedback control in stability augmentation and control augmentation?	2
3.	Explain the control system components – sensors, transducers, servomotors and actuators?	2
4.	Explain the synthesis of control system and describe how the blocks are reduced give an example?	2
5.	Find the transfer function of the system shown below? 	3

6.	Derive the time domain specifications? a) Rise time b) Peak time c) Settling time	2
7.	Define control system? Explain the effects of feedback in closed loop system?	1
8.	1) Derive the static error constants and list the disadvantages?	2
9.	2) How steady state error of a control system is determined? How it can be reduced?	2
10.	Sketch the Bode Plot(Magnitude Plot) for the transfer function $G(s)=s^2/(1+0.2s)(1+0.02s)$	2
11.	Explain the effects of feedback?	2
12.	Define steady state error and explain it ?	1
13.	Derive the types of errors?	1
14.	Define SISO and MIMO ?write the matrix form?	1
15.	Discuss the rules for reduction of block diagrams in feedback	2
16.	Derive the basic transfer function equation for unity feedback system?	2
17.	Explain synchro with neat sketch?	2
18.	What are the drawbacks of the block diagram reduction technique?	1
19.	Explain the need of mason's formula for any system reduction?	2
20.	Define various terms involved in signal flow graphs ?	1

UNIT- III SPECIFICATION OF CONTROL SYSTEM PERFORMANCE REQUIREMENTS- SYSTEM SYNTHESIS- CONTROLLERS- COMPENSATION TECHNIQUES

Sl No	Question	Level of Bloom Taxonomy
1	Explain the specification in frequency domain 's' domain?	2
2	Explain the procedure for designing of active and passive controllers?	2
3	Explain the adoptive control system and how is implemented in gain scheduling?	2
4	Explain the stability of closed loop system? Briefly explain root locus method of analysis and control?	2
5	Explain the design procedure of multi loop feedback system?	2
6	For a first order system, find out the output of the system when the input applied to the system is unit ramp input. Sketch the $r(t)$ and show the steady state error.	3
7	The open loop transfer function of a unity feedback system is given by $G(S) = k/s(1+0.25s)(1+0.4s)$. Find the restriction on K so that the closed loop system is absolutely stable.	3
8	For a unity feedback system having forward path transfer function $G(s) = K/s(1+0.6s)(1+0.4s)$. determine the (a) The range of value of k (b) Margin value of K, (c) Frequency of sustained oscillations.	2
9	Find out the stability of the system whose characteristics equation is $2s^4 + 5s^3 + 6s^2 + 8s + 20$.	2
10	Find the value of magnitude and angle asymptote of the system whose $G(s)H(s) = 20/(s+3)(s+5)$?	2
11	Explain the criteria for finding out the type and order of the system?	2
12	Differentiate between the first and second order system?	3
13	Explain the lead-lag and lead compensation technique?	2
14	Discuss the needs of compensation in control system?	3
15	Differentiate between the active and passive controllers?	3
16	Explain the stability criteria as per the location of poles and zeros?	2
17	Explain the routh's criteria in stability determination?	2
18	Find out the stability of a system by routh's array method whose characteristics equation is given by $s^5 + 2s^4 + 5s^3 + 6s^2 + 8s + 20$.	4

19	Explain the time constant for second order system?	
20	Find out the time constant of a system whose T.F. is $40/s^2+8s+40$.	

UNIT-IV AIRCRAFT RESPONSE TO CONTROLS- FLYING QUALITIES- STABILITY AND CONTROL AUGMENTATION- FLY BY WIRE CONTROL

Sl No	Question	Level of Bloom Taxonomy
1	Explain aircraft transfer function? And an idea about control surface actuators?	2
2	Define the control task of the pilot?	1
3	Explain the need for automatic control system?	2
4	Explain the flying qualities of aircraft relation to airframe transfer function?	2
5	Explain the flying quality requirements for pole-zero function?	2
6	Demonstrate the displacement auto-pilot for roll movement with block diagram?	3
7	Define aircraft dynamics to aircraft control?	1
8	Explain the different actuators are used in flying control surfaces?	2
9	Discuss the automated flying control?	3
10	Explain the control augmentation system?	2
11	Discuss the stability augmentation system for aircraft control?	3
12	Explains the fly-by-wire system of an aircraft?	2
13	Differentiate between reversible and irreversible control of an aircraft?	4
14	Explain the flying control task as input and output control system?	2
15	Discuss the requirement of artificial feel on control sticks?	3

16	Explain the uses of control surface relation to the aircraft control axis?	2
17	Describe the function of rate gyro in autopilot system?	3
18	Explain the different force moments acting on the aircraft axis of rotations?	2
19	Explain the requirements of different controllers used in autopilot mode?	2
20	Explain the different criteria to be considered in autopilot mode?	2

EAD

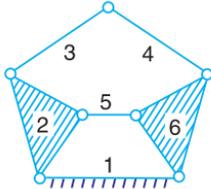
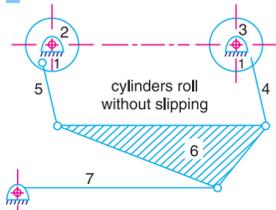
Question no	Questions for EXPERIMENTAL AERODYNAMICS (EAD)	Blooms taxonomy level
1 unit 1	Explain about Model testing using examples?	2
2	Explain forms of aerodynamic experiments?	2
3	Explain the scaling laws with its significance?	2
4	Explain about Benjamin whirling arm concepts?	2
5	Derive area- velocity relation using governing equation?	3
6	Explain with neat sketch components of closed type wind tunnel?	2
7	Explain wind tunnel working principle and its implementation?	2
8	Explain with neat sketch open type wind tunnel with merits and demerits?	2
9	Describe the measurement and observation in the wind tunnel?	3
10	Explain Buckingham pi theorem?	2
11	Explain the Bernoulli's equation and implementation?	2
12	Draw a neat sketch of open type and closed type with merits and demerits?	2
13	Explain Bernoulli principle and its implementation in wind tunnel?	2
14	Explain the sources of drag in wind tunnel?	2
15	Explain about the flow similarities using examples?	2
16	Explain the importance of Reynolds no in wind tunnel experiments?	2
17	Explain about Froude no in wind tunnels experiments?	2
18	List out the forms of aerodynamic experiments with its importance?	2
19	Explain the wright brother's creation towards the wind tunnel?	2
20	Explain briefly George Cayley creation and mistakes with ancient wind tunnels?	2

1	unit 2	Explain about low speed wind tunnel with sketch?
2		Explain briefly about shock tube?
3		Compare and differentiate transonic wind tunnel with low turbulence wind tunnel?
4		Explain about low speed wind tunnel and its relative advantage and disadvantages
5		compare and differentiate hypersonic wind tunnel with high Reynolds no wind tunnel
6		explain briefly about supersonic wind tunnel and its relative merits and demerits
7		Explain special wind tunnel with 1 example?
8		Explain different types of loads on environmental wind tunnel?
9		Explain high Reynolds no wind tunnel with its merits and demerits?
10		Explain low turbulence wind tunnel with its merits and demerits?
11		Explain v/stol wind tunnel concepts?
12		Describe the types of high speed wind tunnel with its merits?
13		explain the types of wind tunnel with its merits and demerits?
14		explain about automobile wind tunnel with its merits and demerits?
15		Explain about closed circuit wind tunnel with neat sketch?
16		Explain about static loads on building in environmental wind tunnel?
17		explain about the dynamic loads on building in environmental wind tunnel
18		Explain flow properties after and before the shock in the shock tube?
19		Describe the process of flow in the hypersonic wind tunnel with neat sketch?
20		Describe the wind tunnel facilities in India?
01	unit 3	Explain about contraction cone and its loss coefficient?
2		Explain about corners and its loss coefficient?

3	Explain about working of test section with its loss coefficient?	2
4	Explain about wind tunnel constraints?	2
5	Explain about diffusers and its loss coefficient?	2
6	Explain about wind tunnel flow quality with comments?	2
7	Explain about fan straightner with its loss coefficient?	2
8	Explain pressure variation around wind tunnel?	2
9	Explain about wind tunnel design construction?	2
10	Explain principal components of closed circuit wind tunnel with neat sketch?	2
11	Explain about test section flow quality?	2
12	Explain the straighter and its loss coefficient?	2
13	Explain about honey comb screens and its loss coefficient?	2
14	Explain about turbulent screen control and its loss coefficient?	2
15	Describe about motor function and design requirements?	2
16	Explain power losses in wind tunnel?	2
17	Define the power inputs for the wind tunnel and its losses?	2
18	Explain about the screens and its losses coefficient?	2
19	Explain the loss coefficient for any 2 wind tunnel components?	2
20	Draw a neat sketch of closed and open type wind tunnel with labels?	2
1 unit 4	Explains sources of inaccuracies with example?	2
2	Explain the streamline curvature for 2 –D flows?	2
3	Explain about streamline curvature for 3-D flows?	2
4	Explain about downwash correction?	2
5	Explain about solid blockage using 2-D flow?	2
6	Explain about zero-lift drag?	2
7	Explain about wake blockage for 3-d flows?	2
8	Explain about total correction on airspeed?	2
9	Explain the buoyancy force in sources of inaccuracies?	2
10	Explain the effect of dynamic pressure in the	2

	correction of wind tunnel?	
11	Estimate the stream line curvature and its causes?	3
12	Explain briefly correction in the wind tunnel?	2
13	Derive the solid blockage using 3d flows?	3
14	Explain the wake blockage using 2d flows?	2
15	Estimate the stream line curvature for 3d flows?	3
16	Explain the boundary layer formation at the corners?	
17	Explain the pressure gradient in the formation of flow separation?	2
18	Explain the flow separation around the model wake?	2
19	Describe the correction methods for wind tunnel?	2
20	Explain the downwash in wake of the model?	2

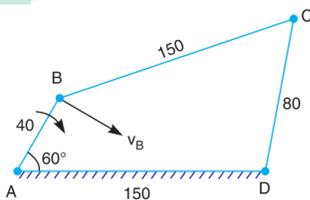
Mechanisms and Mechanical Design
Questions for I-MID AY 2015-2016
Unit I

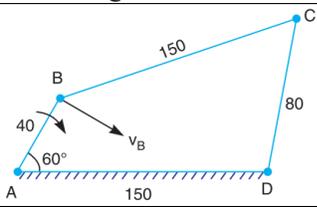
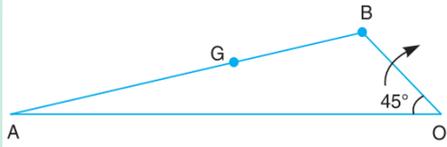
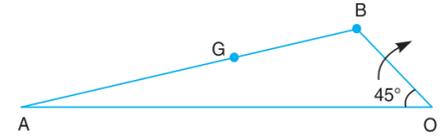
S No	Question	Blooms Level
1.	Determine the mobility (degrees of freedom) of the mechanism shown in Fig 	Evaluate
2.	Sketch and explain the various inversions of a slider crank chain	Understand
3.	Determine the mobility (degrees of freedom) of the mechanism shown in Fig 	Evaluate
4.	Identify and explain the kinematic chains to which the Elliptical trammels mechanism belongs	Understand
5.	Identify and explain the kinematic chains to which the Whitworth quick return motion mechanism belongs	Understand
6.	Identify and explain the kinematic chains to which the Beam engine mechanism belongs	Understand
7.	Identify and explain the kinematic chains to which the Steam engine mechanism belongs	Understand
8.	What is the significance of degrees of freedom of a kinematic chain when it functions as a mechanism? Give examples	Understand
9.	Differentiate a mechanism and a machine?	Understand
10.	Describe the four bar chain mechanism. Why it is considered to be the basic chain?	Remember
11.	Show that slider crank mechanism is a modification of the basic four bar mechanism	Apply
12.	Examine various inversions, stating actual machines in which these are used in practice	Apply
13.	Explain the working of Withworth quick return mechanisms. Give application of it.	Understand
14.	Explain the term kinematic link. Give the classification of kinematic link	Understand

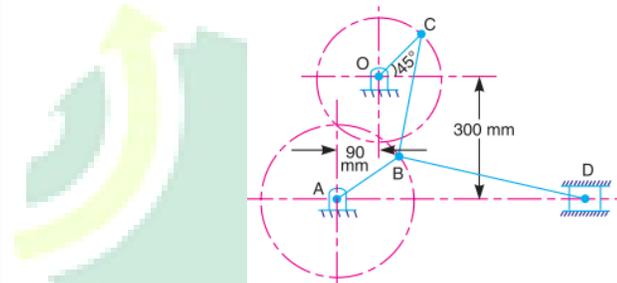
S No	Question	Blooms Level
15.	What is a machine? Giving example, differentiate between a machine and a structure	Understand
16.	Write notes on completely and incompletely constraints in lower and higher pairs, illustrate your answer with neat sketches	Remember
17.	Explain different kinds of kinematic pairs giving example for each one of them	Understand
18.	Explain the terms Lower pair and Higher pair	Understand
19.	Write short notes on Inversion of Mechanism	Remember
20.	Explain the terms Kinematic chain and Kinematic pair	Understand

Unit- II

S No	Question	Blooms Level
1.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the slider A . The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Calculate Acceleration of connecting rod AB	Apply
2.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the slider A . The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Calculate Velocity of B with respect to O using Graphical Method	Apply
3.	In a four bar chain $ABCD$, AD is fixed and is 150 mm long. The crank AB is 40mm long and rotates at 120 r.p.m. clockwise, while the link $CD = 80$ mm oscillates about D . BC and AD are of equal length. Determine the angular velocity of link CD when angle $BAD = 60^\circ$	Evaluate
4.	In a four bar chain $ABCD$, AD is fixed and is 150 mm long. The crank AB is 40mm long and rotates at 120 r.p.m. clockwise, while the link $CD = 80$ mm oscillates about D . BC and AD are of equal length. Determine the velocity of link C with respect to A when angle $BAD = 60^\circ$	Evaluate



S No	Question	Blooms Level
		
5.	In a slider crank mechanism, the length of the crank and connecting rod are 150 mm and 675 mm respectively. The crank position is 60° from inner dead centre. The crank shaft speed is 300 r.p.m. clockwise. Using Klein's construction, Determine Acceleration of Slide	Evaluate
6.	In a slider crank mechanism, the length of the crank and connecting rod are 150 mm and 675 mm respectively. The crank position is 60° from inner dead centre. The crank shaft speed is 300 r.p.m. clockwise. Using Klein's construction, Determine Velocity of Slide	Evaluate
7.	Describe the method to find the acceleration of a point on a link whose direction (or path) is known and the velocity of some other point on the same link in magnitude and direction is given	Remember
8.	Define rubbing velocity at a pin joint. What will be the rubbing velocity at pin joint when the two links move in the same and opposite directions	Remember
9.	Explain how the velocities of a slider and the connecting rod are obtained in a slider crank mechanism	Understand
10.	Explain Relative Velocity with neat sketch	Understand
11.	<p>The engine mechanism shown in Fig. has crank OB = 50 mm and length of connecting rod AB 225 mm. The centre of gravity of the rod is at G which is 75 mm from B. The engine speed is 200 r.p.m. Calculate Velocity of point A with respect to O</p> 	Apply
12.	<p>The engine mechanism shown in Fig. has crank OB = 50 mm and length of connecting rod AB 225 mm. The centre of gravity of the rod is at G which is 75 mm from B. The engine speed is 200 r.p.m. Calculate Velocity of point G with respect to O</p> 	Apply
13.	In a pin jointed four bar mechanism ABCD, the lengths of various links are as follows: AB = 25 mm; BC = 87.5 mm; CD =	Evaluate

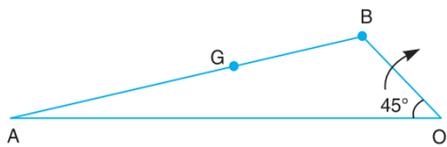
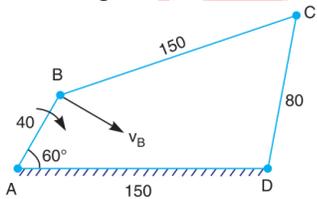
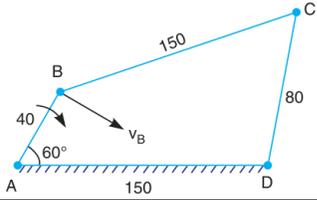
S No	Question	Blooms Level
	50 mm and AD = 80 mm. The link AD is fixed and the angle BAD = 135°. If the velocity of B is 1.8 m/s in the clockwise direction, Determine Velocity at the midpoint of BC, and	
14.	In a pin jointed four bar mechanism ABCD, the lengths of various links are as follows: AB = 25 mm; BC = 87.5 mm; CD = 50 mm and AD = 80 mm. The link AD is fixed and the angle BAD = 135°. If the velocity of B is 1.8 m/s in the clockwise direction, Determine Angular velocity of link CB	Evaluate
15.	In a four bar chain ABCD, link AD is fixed and the crank AB rotates at 10 radians per second clockwise. Lengths of the links are AB = 60 mm; BC = CD = 70 mm; DA = 120 mm. When angle DAB = 60° and both B and C lie on the same side of AD, Determine Angular velocity of BC	Evaluate
16.	In a four bar chain ABCD, link AD is fixed and the crank AB rotates at 10 radians per second clockwise. Lengths of the links are AB = 60 mm; BC = CD = 70 mm; DA = 120 mm. When angle DAB = 60° and both B and C lie on the same side of AD, Calculate Velocity of C with respect to B	Evaluate
17.	In the toggle mechanism, as shown in Fig., D is constrained to move on a horizontal path. The dimensions of various links are: AB = 200 mm; BC = 300 mm; OC = 150 mm; and BD = 450mm. The crank OC is rotating in a counter clockwise direction at a speed of 180 r.p.m., increasing at the rate of 50 rad/s. Determine Velocity of D. 	Evaluate
18.	In the toggle mechanism, as shown in Fig., D is constrained to move on a horizontal path. The dimensions of various links are: AB = 200 mm; BC = 300 mm; OC = 150 mm; and BD = 450mm. The crank OC is rotating in a counter clockwise direction at a speed of 180 r.p.m., increasing at the rate of 50 rad/s. Determine Angular velocity of BD	Evaluate

S No	Question	Blooms Level
19.	<p>The mechanism, as shown in Fig., has the dimensions of various links as follows: $AB = DE = 150$ mm; $BC = CD = 450$ mm; $EF = 375$ mm. The crank AB rotates in the clockwise direction at a uniform speed of 120 r.p.m. The lever DC oscillates about the fixed point D, which is connected to AB by the coupler BC. Determine: Velocity of the block F</p>	Evaluate
20.	<p>The mechanism, as shown in Fig., has the dimensions of various links as follows: $AB = DE = 150$ mm; $BC = CD = 450$ mm; $EF = 375$ mm. The crank AB rotates in the clockwise direction at a uniform speed of 120 r.p.m. The lever DC oscillates about the fixed point D, which is connected to AB by the coupler BC. Determine: Angular Velocity of the block F</p>	Evaluate

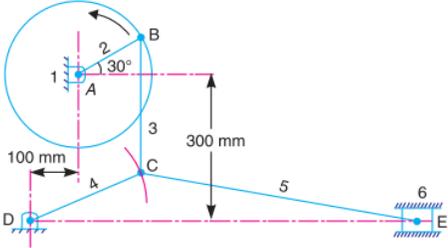
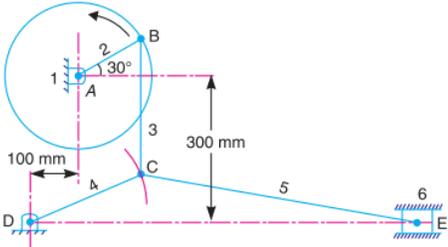
UNIT-III

S No	Question	Blooms Level
1.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the	Evaluate

S No	Question	Blooms Level
	slider A. The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Determine: Velocity of the slider A using Instantaneous Centre method	
2.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the slider A. The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Determine: Velocity of the point G using Instantaneous Centre method	Evaluate
3.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the slider A. The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Determine: Angular Velocity of the connecting rod AB using Instantaneous Centre method	Evaluate
4.	Describe the Instantaneous Centre method to find the velocity of a point on a link whose direction (or path) is known and the velocity of some other point on the same link in magnitude and direction is given	Remember
5.	Define instantaneous Centre	Remember
6.	Define Centrode and Axodes	Remember
7.	Differentiate between body and space Centrodes	Understand
8.	List out the properties of instantaneous centres	Remember
9.	Explain types of Instantaneous Centres	Understand
10.	Explain. What do you understand by the instantaneous centre of rotation (Centro) in kinematic of machines? Answer briefly	Understand
11.	Explain, with the help of a neat sketch, the space Centrode and body Centrode	Understand
12.	Write the relation between the number of instantaneous centres and the number of links in a mechanism	Remember
13.	State and Prove the 'Aronhold Kennedy's Theorem' of three instantaneous centres	Remember
14.	In a slider crank mechanism, the length of crank OB and connecting rod AB are 125 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from the slider A. The crank speed is 600 r.p.m. clockwise. When the crank has turned 45° from the inner dead centre position, Determine: Velocity of the point G using Aronhold Kennedy's Theorem	Evaluate

S No	Question	Blooms Level
15.	<p>The engine mechanism shown in Fig. 8.38 has crank $OB = 50$ mm and length of connecting rod $AB = 225$ mm. The centre of gravity of the rod is at G which is 75 mm from B. The engine speed is 200 r.p.m. calculate Velocity of point A using Instantaneous Centre method</p> 	Apply
16.	<p>In a four bar chain $ABCD$, link AD is fixed and the crank AB rotates at 10 radians per second clockwise. Lengths of the links are $AB = 60$ mm; $BC = CD = 70$ mm; $DA = 120$ mm. When angle $DAB = 60^\circ$ and both B and C lie on the same side of AD, Determine Angular velocity of BC using Instantaneous Centre Method</p>	Evaluate
17.	<p>In a four bar chain $ABCD$, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link $CD = 80$ mm oscillates about D. BC and AD are of equal length. Determine the velocity of link C with respect to A when angle $BAD = 60^\circ$ using instantaneous Centres</p> 	Evaluate
18.	<p>In a four bar chain $ABCD$, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link $CD = 80$ mm oscillates about D. BC and AD are of equal length. Determine the Angular Velocity of link C with respect to A when angle $BAD = 60^\circ$ using instantaneous Centres</p> 	Evaluate
19.	<p>Locate all the instantaneous centres of the mechanism as shown in Fig. The lengths of various links are : $AB = 150$ mm ; $BC = 300$ mm; $CD = 225$ mm ; and $CE = 500$ mm. When the crank AB rotates in the anticlockwise direction at a uniform speed of 240 r.p.m. Calculate Velocity of the slider E</p>	Apply



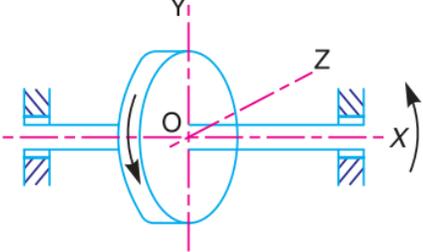
S No	Question	Blooms Level
		
20.	<p>Locate all the instantaneous centres of the mechanism as shown in Fig. The lengths of various links are : $AB = 150 \text{ mm}$; $BC = 300 \text{ mm}$; $CD = 225 \text{ mm}$; and $CE = 500 \text{ mm}$. When the crank AB rotates in the anticlockwise direction at a uniform speed of 240 r.p.m. Calculate Angular Velocity of the links BC and CE.</p> 	Apply

UNIT-IV

S No	Question	Blooms Level
1.	Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn	Understand
2.	Explain the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft	Understand
3.	Each road wheel of a motor cycle has a mass moment of inertia of 1.5 kg-m^2 . The rotating parts of the engine of the motor cycle have a mass moment of inertia of 0.25 kg-m^2 . The speed of the engine is 5 times the speed of the wheels and is in the same sense. The mass of the motor cycle with its rider is 250 kg and its centre of gravity is 0.6 m above the ground level. Calculate the angle of heel if the cycle is travelling at 50 km / h and is taking a turn of 30 m radius. The wheel diameter is 0.6 m	Apply
4.	A racing motor cyclist travels at 140 km/h round a curve of 120 m radius measured horizontally. The cycle and rider have mass of 150 kg and their centre of gravity lies at 0.7 m above the ground level when the motor cycle is vertical. Each wheel is 0.6 m in diameter and has moment of inertia about its axis of rotation 1.5 kg-m^2 . The engine has rotating parts whose moment of inertia about their axis of rotation is 0.25 kgm^2 and it rotates at five times the wheel speed in the same direction. Calculate The correct angle of banking of the track so that there is no tendency to side slip.	Apply
5.	A racing car weighs 20 kN. It has a wheel base of 2 m, track width 1 m and height of C.G. 300 mm above the ground level and lies midway between the front and rear axle. The engine flywheel rotates at 3000 r.p.m. clockwise when viewed from the front. The moment of inertia of the flywheel is 4 kg-m^2 and moment of inertia of each wheel is 3 kg-m^2 . Calculate the reactions between the wheels and the ground when the car takes a curve of 15 m radius towards right at 30 km/h, taking into consideration the gyroscopic effect. Each wheel radius is 400 mm	Apply
6.	Write a short note on gyroscopes	Remember
7.	Explain gyroscopic couple? Derive a formula for its magnitude	Understand
8.	Explain the application of gyroscopic principles to aircrafts	Understand
9.	Describe the gyroscopic effect on sea going vessels	Remember
10.	Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve	Understand
11.	Explain Terms Spinning axis, Precession axis and Output axis for	Understand

S No	Question	Blooms Level
	a Gyroscope	
12.	A racing motor cyclist travels at 140 km/h round a curve of 120 m radius measured horizontally. The cycle and rider have mass of 150 kg and their centre of gravity lies at 0.7 m above the ground level when the motor cycle is vertical. Each wheel is 0.6 m in diameter and has moment of inertia about its axis of rotation 1.5 kg-m^2 . The engine has rotating parts whose moment of inertia about their axis of rotation is 0.25 kgm^2 and it rotates at five times the wheel speed in the same direction. Calculate the correct angle of inclination of the cycle and rider to the vertical	Apply
13.	A flywheel of mass 10 kg and radius of gyration 200 mm is spinning about its axis, which is horizontal and is suspended at a point distant 150 mm from the plane of rotation of the flywheel. Determine the angular velocity of precession of the flywheel. The spin speed of flywheel is 900 r.p.m	Evaluate
14.	A horizontal axle AB, 1 m long, is pivoted at the mid point C. It carries a weight of 20 N at A and a wheel weighing 50 N at B. The wheel is made to spin at a speed of 600 r.p.m in a clockwise direction looking from its front. Assuming that the weight of the flywheel is uniformly distributed around the rim whose mean diameter is 0.6 m, Calculate the angular velocity of precession of the system around the vertical axis through C	Apply
15.	Each paddle wheel of a steamer has a mass of 1600 kg and a radius of gyration of 1.2 m. The steamer turns to port in a circle of 160 m radius at 24 km/h, the speed of the paddles being 90 r.p.m. Calculate the magnitude and effect of the gyroscopic couple acting on the steamer	Apply
16.	The rotor of the turbine of a yacht makes 1200 r.p.m. clockwise when viewed from stern. The rotor has a mass of 750 kg and its radius of gyration is 250 mm. Calculate the maximum gyroscopic couple transmitted to the hull (body of the yacht) when yacht pitches with maximum angular velocity of 1 rad /s.	Apply
17.	Explain the effect of couple when yacht pitches up	Understand
18.	Define Precession in Gyroscopes	Remember
19.	A uniform disc of 150 mm diameter has a mass of 5 kg. It is mounted centrally in bearings which maintain its axle in a horizontal plane. The disc spins about its axle with a constant speed of 1000 r.p.m. while the axle precesses uniformly about the vertical at 60 r.p.m. The directions of rotation are as shown in Fig. If the distance between the bearings is 100 mm, Calculate the resultant reaction at each bearing due to the mass and gyroscopic effects.	Apply



S No	Question	Blooms Level
		
20.	Explain Working of Gyroscopes with neat Sketch.	Understand

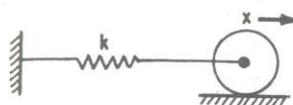
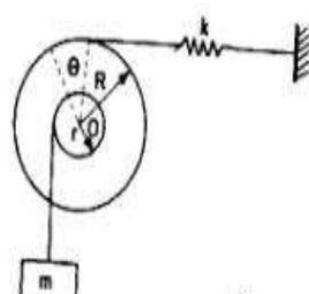
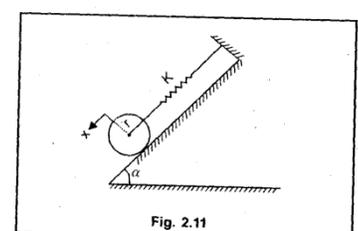


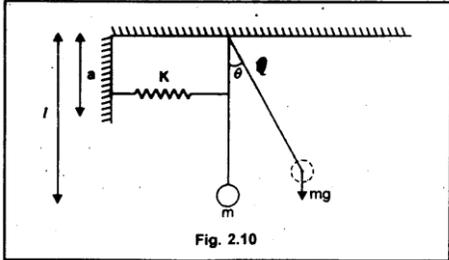
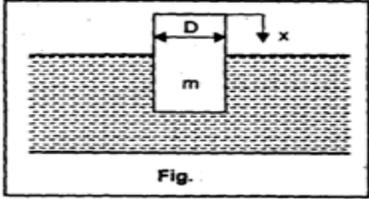
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I MID Part Exam

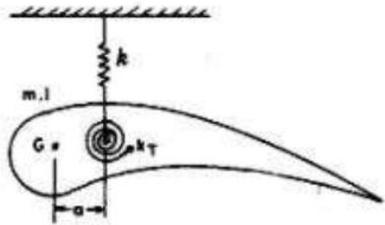
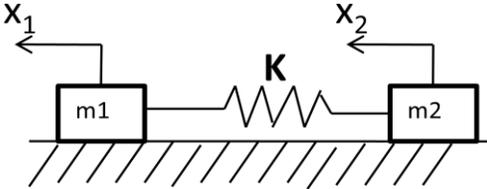
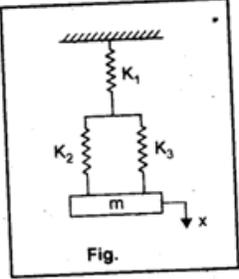
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Year & Sem : IV- I

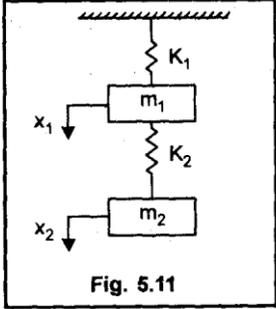
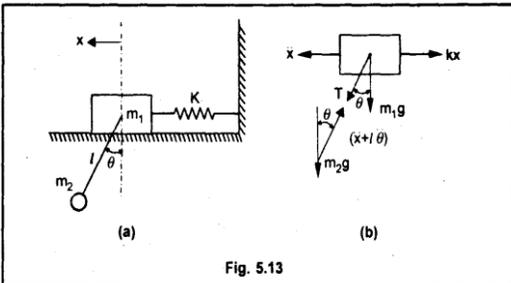
UNIT-I			
Slno	Question	Blooms	Level
1	<p>Calculate its natural frequency by using Newton's second law method.</p> 	Apply	III
2	<p>Calculate the natural frequencies by Newton's methods of analysis</p>	Apply	III
3	<p>Calculate the natural frequencies by Rayleigh methods of analysis</p>	Apply	III
4	<p>Calculate the natural frequency of the system as shown in fig.</p> 	Apply	III
5	<p>Calculate the natural frequency of the system shown in Fig.</p>  <p style="text-align: center;">Fig. 2.11</p>	Apply	III
6	<p>Calculate the natural frequency of spring controlled simple pendulum as shown in Fig.</p>	Apply	III

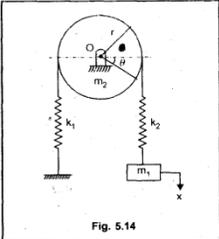
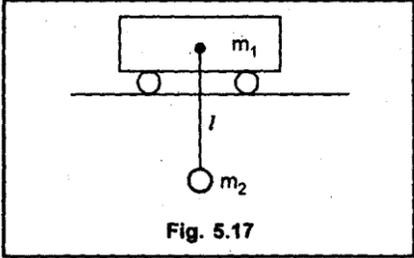
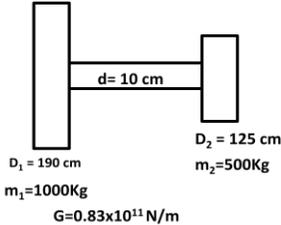
	 <p style="text-align: center;">Fig. 2.10</p>		
7	<p>A cylinder of diameter D and mass m floats vertically in a liquid of mass density ρ as shown in Fig. Calculate the natural frequency</p>  <p style="text-align: center;">Fig.</p>	Apply	III
8	Derive the relation for natural frequency of the simple pendulum.	Apply	III
9	Explain Concept of Vibration		
10	Calculate the natural frequencies by Energy methods of analysis	Apply	III
11	Classify different types of vibrations	Analyze	IV
12	How does a continuous system differ from a discrete system in the nature of its equation of motion?	Understand	II
13	Derive the relation for natural frequency of torsional vibrations.	Apply	III
14	The natural frequency of a spring-mass system is 20 Hz and when extra 3 kg mass is attached to its mass the natural frequency reduces by 4 Hz. Determine the mass and stiffness of the system.	Apply	III
15	A spring-mass system has a time period of 0.25 sec. What will be the new time period if the spring constant is increased by 30%? .	Understand	II
16	A car is having a mass of 1000 kg and its spring gets deflected 3 cm under its own load. Calculate the natural frequency of car in vertical direction.	Apply	III
17	Derive the expression for the forced Vibration	Apply	III
18	Derive the logarithmic decrement	Apply	III
19	Derive the damped natural frequency		
20	The disc of torsional pendulum has moment of inertia 600kg-cm^2 and is immersed in a viscous fluid. The brass	Apply	III

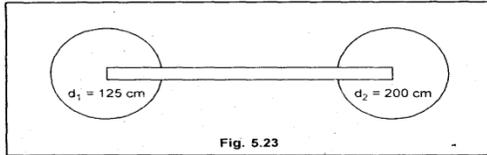
	shaft attached to it is of 10cm dia and 40cm long. When the pendulum vibrating the observed amplitudes on same sides of the rest position for successive cycles are 9,6,4 degrees. Calculate a) logarithmic decrement b) damping torque at unit velocity c) the periodic time of vibrations where $G= 4.4 \times 10^{10} \text{N/m}^2$		
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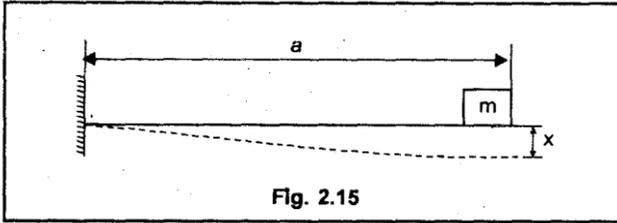
UNIT-II

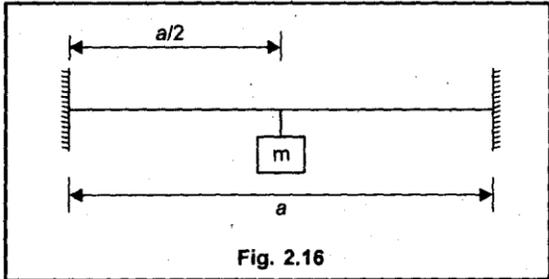
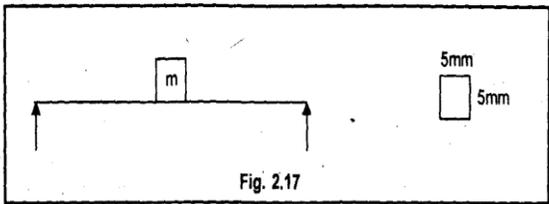
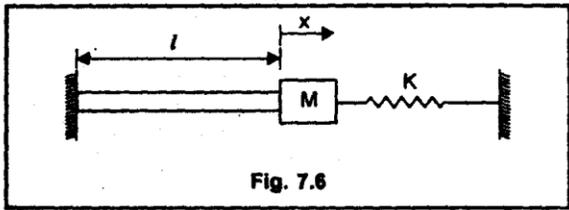
Slno	Question	Blooms	Level
1	Explain the two degree of freedom systems with help of neat sketches.	Understand	II
2	An aerofoil wing in its bending and torsional modes shown in fig. where k is a translational spring stiffness and torsional stiffness k_t in write the equation of motion and calculate the two natural frequencies .Assume $k=5 \times 10^3 \text{N/m}$ and $k_t=0.4 \times 10^3 \text{N.m / rad}$. $m=5\text{kg}$ and $I=0.12 \text{kg-m}^2$, $a=0.1\text{m}$. 	Apply	III
3	Derive the expressions of the semi-definite system as shown in fig. 	Apply	III
4	A mass is suspended from a spring system as shown in figure. Calculate the natural frequency of the system. 	Apply	III
5	Calculate the natural frequencies of such system with dynamic coupling.	Apply	III
6	Prove that spring force of the absorber system is equal and opposite to the excitation force for main system to be	Analyze	IV

	stationary.		
7	Discuss the effect of mass ratio on natural frequency of the vibration absorber.	Understand	II
8	<p>Calculate the two natural frequencies of vibration and the ratio of the amplitudes of motion of mass m_1 and m_2 for the system shown in Fig.</p>  <p style="text-align: center;">Fig. 5.11</p>	Apply	III
9	<p>A vibratory system performs the motions as expressed by the following equations. If the system is turned through 1.5 radians and released, Calculate the frequencies and mode shapes</p> $\ddot{x} + 800x + 90\theta = 0$ $\ddot{\theta} + 800\theta + 90x = 0$	Apply	III
10	<p>A machine runs at 5000 rpm. Its forcing frequency is very near to its natural frequency. Calculate the nearest frequency of the machine is at least 20% from the forced frequency, design a suitable vibration absorber for the system. Assume the mass of the machine as 30 kg.</p>	Apply	III
11	Explain about two and three degree of freedom system with neat sketches	Understand	II
12	<p>Calculate the frequencies of the system shown in Fig.</p>  <p style="text-align: center;">Fig. 5.13</p>	Apply	III
13	Calculate the natural frequencies of the there is no slip between cord and cylinder system shown in Fig. Assume that	Apply	III

	<p>Given :</p> $k_1 = 40 \text{ N/m}$ $k_2 = 60 \text{ N/m}$ $m_1 = 2 \text{ kg}$ $m_2 = 10 \text{ kg}$	 <p style="text-align: center;">Fig. 5.14</p>		
14	<p>Calculate the natural frequency of the system shown in Fig.</p>	 <p style="text-align: center;">Fig. 5.17</p>	Apply	III
15	<p>Explain the concept of vibration absorber.</p>	Understand	II	
16	<p>Calculate the natural frequency of the torsional vibrations of two rotors having length of shaft is 100cm as shown in fig</p>	 <p style="text-align: center;"> $d = 10 \text{ cm}$ $D_1 = 190 \text{ cm}$ $m_1 = 1000 \text{ Kg}$ $D_2 = 125 \text{ cm}$ $m_2 = 500 \text{ Kg}$ $G = 0.83 \times 10^{11} \text{ N/m}$ </p>	Apply	III
17	<p>Derive the expression for undamped two DOF system.</p>	Apply	III	
18	<p>Distinguish between a vibration absorber and a vibration isolator?</p>	Understand	II	
19	<p>Calculate the natural frequency of a shaft of diameter 10 cm and length 300 cm carrying two discs of diameters 125 cm and 200 cm respectively at its ends and weighing 480 N and 900 N respectively. Modulus of the rigidity of the shaft may be taken as $2 \times 10^{11} \text{ N/m}^2$.</p>	Apply	III	

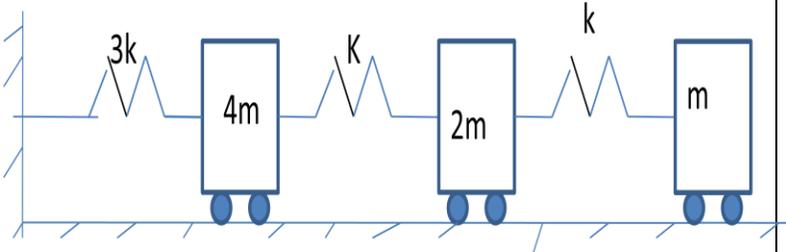
	 <p style="text-align: center;">Fig. 5.23</p> <p> $l = 300 \text{ cm} = 3 \text{ m}$ $d = 10 \text{ cm} = 0.1 \text{ m}$ $w_1 = 480 \text{ N}$ $w_2 = 900 \text{ N}$ $C = 2 \times 10^{11} \text{ N/m}^2$ </p>		
20	Write the equation of motion for static and dynamic coupling	Remember	I

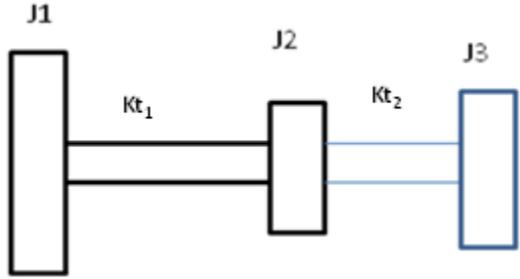
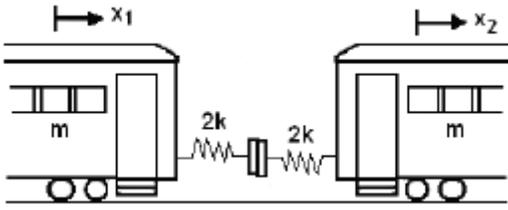
UNIT-III			
Slno	Question	Blooms	Level
1	Derive the general solution for lateral vibrations of the string.	Apply	III
2	Write the advantages of vibration	Remember	I
3	Define Degree of freedom	Remember	I
4	List out different methods of find natural frequencies in vibration analysis	Remember	I
5	Describe about the Multi degree of freedom system.	Understand	II
6	Prove the Maxwell's reciprocal theorem with help of simply supported beams	Apply	III
7	Describe about the boundary conditions for various types of beams.	Understand	II
8	Obtain the wave equation of motion for the transverse vibrations of beam.	Apply	III
9	A cantilever beam of negligible mass is loaded with mass $4m'$ at the free end. Calculate the natural frequency of the mass sm' .	Apply	III
 <p style="text-align: center;">Fig. 2.15</p>			
10	Derive the frequency equation for longitudinal vibrations of	Apply	III

	bars		
11	<p>Calculate the natural frequency of the system as shown in figure.</p>  <p style="text-align: center;">Fig. 2.16</p>	Apply	III
12	<p>Derive the frequency equation for longitudinal vibrations for a free-free beam with zero initial displacement</p>	Apply	III
13	<p>A simply supported beam of square cross section 5 mm x 5 mm and length 1 m, carrying a mass of 2.3 kg at the middle, is found to have a natural frequency of transverse vibrations of 30 rad/s. Calculate the Young's modulus of elasticity of the beam.</p> <p>Ans.</p>  <p style="text-align: center;">Fig. 2.17</p>	Apply	III
14	<p>Derive suitable expression for longitudinal vibrations for a uniform cross-section bar of length 'l' fixed at one end and free at the other end</p>	Apply	III
15	<p>Explain various types of continuous systems.</p>	Understand	II
16	<p>Calculate the natural frequency of a bar shown in Fig.</p>  <p style="text-align: center;">Fig. 7.6</p>	Apply	III

17	Explain about continuous vibrations with boundary conditions	Understand	II
18	Distinguish between discrete system and continuous systems	Understand	II
19	Define semi-definite system	Remember	I
20	Obtain the wave equation of motion for the torsional vibrations of rod or shaft	Apply	III

UNIT-IV

Sln o	Question	Blooms	Leve 1
1	Describe about the multi rotor system.	Understand	II
2	Derive the expressions of the undamped systems and mode shapes.	Apply	III
3	Explain several degrees of freedom vibrating systems with the help of an example.	Understand	II
4	Explain the concept of influence coefficients.	Understand	II
5	Explain the equivalent stiffness concept.	Understand	II
6	Write the equation of motion for 2DOF torsional vibrations	Remember	I
7	Calculate the response of spring mass damper system to an step input and the plot the system response for different amounts of damping.	Apply	III
8	Define 'Normal mode of vibration	Remember	I
9	Define two degree of freedom systems	Remember	I
10	<p>Calculate the three natural frequencies and draw the corresponding mode shapes as shown in fig</p> 	Apply	III
11	Define vibration isolator	Remember	I

12	<p>Calculate the natural frequencies and draw the corresponding mode shapes of the multi rotor system as shown in fig.</p> 	Apply	III
13	<p>Draw the mode shapes for two rotor system</p>	Remember	I
14	<p>Define transmissibility.</p>	Remember	I
15	<p>An electrical train made of two cars each of mass 2000 kg is connected by couplings of stiffness equal to 40×10^6 N/m, as shown in figure. Calculate the natural frequency of the system.</p> 	Apply	III
16	<p>List out the disadvantages of dynamic vibration absorber</p>	Remember	I
17	<p>Write the equation of motion for 2DOF undamped vibrations</p>	Remember	I
18	<p>Explain maxwell's reciprocal theorem with the help of simple supported beam with two concentrated loads.</p>	Understand	II
19	<p>Derive the orthogonality principle of normal modes for longitudinal vibrations of uniform bars</p>	Apply	III
20	<p>Explain The Concept Of Equilibrium</p>	Understand	II

IV B.TECH I SEM COMPUTER SCIENCE & ENGINEERING
COMPUTER GRAPHICS
MID I QUESTION BANK

UNIT - I

1. Draw the cross-sectional diagram of a CRT device. Identify the major components and discuss their roles.
2. Discuss the operation of Random scan System with a neat sketch
3. Distinguish between the Raster scan system & Random scan system
4. Discuss the Flat-Panel Display devices.
5. List the different Input devices .What are the applications.
6. Distinguish the merits and limitations of the video display devices.
7. What are the major components of CRT device? Explain their role in the graphical display.
8. Explain the design issues in color CRT monitors.
9. Distinguish between CRT monitors and direct view storage tube (DVST) devices.
10. Explain the terms
 - i. Frame buffer
 - ii. Resolution
11. Write a short note on a) KeyBoard b) Mouse c) Track ball and Spaceball d) Joystick e) Digitizer f) Light Pen g) Touch Panels h) Scanner i) Data glove.
12. Write a short notes on a) Cathode-Ray tubes b) Raster scan Display.
13. Write a short notes on graphics monitors and work stations.
14. Explain the function of Display Processor.
15. Explain the advantages of computer graphics.
16. What are the applications of computer graphics.
17. Explain the Raster scan display processors.
18. Describe the classification of computer graphics.
19. Explain about i) Control Grid ii) Focusing system iii) Accelerating node iv) Horizontal and vertical deflection plates.
20. Explain the architecture of raster display.

UNIT – II

1. What are the steps involved in mid point circle algorithm?
2. Explain how the pixel screen positions are stored and retrieved from frame buffer.
3. Use the mid-point method to derive a decision parameter for generating points along a straight line path with slope in the range $0 < m < 1$.
4. Write an algorithm for generating the intermediate points using Bresenham's algorithm when two-end points are given as input.
5. Digitize the line with end-points (20,10) and (30,18) using DDA algorithm
6. Explain the DDA scan conversion algorithm for generating the points on Line segment, when two end-points are given as input
7. Using the Bresenham's algorithm, generate the intermediate points of the line segment, if the two end-points are given as (30, 18) and (20, 10).

8. What are the steps involved in Bresenham's line drawing algorithm for $|m| > 1$, where m is slope of the line. Generate all raster points on the line segments, if the two end-points are given as (10, 20) and (18, 30) using the above algorithm
9. Explain the steps in DDA line drawing Algorithm.
10. Discuss the merits of DDA line drawing algorithm.
11. Explain the steps in Bresenham's line drawing Algorithm.
12. List Various Scan Conversion techniques.
13. Discuss the merits of Scan Conversion.
14. What is polygon; Write the different types of polygon.
15. Explain the steps required to fill the polygon using Flood Fill Technique.
16. Explain the steps required to fill the polygon using Boundary Fill Technique.
17. What is display file.
18. Discuss the demerits of real time Scan Conversion
19. Difference between run length encoding and cell encoding.
20. Explain the merits and demerits of cell encoding.

UNIT – III

1. If $P(x, y, z)$ is an object reference point for scaling, explain how the scaling operation is defined in terms of scaling with respect to the origin.
2. Show that the multiplication of two successive scalings is commutative.
3. Prove that the multiplication matrices for each of the following sequence of operations is commutative
 - (a) Two successive rotations
 - (b) Two successive translations
 - (c) Two successive scalings.
4. Show that the transformation matrix for a reflection about the line $y = -x$ is equivalent to a reflection relative to the y -axis followed by a counter clockwise rotation.
5. List the basic transformation techniques. What are their respective mathematical and matrix representations?
6. Prove or disprove that two successive rotations in 2-D space are commutative.
7. Derive the transformation matrix for rotation about origin.
8. Explain the terms: i. Homogeneous Coordinates ii. Rigid-body transformations iii. Composite transformations
9. Prove that a uniform scaling ($S_x = S_y$) and a rotation form a commutative pair of operations, but that, in general, scaling and rotation are not commutative.
10. Derive the transformation matrix for rotation about origin.
11. Perform a 45 degree rotation of a triangle $A(0,0)$, $B(1,1)$ and $C(5,2)$ about $P(-1,-1)$.
12. Translate a polygon with coordinates $A(2,5)$ $B(7,10)$ $C(10,2)$ by 3 units in x direction and 4 units in y direction.
13. A point (4,3) is rotated counter clock wise direction with an angle of 45 degrees. Find the rotational Matrix and resultant point
14. Find the transformation matrix that transforms the given square ABCD to half its size with centre still remain at the same position. Coordinates are $A(1,1)$ $B(3,1)$ $C(3,3)$ $D(2,2)$. Also find the resultant coordinates.
15. Apply the shearing transforms to square with $A(0,0)$ $B(1,0)$ $C(1,1)$ $D(0,1)$
 - a. Shear parameter value of 0.5 relative to line $y_{ref} = -1$
 - b. Shear parameter value of 0.5 relative to line $x_{ref} = -1$

16. Show how shear transformations may be expressed in terms of rotation and scaling.
17. Take a 2by2 Matrix for following rotations about the origin.
 - a. counter clock wise by π (180 DEGREE);
 - b. COUNTER clock wise by $(\pi/2)$
 - c. Clock wise by π degree
 - d. Counter clock by $5(\pi/2)$
18. Write general form of scaling matrix with respect to fixed point (h,k)
19. Show how the reflection in the line $y=x$ and in the line $y=-x$ can be performed by ascaling operation followed by rotation
20. Prove two scaling transformations commute that $S_1S_2=S_2S_1$

UNIT – IV

1. What are the basic transformation techniques used in Window-to-Viewport transformation?
2. What is the significance of 4-bit region code is Cohen-Sutherland algorithm?
3. Derive the viewing transformation matrix.
4. Explain the Cohen-Sutherland line clipping algorithm.
5. Give a brief note about two dimensional viewing functions. Give an example which uses two dimensional viewing functions.
6. Derive the Window-to-View port transformation.
7. what are the stages involved in two-dimensional viewing transformation Pipeline. Explain briefly about each stage.
8. What are the stages involved in Window-to-viewport coordinate transformation. Explain about each stage
9. What is the procedure followed in point clipping with respect to a rectangular window.
10. Distinguish between window and view port.
11. Discuss the algorithm and develop a program for polygon clip.illustrate with example
12. Determine/ define word coordinates,device coordinates,normalized and homogeneous coordinates.
13. Write an line clip which uses parametric form of equations.test if for a line p_1, p_2 where $p_1(10\ 10)$ $p_2(60\ 30)$ against window with $(x_{wmin}\ y_{wmin})(15\ 15)$ and $(x_{wmax}\ y_{wmax})(25\ 25)$
14. Explain suther land hodgman clip algorithm
15. What is use of normalized device coordinates
16. Develop an procedure which performs line clip using the Cohen-Sutherland,how the line between $(2\)$ and $(12\ 9)$ is clipped against window with $(x_{wmin}\ y_{wmin})(4\ 4)$ and $(x_{wmax}\ y_{wmax})(9\ 8)$
17. Short note on generalized clip
18. What is normalization transform,why it is needed
19. What is point and line clipping
20. Differ suther land hodgman clip by Cohen-Sutherland line clipping.



Ac. Yr. 2015-16 B. Tech. (IV YR. I SEM) I – MID EXAMINATIONS AUG – 2015

(Subjective)

Subject : Data Warehousing and Data Mining Max Marks : 10

Elective : - Date : _____

Branch : CSE Time : _____

NOTE: Answer any TWO questions.

- 1 a) Explain KDD Process in detail [2.5 M]
b) Explain Data mining Functionalities [2.5 M]

- 2 a) Define Data Warehouse? Explain the 3-Tier Architecture of a Data Warehouse? [2.5 M]

b) Compare OLAP with OLTP?

[2.5 M]

- 3 A database has nine transactions.

TID	Items_bought
T100	{I1,I2,I5,}
T200	{I2,I4}
T300	{I2,I3}
T400	{I1,I2,I4}
T500	{I1,I3}
T600	{I2,I3}
T700	{I1,I3}
T800	{I1,I2,I3,I5}
T900	{I1,I2,I3}

- a) Find all frequent item sets using Apriority algorithm [3M]
- b) List all the strong rules [2M]

4. a) Define classification of data mining? [1.5]
- b) What is the significance of attribute selection measures in classification? Explain these measures with appropriate examples?

[3.5]



Ac. Yr. 2015-16 B. Tech. (IV YR. I SEM) I – MID EXAMINATIONS AUG – 2015
(Subjective)

Subject : Data Warehousing and Data Mining **Max Marks** : 10

Elective : - **Date** : _____

Branch : CSE **Time** : _____

NOTE: Answer any TWO questions.

- 1 a) How can you go about filling in the missing values in data cleaning process? **[2.5 M]**
b) Discuss the data smoothing techniques **[2.5 M]**
- 2 a) Explain various data cube computation techniques? **[2.5 M]**
b) Differentiate operational database systems and data warehousing? **[2.5 M]**
- 3 a) Explain about multilevel Association rules from transaction databases. **[2.5 M]**
b) Compare the performance of apriority with Fp-Growth Algorithm? **[2.5M]**
4. a)What is decision tree? Explain with example **[2.5 M]**
b) How does tree pruning work? What are some enhancements to basic decision tree induction? **[2.5 M]**



Ac. Yr. 2015-16 B. Tech. (IV YR. I SEM) I – MID EXAMINATIONS AUG – 2015
(Subjective)

Subject : Data Warehousing and Data Mining **Max Marks** : 10

Elective : - **Date** :

Branch : CSE **Time** :

NOTE: Answer any TWO questions.

- 1 a) Briefly discuss the major issues in data mining **[2.5 M]**
b) Explain the methods to handle missing values in pre-processing **[2.5 M]**
- 2 a) Describe the OLAP operations in the multidimensional data model
[3 M]
b) Explain about Metadata Repository **[2 M]**
- 3 a) Explain about Constraint-Based Association Mining **[2.5 M]**
b) How to improve the efficiency of Apriority algorithm? Explain **[2.5 M]**
4. a) Why naive Bayesian classification called 'naive'? **[2 M]**
b) Briefly outline the major ideas of naive Bayesian classification **[3 M]**



Ac. Yr. 2015-16 B. Tech. (IV YR. I SEM) I – MID EXAMINATIONS AUG –2015
(Subjective)

Subject : Data Warehousing and Data Mining Max Marks : 10

Elective : - Date : _____

Branch : CSE Time : _____

NOTE: Answer any TWO questions.

- 1 a) How can we standardize data mining primitives? [2.5 M]
b) Draw& explain the data mining architecture with example? [2.5 M]
- 2 a) Explain the schemas for multidimensional databases [3 M]
b) Explain about Indexing OLAP data [2 M]
- 3 a) What is Association Rule? Explain? [1.5 M]
b) **A database have six transactions.Let min-sup=3, Find all frequent item sets using FP Growth algorithm [3.5M]**

TID	Items_bought
T100	{A,B,D,E}
T200	{B,C,E }
T300	{A,B,D,E}
T400	{A,B,C,E}
T500	{A,B,C,D,E}
T600	{B,C,D}

4. a) Define regression. Briefly explain about linear, non-linear and multiple regressions [2.5 M]
b) Explain training Bayesian belief networks [2.5 M]

IRS-QUESTIONBANK

UNIT-I

1. Discuss that software testing will ensure the quality of developed software? **2.5M**
2. Demonstrate the trade - off between quality assurance costs and manufacturing costs? **2.5M**
3. Describe is it possible for a tester to find all the bugs in a system? **2.5M**
- 4 Explain model for testing? **2.5M**
5. Discuss to what extent can testing be used to validate that the program is fit for its purpose? **2.5M**
6. Demonstrate the phases in a tester's mental life? **2.5M**
7. Describe that testing is not everything? **2.5M**
8. Define testing and explain the purpose of testing? **2.5M**
9. Explain the principles of test case design? **2.5M**
10. List out various dichotomies and explain? **2.5M**
11. State differences between functional and structural testing? **2.5M**
12. List the factors on which the importance of the bugs depend and give the metrics for them? **2.5M**
13. Explain various consequences of bugs? **2.5M**
14. Discuss the remedies for test bugs? **2.5M**
15. Classify the different kinds of bugs and explain? **2.5M**
16. Explain the procedure used in quantifying the nightmare list to stop testing? **2.5M**
17. Discuss clearly about requirements, features, and functionality of bugs? **2.5M**
18. Illustrate in detail the integration and system bugs? **2.5M**
19. Explain the five types of structural bugs? **2.5M**
20. Classify the levels of testing? **2.5M**

UNIT-II

1. Define statement coverage (C1) and branch coverage (C2)? **2.5M**
2. Explain with an example methods to select enough paths to achieve C1+C2 ? **2.5M**
3. Define loop? State and explain various kinds of loops with suitable examples also discuss methods to select optimal paths for C1+C2. (Statement coverage + Branch coverage)? **2.5M**
4. Discuss about assignment blindness, and equality blindness of predicates? **2.5M**
5. Explain the terms achievable and unachievable paths? **2.5M**
6. Discuss about "Traversal marker" form of path instrumentation? **2.5M**
7. Explain coincidental correctness? Give an example? **2.5M**
8. Discuss statement testing and branch testing? Give suitable examples? **2.5M**
9. State and explain various path selection rules for path testing? **2.5M**
10. Explain about program's control flow? Is it useful for path testing? **2.5M**
11. Discuss various flow graph elements with their notations? **2.5M**
12. Justify flowchart is different from a control flow graph? **2.5M**
13. Explain about multi entry and multi exit routines and fundamental path selection criteria? **2.5M**
14. Describe the following concepts **2.5M**
 - a. Predicates
 - b. Predicate Expression
 - c. Predicate Coverage
 - d. Achievable paths
15. Define path sensitization and write heuristic the procedure used in path sensitization?
Explain how concatenated loops can be tested? **2.5M**
16. Discuss the three cases for single loop testing? **2.5M**
17. Draw a flow graph for calculating the sum of square of n given numbers algorithm? **2.5M**
18. Evaluate the sum of products form for the expression **2.5M**
(ADFGHIJKL+AEFGHIJKL+BCDFGHIJKL+BCEFGHIJKL)?
19. Compare and contrast achievable and unachievable paths? **2.5M**
20. Illustrate various flow graph elements with their notations? **2.5M**

UNIT-III

1. Define transaction. Give an example. **2.5M**
2. Describe transaction flow testing. **2.5M**
3. State and explain various transaction flow junctions and mergers. **2.5M**
4. Discuss the three possible interpretations of the decision symbol with two or more outlinks. **2.5M**
5. What is meant by transaction flow structure ? **2.5M**
6. Discuss the reason why the transaction flow are often ill structured. **2.5M**
7. Discuss the transaction flow testing techniques in details. **2.5M**
8. Explain the concept of sensitizing in transaction flow? **2.5M**
9. Explain different kinds of data flow machines? **2.5M**
10. Explain about data flow graphs. **2.5M**
11. What are the different data object states in data flow graphs? **2.5M**
12. List nine possible two letter combination of the object states of data flow anomalies. Classify them as buggy ,suspicious and ok. **2.5M**
13. Define du path and definition clear path segment ? **2.5M**
14. Name and explain data flow testing strategies. **2.5M**
15. Explain the all c uses/some p uses (ACU+P) strategy on data flow testing with a suitable example**2.5M**
16. Why All du paths (ADUP) is the strongest data flow testing strategy? **2.5M**
17. Explain (APU+C) strategy and (ACU+P) strategy. **2.5M**
18. What is is meant by dataflow model? Discuss various components of it. **2.5M**
19. Differentiate between transaction and data flow graphs. **2.5M**
20. How an anomaly can be detected? Explain different types of data flow anomalies and data flow anomaly state graphs. **2.5M**

Unit -IV

1. Explain briefly about Domain closure **2.5M**
2. Write a short notes on Domain Dimensionality. **2.5M**
3. Discuss about Bug Assumption for domain testing. **2.5M**
4. Explain in detail about nice domains and properties that nice domains should possess. **2.5M**
5. Explain different Ugly Domains. **2.5M**
6. Explain clearly how one dimensional domains are tested. **2.5M**
7. Explain the domain boundary bugs for two dimensional Domain bugs? **2.5M**
8. Discuss in detail the domains and interface testing. **2.5M**
9. What are the bug assumption for domain testing **2.5M**
10. What are the restrictions in Domain Testing? **2.5M**
11. Differentiate between specified domain and implemented domains? **2.5M**
12. How programmers and Tester treat Ugly Domain? **2.5M**
13. What is Domain Testing ? Give the overview of Domain testing. **2.5M**
14. What are different kinds of points in the domains? **2.5M**
15. Describe the interior point ,boundary point, extreme point? **2.5M**
16. What are the possible domain bugs for one dimensional closed boundary? **2.5M**
17. Explain the acronym Closed Off Outside, Open Off Inside (COO OOI) in domain testing. **2.5M**
18. Differentiate between Linear and Non Linear domain boundaries **2.5M**
19. Explain about equality and in equality predicates .Also explain how they are treated in domain testing. **2.5M**
20. Explain in detail about Incomplete and complete domain boundaries. **2.5M**

Linux Programming Question Bank

UNIT-I

1. Write a SED Script to print all the lines of a file that is passed as command line argument by changing the string madras with Chennai
2. Write in detail with example on the commands chown,fgrep,ps and tar.
3. Write a AWK program to print the fields 1 and 4 of a file that is passed as a command line argument .The file contains lines of information that is separated by “ , ” as delimiter .The awk program must print at the end the sum of all 4th field data.
4. Write a Linux command to display the lines from 25 to 45 of /etc/passwd file. Write a linux command to display the directories in /etc
5. Consider that marks.txt is a file that contains one record per line (comma separated fields) of the student data in the form of studentid, student name, Telugu marks, English marks, Maths marks, Science marks, Social marks. Write an awk script to generate result for every student in the form of studentid, student name, Total marks and result. Result is PASS if marks is ≥ 30 in Telugu and English , and if marks ≥ 40 in other subjects. Result is FAIL otherwise.
6. Write briefly on sed, chmod, df, comm, fgrep and sort commands with examples.
7. Discuss the significance of filters and identify some filter command of your choice .Explain them briefly.
8. Compare the features of stream editor with line editor.
9. Write a short notes on du df utilities.
10. Discuss about various file handling utilities available in LINUX . Quote various options and example for each.
11. Differentiate BASH and CSH?
12. Illustrate moving of files in Linux environment with examples?
13. Illustrate creating a new directory in Linux with example?
14. Explain deleting of directory and its contents with examples?
15. Differentiate copying and moving files in Linux environment.
16. Illustrate creating a new directory in Linux os with example and list out the available files?
- 17.Differentiate between a process, and program?

18. Illustrate about job control commands with examples?
19. Explain about background job and foreground jobs in Linux?
20. Explain about 'ps' comm. and 'telnet' command

Unit -2

1. Write briefly on case control in bash with example. Write briefly on "|" operator in bash.
2. write briefly on the features of Test command
3. Write a shell program to print a multiplication table of a number given from command line.
4. Write briefly on the ":" and "." commands in bash. Write briefly on if control structure in bash with examples. Write briefly on "&&" operator in bash.
5. Write in detail on the features of expr command.
6. Explain various conditional structure supported by Shell with programming example.
7. Write a shell script to find out factorial of a given number .
8. Explain the significance of single quote and double quote.
9. Describe about I/O Redirection operations, built in variables in Shell.
10. Write a shell script to count the specified number of lines in a text file without using wc command.
11. Write a shell script to find and delete all lines in a file with the word "unix".
12. Write a shell script to print ,given two integers, X and Y , identify whether $X < Y$ or $X > Y$ or $X = Y$.
13. Write a shell script to use *for* loops to display only *odd* natural numbers from 1 to 99.
14. Explain the security and compare with windows and dos operating systems?
15. What does the shell do with the meta characters if it finds in the command line?
16. Distinguish between user Defined variables and environment variables with example?
16. Write about here documents?
17. Given three integers (X , Y , and Z) representing the three sides of a triangle, identify whether the triangle is Scalene, Isosceles, or Equilateral?
18. Explain how debugging can be done in a shell script.
19. Describe any four built in variables in Shell and Demonstrate their usage by example?

20. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

Unit 3

1. Write a C program to implement "ls-li" command using directory API and other system calls

2. Discuss various status flags and file modes associated with an open system call.

3 Differentiate library functions and system calls.

4. Differentiate between the three stat functions with examples.

5. Write a program to print the type of a file for each command line argument.

6. Differentiate between advisory locking and mandatory locking.

7. Differentiate getc () and fgetc () with example?

8. Explain about dot and dot dot directories in the file system?

9. Differentiate systemcall with library function?.

10. Decide what happens if the file mode creation mask is set to 777 (Octal) value?

11. Explain about the following system calls: a) open () b) seek () c) read () d) link ().

12. Illustrate fcntl () with a program. What are the status flags that are associated with fcntl ()?

13. Write a C program that counts the number of blanks in a text file

a. Using standard I/O b. Using system calls

14. Explain about unlink () function with example?

15. Explain about symlink () function with example?

16. Differentiate stat () and fsat () with example?

17. Differentiate printf () Vs fprintf () with example?

18. Define write () function with example?

19. Define stat () function with example?

20 Define create () function with example?

Unit4

1. Write a C program to create a Zombie process and Print process details using ps command.
2. Write a C program to print the number from 1 to 10 with a time interval of 1 second using alarm and signal system.
3. List the differences between named and unnamed pipe.
4. Write a program to implement full duplex communication using unnamed.
5. Explain any three system calls in Linux that supports efficient process management and maintenance.
6. Illustrate SIGKILL with an example?
7. Illustrate SIGINT with an example?
8. Differentiate SIGKILL and SIGINT?
9. Write the syntax of six versions of exec functions and also explain how these functions differ from each other.
10. Write a C program to illustrate exec() function
11. Write a c program that demonstrates redirection of standard output to a file.Ex: ls > f1. ?
12. Write c program that accepts two small numbers as arguments and then sums the two numbers in a child process. The sum should be returned by child to the parent as its exit status and the parent should print the sum?
13. Write a program that demonstrates the use of exit().
14. Differentiate reliable and unreliable signals with suitable example?
15. Explain the mechanism for handling a signal with example?
16. Define zombie processes with example?
17. Illustrate redirection of standard output to file abc.txt
18. Describe reliable signals.
19. Define orphan process?
20. Write a c program to create orphan process ?

IV B.TECH CSE I SEM
MID I QUESTION BANK
MOBILE COMPUTING

UNIT-1

1. Describe the applications of Mobile Computing Systems?(2 M)
2. Describe the security services offered by GSM?
3. Explain in detail about GSM architecture? (2.5M)
4. Describe the limitations of Mobile computing? (2.5M)
5. Explain the services offered by GSM? (2M)
6. Explain the handover mechanism in GSM?(2.5 M)
7. Explain the functions of subsystems in GSM System architecture?(3 M)
8. Write a short note on GPRS? (2.5 M)
9. Compare the HSCD data transfer is different from that in GPRS?Explain(2.5 M)
10. Explain the concept of DECT architecture with neat diagram.(3 M)

UNIT-2

Long Answer Questions

1. Explain TDMA mechanism with neat sketch?(2.5 M)
2. Describe the solution for Hidden and exposed terminal problem explain with neat sketch? (2.5 M)
3. Explain about Near & Far terminals problems and how to overcome the problem?(2 M)
4. Explain CDMA and also explain its advantages and disadvantages?(2.5 M)
5. Write a short note on classical aloha and slotted aloha with neat sketch?(3 M)
6. Explain FDMA mechanism?(2.5 M)
7. Explain the working of MACA protocol?(2.5 M)

8. Explain about carrier sense multiple accesses with collision detection, what are the schemes introduced to avoid problems of CSMA/CD.(2.5 M)
9. Explain the working principle of MACAW protocol?(2.5 M)
10. Compare SDMA,FDMA ,TDMA and CDMA? (2.5 M)

UNIT-3

Long Answer Questions

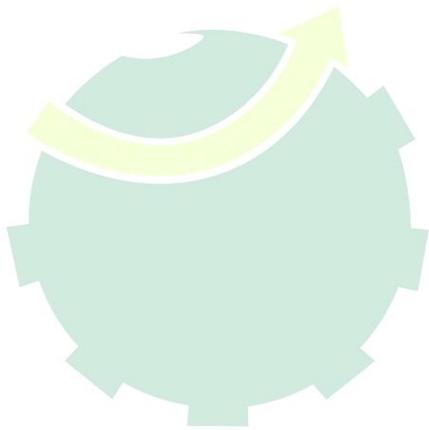
1. Explain in detail about IP Packet delivery with a neat sketch.(2.5 M)
2. Explain about An Agent advertisement with neat sketch? (2.5 M)
3. Explain in detail about IP-in-IP & Minimal Encapsulation? (2.5 M)
4. Differentiate the Care-of-address and co-located COA? (2.5 M)
5. Explain the entities that are part of Mobile IP? Explain them with an example network? (2.5 M)
6. Describe the concept of Dynamic host configuration protocol? (2.5 M)
7. Explain in detail about Generic routing Encapsulation mechanism? (2.5 M)
8. Explain about Route Optimization in Mobile IP? (2.5 M)
9. Explain about An Agent Registration with neat sketch? (2.5 M)
10. Explain about tunneling and Generic routing Encapsulation? (2.5 M)

UNIT-4

Long Answer Questions

1. Compare the classical approaches to make the TCP suitable for Mobile environment give their relative advantages and disadvantages? (2.5 M)
2. Explain about transmission/time-out freezing concept? (2.5 M)
3. Explain the concept of M-TCP and also give with its advantages and disadvantages? (2.5 M)

4. Explain the concept of fast transmit/ fast recovery in traditional TCP. (2.5 M)
5. Explain Indirect TCP and also give its advantages and disadvantages? (3 M)
6. Describe briefly on congestion control in traditional TCP? (2.5 M)
7. Explain snooping TCP and also give its advantages and disadvantages? (2.5 M)
8. Explain selective retransmission? (2 M)
9. Compare I-TCP, Snooping TCP and Mobile TCP? (2.5 M)
10. Explain the concept of slow-start mechanism with graph. (2.5 M)



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STM-QUESTIONBANK

UNIT-1

1. Discuss that software testing will ensure the quality of a developed software? **2.5M**
2. Demonstrate the trade - off between quality assurance costs and manufacturing costs? **2.5M**
3. Describe is it possible for a tester to find all the bugs in a system? **2.5M**
- 4 Explain model for testing? **2.5M**
5. Discuss to what extent can testing be used to validate that the program is fit for its purpose? **2.5M**
6. Demonstrate the phases in a tester's mental life? **2.5M**
7. Describe that testing is not everything? **2.5M**
8. Define testing and explain the purpose of testing? **2.5M**
9. Explain the principles of test case design? **2.5M**
10. List out various dichotomies and explain? **2.5M**
11. State differences between functional and structural testing? **2.5M**
12. List the factors on which the importance of the bugs depend and give the metrics for them? **2.5M**
13. Explain various consequences of bugs? **2.5M**
14. Discuss the remedies for test bugs? **2.5M**
15. Classify the different kinds of bugs and explain? **2.5M**
16. Explain the procedure used in quantifying the nightmare list to stop testing? **2.5M**
17. Discuss clearly about requirements, features, and functionality of bugs? **2.5M**
18. Illustrate in detail the integration and system bugs? **2.5M**
19. Explain the five types of structural bugs? **2.5M**
20. Classify the levels of testing? **2.5M**

UNIT-2

1. Define statement coverage (C1) and branch coverage (C2)? **2.5M**
2. Explain with an example methods to select enough paths to achieve $C1+C2$? **2.5M**
3. Define loop? State and explain various kinds of loops with suitable examples also discuss methods to select optimal paths for $C1+C2$. (Statement coverage + Branch coverage)? **2.5M**
4. Discuss about assignment blindness, and equality blindness of predicates? **2.5M**
5. Explain the terms achievable and unachievable paths? **2.5M**
6. Discuss about "Traversal marker" form of path instrumentation? **2.5M**
7. Explain coincidental correctness? Give an example? **2.5M**
8. Discuss statement testing and branch testing? Give suitable examples? **2.5M**
9. State and explain various path selection rules for path testing? **2.5M**
10. Explain about program's control flow? Is it useful for path testing? **2.5M**
11. Discuss various flow graph elements with their notations? **2.5M**
12. Justify flowchart is different from a control flow graph? **2.5M**
13. Explain about multi entry and multi exit routines and fundamental path selection criteria? **2.5M**
14. Describe the following concepts **2.5M**
 - a. Predicates
 - b. Predicate Expression
 - c. Predicate Coverage
 - d. Achievable paths
15. Define path sensitization and write heuristic the procedure used in path sensitization? **2.5M**

Explain how concatenated loops can be tested? **2.5M**
16. Discuss the three cases for single loop testing? **2.5M**
17. Draw a flow graph for calculating the sum of square of n given numbers algorithm? **2.5M**
18. Evaluate the sum of products form for the expression **2.5M**
(ADFGHIJKL+AEFGHIJKL+BCDFGHIJKL+BCEFGHIJKL)?
19. Compare and contrast achievable and unachievable paths? **2.5M**
20. Illustrate various flow graph elements with their notations? **2.5M**

UNIT-3

1. Define transaction. Give an example. **2.5M**
2. Describe transaction flow testing. **2.5M**
3. State and explain various transaction flow junctions and mergers. **2.5M**
4. Discuss the three possible interpretations of the decision symbol with two or more outlinks. **2.5M**
5. What is meant by transaction flow structure ? **2.5M**
6. Discuss the reason why the transaction flow are often ill structured. **2.5M**
7. Discuss the transaction flow testing techniques in details. **2.5M**
8. Explain the concept of sensitizing in transaction flow? **2.5M**
9. Explain different kinds of data flow machines? **2.5M**
10. Explain about data flow graphs. **2.5M**
11. What are the different data object states in data flow graphs? **2.5M**
12. List nine possible two letter combination of the object states of data flow anomalies. Classify them as buggy ,suspicious and ok. **2.5M**
13. Define du path and definition clear path segment ? **2.5M**
14. Name and explain data flow testing strategies. **2.5M**
15. Explain the all c uses/some p uses (ACU+P) strategy on data flow testing with a suitable example**2.5M**
16. Why All du paths (ADUP) is the strongest data flow testing strategy? **2.5M**
17. Explain (APU+C) strategy and (ACU+P) strategy. **2.5M**
18. What is is meant by dataflow model? Discuss various components of it. **2.5M**
19. Differentiate between transaction and data flow graphs. **2.5M**
20. How an anomaly can be detected? Explain different types of data flow anomalies and data flow anomaly state graphs. **2.5M**

Unit -4

1. Explain briefly about Domain closure **2.5M**
2. Write a short notes on Domain Dimensionality. **2.5M**
3. Discuss about Bug Assumption for domain testing. **2.5M**
4. Explain in detail about nice domains and properties that nice domains should possess. **2.5M**
5. Explain different Ugly Domains. **2.5M**
6. Explain clearly how one dimensional domains are tested. **2.5M**
7. Explain the domain boundary bugs for two dimensional Domain bugs? **2.5M**
8. Discuss in detail the domains and interface testing. **2.5M**
9. What are the bug assumption for domain testing **2.5M**
10. What are the restrictions in Domain Testing? **2.5M**
11. Differentiate between specified domain and implemented domains? **2.5M**
12. How programmers and Tester treat Ugly Domain? **2.5M**
13. What is Domain Testing ? Give the overview of Domain testing. **2.5M**
14. What are different kinds of points in the domains? **2.5M**
15. Describe the interior point ,boundary point, extreme point? **2.5M**
16. What are the possible domain bugs for one dimensional closed boundary? **2.5M**
17. Explain the acronym Closed Off Outside, Open Off Inside (COO OOI) in domain testing. **2.5M**
18. Differentiate between Linear and Non Linear domain boundaries **2.5M**
19. Explain about equality and in equality predicates .Also explain how they are treated in domain testing. **2.5M**
20. Explain in detail about Incomplete and complete domain boundaries. **2.5M**

IV B.TECH IT I SEM
MID I QUESTION BANK
MOBILE APPLICATION DEVELOPMENT

UNIT-1

1. Explain how J2ME is Organized in small computing devices?(2.5M)
2. Compare CLDC and CDC Configurations in J2ME? (2.5M)
3. Explain about J2ME Configurations? (2.5M)
4. Classify different type of Profiles in J2ME? (2.5M)
5. Explain about MIDP Profile and Personal Profile in J2ME? (2.5M)
6. Distinguish CLDC and CDC Configurations with its features of J2ME? (2.5M)
7. Explain the following technologies with supported networks (2M)
 - a. Wireless Technology
 - b. Microwave Technology
8. Explain about Features of J2ME? (2.5M)
9. Explain about limitations of J2ME? (2.5M)
10. Illustrate the evaluation of J2ME in small computing devices? (2.5M)
11. Differentiate CDC and CLDC Configurations in terms of their implementations.? (2.5M)
12. Explain different type of messaging services offered by Cellular Telephone Companies.? (2.5M)
13. Explain about PDA's? (2.5M)
14. Explain about Radio Transmission Technology in Small computing devices? (2.5M)
15. Explain how J2ME application is balance between local and server processing? (2.5M)
16. Explain about the following messaging services(3M)
 - a)SMS
 - b)CBS
 - c)USSD
17. Explain about Cellular Telephone Networks? (2.5M)

UNIT-2

Long Answer Questions

1. Draw and explain the modular design of J2ME architecture? (2.5M)
2. Explain about the small computing device requirements? (2.5M)
3. Differentiate the Manifest file and the Java Descriptor file? (2.5M)
4. Write a MIDlet which displays a small message on the emulator as a text which we can edit using J2ME.? (2.5M)
5. Write a MIDlet to display “Hello World “ message on screen? (2.5M)
6. Explain about the attributes in Manifest file? (2.5M)
7. Explain about the attributes of JAD file? (2.5M)
8. Explain about Run-Time Environment of J2ME? (2.5M)
9. Explain about three software layers in J2ME architecture? (2.5M)
10. Explain about minimal hardware and software requirements to run a J2ME application? (2.5M)
11. Explain about lifecycle of a MIDlet in J2ME application? (2.5M)
12. Explain about Event handling in a MIDlet? (2.5M)
13. Explain about User Interfaces in a MIDlet? (2.5M)
14. Explain about J2ME wireless Toolkit? (2.5M)
15. Discuss how to Building and running a Project in J2ME Wireless Toolkit? (2.5M)
16. Write a MIDlet to display “Good Morning “message? (2.5M)
17. Write a MIDlet to display “MLR Institute Of Technology” message? (2.5M)

UNIT-3

Long Answer Questions

1. Illustrate about Palm OS Emulator? (2.5M)
2. Write a J2ME program that must display the instructions in text box when user selects theHelp command.? (2.5M)

3. Write about the Exception handling Mechanism with an example in J2ME platform? (2.5M)
4. Explain about the following?(5M)
 - a)keep application simple
 - b)limit the use of memory
 - c)don't concatenate strings
 - d)Avoid synchronization
 - e)Use Local Variables
5. Explain in detail about ItemListenerInterface? (2.5M)
6. Explain in detail about CommandListenerInterface? (2.5M)
7. write a MIDlet example for Item class? (2.5M)
8. Write short note on MIDletStateChangeException? (2.5M)
9. Write example program for throwing a MIDletStateChangeException?(2.5M)
- 10.write a MIDlet example for Command class? (2.5M)
- 11.Explain about any four J2ME Best Practices? (2.5M)
- 12.Explain about Command class ? (2.5M)
- 13.Explain about Display Class? (2.5M)

UNIT-4

Long Answer Questions

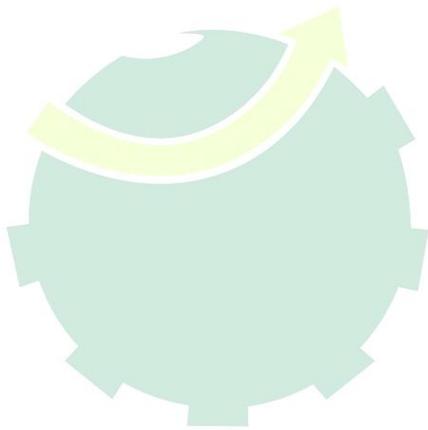
1. Write about Alert Class? (2.5M)
2. write a MIDlet to create example Alertbox? (2.5M)
3. Explain the hierarchy of screen class? (2.5M)
4. Write a MIDlet to illustrate radiobuttons? (2.5M)
5. write about creating and drawing images on canvas? (2.5M)
6. Write a MIDlet to illustrate checkboxes? (2.5M)
7. write about creating animation in canvas? (2.5M)
8. Explain about Item Class? (2.5M)
9. Write about Date Field Class ? (2.5M)
10. Explain about Gauge Class? (2.5M)

11. Explain about StringItem Class? (2.5M)

12. Explain about TextField Class? (2.5M)

13. Explain about ImageItem Class? (2.5M)

14. Write a MIDlet to draw an Arc? (2.5M)



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UNIT I

1. a) How are classes and objects related?
b) Does inheritance break encapsulation? Justify your answer.
c) Is abstraction possible without object orientation? Illustrate with example.
2. a) What are the aims of modeling? What are the principles of modeling.
b) What are the application areas of UML? Give any five.
c) What is software architecture? Define stakeholder.
b) Contrast: interface Vs. component Vs. class
5. Briefly explain the following with UML notation wherever applicable.
b) Inheritance
c) Runtime Polymorphism
d) Encapsulation
e) Realization
f) Liskov's substitution principle
g) Using relationship
6. a) Explain the UML approach to software architecture.
b) Why is UML used? Explain the various relationships with UML notation.
7. a) Enumerate the steps to model different views of a system.
b) Enumerate the steps to model complex views.
c) Define idiom. Enumerate the steps to model structural relationships.
10. a) Explain briefly runtime polymorphism illustrating a program in Java or C++.
b) What are the principles of modeling?
c) Explain the antisymmetric and transitive properties of aggregation
11. What is the UML approach to SDLC? Explain the various phase.
12. a) What is genericity.
b) Enumerate the principles of modeling.
c) Enumerate any six artifacts.
13. a) Explain briefly about use case, sequence, component and deployment diagram.
b) Explain the UML approach to SDLC.
14. a) Define object identity. What is oid uniqueness principle?
b) What is model? What are the aims of modeling?
b) What is UML? Define.
16. a) What are the salient features of object orientation? Explain briefly.
b) How does object orientation facilitate software reuse? Illustrate.
c) How are classes and objects identified from a given problem description?
17. a) Enumerate the steps to model the distribution of responsibilities in a system.
b) Enumerate the steps to model non-software things.
c) Enumerate the steps to model primitive types.
18. a) Explain briefly the various common mechanisms in UML.
b) State and explain the classification of things with UML notation.
19. a) How are objects and classes identified from a given application domain?
b) Define object model. Should all objects of a class share the same operations? Why or why not?
c) What do you understand by the structure of complex system?
d) Contrast: interface, class.

3. a) C
4. Define: ob
a) A

15. a) What ar
)

UNIT – II

1. (a) Explain any three features used in creating abstractions.
(b) Enumerate the steps to model the vocabulary of a system.

- (c) Write a simple JAVA applet for printing "Hello, World!" in a web browser.
- 2. a) How is association modeled as a class?
b) Explain the antisymmetric and transitive properties of aggregation.
- 3. a) How is generalization specialization contrasted with more code reuse? State Liskov's substitution principle?
b) What are the principles of modeling?
- 4. Contrast is-a relationship with has-a relationship.
- 5. Consider a computer-based system that plays chess with a user. Which UML diagrams would be helpful in designing the system? Why? (**Feb 08, Feb 07**)
- 7. Enumerate this steps to forward engineering a class diagram.
Enumerate this steps to reverse engineering a class diagram.
- 8. Which UML diagrams give a static view and which give a dynamic view of a system?
- 9. Contrast the following:
 - a) Actors Vs. Stakeholders
 - b) Use case Vs. Algorithm.
- 10. Explain the UML approach to software architecture.
- 11. What are the five constraints applied to association relationships? Giva a brief.
- 12. What are the visibility specifiers used for classes and packages? Explain.
- 13. a) Define object identity. What is oid uniqueness principle?
b) What is model? What are the aims of modeling?
- 14. a) What are the principles of modeling?
b) What is UML? Define.
- 15. a) Why is it necessary to jhave a variety of diagrams in a model of a system?
b) Which UML diagrams give a static view and which give a dynamic view of a system?
- 16. Consider a computer-based system that plays chess with a user. Which UML diagrams would be helpful in designing the system? Why?
- 17. Explain the eight stereotypes that apply to dependency relationships among classes and objects in class diagrams.
- 18. Define: object, class, interface, component, UML.
- 19. Explain the significance of the protected, public and private access specifiers briefly.

UNIT - III

- 1. Enumerate the steps to model logical database schema. Give all example class diagram.
- 2. Enumerate the steps to model non-software things.
Enumerate the steps to model primitive types.
- 3. a) Enumerate the steps to model simple collaborations.
b) Describe forward engineering and reverse engineering.

- c) The cellular network must place the phone call correctly, and also schedule the receiving and conference
4. a) Enumerate the steps to forward engineer a class diagram.
b) Enumerate the steps to reverse engineer a class diagram.
c) What are forward engineering and reverse engineering?
 5. Enumerate the steps to model object structures. Illustrate with an object diagram.
 6. Explain the common uses of class diagrams briefly.
 7. Enumerate the steps to reverse engineer class diagrams and to reverse engineer object diagrams.
 8. What are the properties of a well-structured object diagram?
 9. The cellular network must place the phone call correctly, and also schedule the receiving and conference calls. Draw a class diagram.
 10. What are the common properties, uses and contents of object diagrams? Enumerate on similar lines for class diagrams.
 11. Enumerate the steps to forward engineer a class diagram.
What are forward engineering and reverse engineering?
 12. Explain any three features used in creating abstractions.
 13. Enumerate the steps to model the vocabulary of a system.
 14. Write a simple JAVA applet for printing "Hell, World!" in a web browser.
 15. Enumerate the steps to model the distribution of responsibilities in a system.
 16. Enumerate the steps to model reverse engineer a class diagram.
What are forward engineering and reverse engineering?
 17. a) What are the properties of a well-structured object diagram?
b) What are the results of forward engineering and reverse engineering object diagrams?
 18. What are the common properties and uses of class diagrams?
 19. With reference to class diagrams, enumerate the steps to forward engineer.
 20. What is class diagram? Explain with example diagram

UNIT - IV

1. What are interaction diagrams? What are their contents and common properties? Define semantic equivalence between two kinds of interaction diagrams.
2. Enumerate the steps to model flows of control by time ordering.
3. What are sequencing and delegation? How is nested flow of control rendered in UML notation? Illustrate.
4. What is sequence diagram? What is collaboration diagram? What are the features in each one?.
5. Define interaction. What is the significance of context in interactions?

- 6 How is recursion represented in a sequence diagram?
7. Explain the following with regard to interaction diagrams.
- Object life line
 - Focus of control
 - Dewey decimal numbering
 - Nesting of tours of control
 - Semantic equivalence.
8. a) Enumerate the steps to model the distribution of objects. Explain briefly considering a UML diagram.
b) Enumerate the steps to model interprocess communication.
9. a) How is recursion represented in a sequence diagram?
b) Explain the following with regard to interaction diagrams.
- Object life line
 - <<create>>and <<destroy>>messages
 - Focus of control
 - Dewey decimal numbering
 - Nesting of tours of control
 - Semantic equivalence.
10. a) What is sequence diagram? What is collaboration diagram? What are the features in each one?
b) What are the properties and common uses of sequence diagrams and collaboration diagrams?
2008)
11. Briefly write about message and sequencing with an illustrative diagram.
12. Explain the following standard stereo types that adorn the end of links
i) association ii) global iii) self iv) local v) parameter
13. What are the properties and common uses of sequence diagrams and collaboration diagrams?
14. a) Enumerate the steps to jmodel simple collaborations.
b) Enumerate the steps to model object structures.
15. Draw a sequence diagram that specifies the flow of control involved in initiating a simple, two-party phone call.
16. Draw a sequence diagram that shows how a GUI interacts with other objects. Explain.
17. Explain the features of both the kinds of interaction diagrams and compare and contrast them
18. Explain about collaboration diagrams. How are they contrasted with sequence diagrams? What is semantic equivalence between interaction diagrams?
19. a) Draw a sequence diagram that specifies the flow of control involved in initiating a simple, two-party phone call. Explain.
b) What are the common properties and uses of interaction diagrams?
20. Draw a collaboration diagram that specifies the flow of control involved in registering a new student at a school.

STM-QUESTIONBANK

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18. Illustrate in detail the integration and system bugs? **2.5M**
19. Explain the five types of structural bugs? **2.5M**
20. Classify the levels of testing? **2.5M**

UNIT-2

1. Define statement coverage (C1) and branch coverage (C2)? **2.5M**
2. Explain with an example methods to select enough paths to achieve C1+C2 ? **2.5M**
3. Define loop? State and explain various kinds of loops with suitable examples also discuss methods to select optimal paths for C1+C2. (Statement coverage + Branch coverage)? **2.5M**
4. Discuss about assignment blindness, and equality blindness of predicates? **2.5M**
5. Explain the terms achievable and unachievable paths? **2.5M**
6. Discuss about "Traversal marker" form of path instrumentation? **2.5M**
7. Explain coincidental correctness? Give an example? **2.5M**
8. Discuss statement testing and branch testing? Give suitable examples? **2.5M**
9. State and explain various path selection rules for path testing? **2.5M**
10. Explain about program's control flow? Is it useful for path testing? **2.5M**
11. Discuss various flow graph elements with their notations? **2.5M**
12. Justify flowchart is different from a control flow graph? **2.5M**
13. Explain about multi entry and multi exit routines and fundamental path selection criteria? **2.5M**
14. Describe the following concepts **2.5M**
 - a. Predicates
 - b. Predicate Expression
 - c. Predicate Coverage
 - d. Achievable paths
15. Define path sensitization and write heuristic the procedure used in path sensitization? **2.5M**

Explain how concatenated loops can be tested? **2.5M**
16. Discuss the three cases for single loop testing? **2.5M**
17. Draw a flow graph for calculating the sum of square of n given numbers algorithm? **2.5M**
18. Evaluate the sum of products form for the expression **2.5M**
(ADFGHIJKL+AEFGHIJKL+BCDFGHIJKL+BCEFGHIJKL)?
19. Compare and contrast achievable and un achievable paths? **2.5M**

20. Illustrate various flow graph elements with their notations? **2.5M**

UNIT-3

1. Define transaction. Give an example. **2.5M**
2. Describe transaction flow testing. **2.5M**
3. State and explain various transaction flow junctions and mergers. **2.5M**
4. Discuss the three possible interpretations of the decision symbol with two or more outlinks. **2.5M**
5. What is meant by transaction flow structure? **2.5M**
6. Discuss the reason why the transaction flow are often ill structured. **2.5M**
7. Discuss the transaction flow testing techniques in details. **2.5M**
8. Explain the concept of sensitizing in transaction flow? **2.5M**
9. Explain different kinds of data flow machines? **2.5M**
10. Explain about data flow graphs. **2.5M**
11. What are the different data object states in data flow graphs? **2.5M**
12. List nine possible two letter combination of the object states of data flow anomalies. Classify them as buggy, suspicious and ok. **2.5M**
13. Define du path and definition clear path segment? **2.5M**
14. Name and explain data flow testing strategies. **2.5M**
15. Explain the all c uses/some p uses (ACU+P) strategy on data flow testing with a suitable example **2.5M**
16. Why All du paths (ADUP) is the strongest data flow testing strategy? **2.5M**
17. Explain (APU+C) strategy and (ACU+P) strategy. **2.5M**
18. What is meant by dataflow model? Discuss various components of it. **2.5M**
19. Differentiate between transaction and data flow graphs. **2.5M**
20. How an anomaly can be detected? Explain different types of data flow anomalies and data flow anomaly state graphs. **2.5M**

Unit -4

1. Explain briefly about Domain closure **2.5M**
2. Write a short notes on Domain Dimensionality. **2.5M**
3. Discuss about Bug Assumption for domain testing. **2.5M**
4. Explain in detail about nice domains and properties that nice domains should possess. **2.5M**
5. Explain different Ugly Domains. **2.5M**
6. Explain clearly how one dimensional domains are tested. **2.5M**
7. Explain the domain boundary bugs for two dimensional Domain bugs? **2.5M**
8. Discuss in detail the domains and interface testing. **2.5M**
9. What are the bug assumption for domain testing **2.5M**
10. What are the restrictions in Domain Testing? **2.5M**
11. Differentiate between specified domain and implemented domains? **2.5M**
12. How programmers and Tester treat Ugly Domain? **2.5M**
13. What is Domain Testing ? Give the overview of Domain testing. **2.5M**
14. What are different kinds of points in the domains? **2.5M**
15. Describe the interior point ,boundary point, extreme point? **2.5M**
16. What are the possible domain bugs for one dimensional closed boundary? **2.5M**
17. Explain the acronym Closed Off Outside, Open Off Inside (COO OOI) in domain testing. **2.5M**
18. Differentiate between Linear and Non Linear domain boundaries **2.5M**
19. Explain about equality and in equality predicates .Also explain how they are treated in domain testing. **2.5M**
20. Explain in detail about Incomplete and complete domain boundaries. **2.5M**

IV B.TECH I SEM
MID I QUESTION BANK

20 long answer questions of 2 m or 2.5 m or 3m (blooms level 2 & 3) from each unit (for unit 1, 2, 3, 4)

UNIT-1 (ALL BLOOMS LEVEL 2 and 3)

20 questions (2m or 2.5 or 3m)

Long Answer Questions

1. Discuss the importance of good design with proper example and define HCI.
2. Explain the history of screen design
3. Compare a 1970's screen, a 1980's screen, and a 1990's and beyond screen
4. Point out benefits of good design.
5. Point out few points on chronological history of GUI.
6. Conclude where different screens are used in various decades?
7. Discuss about the blossoming of the WWW.
8. Explain in detail the importance of user interface for success of a software
9. Show the importance and definition of good user interface
10. Discuss the impact of inefficient screen design on processing time with an example
11. Distinguish interface and design?
12. Show the need good design?
13. Explain screen evaluations?
14. Discuss the impact of inefficient screen design
15. Discuss in detail the importance of the user interface for success of software.
16. Is good design of user interface important? What comprises a good design?
Explain
17. Point out the different views for good design
18. Give an example regarding the development of screen design
19. Success of a production/project depends on effective user interface. Discuss
20. Show the importance of good design.

UNIT-2 (ALL BLOOMS LEVEL 2 and 3)

20 questions (2m or 2.5 or 3m)

Long Answer Questions

- 1) Differentiate printed page versus Web page design
- 2) Point out the demerits of graphical systems.
- 3) Explain the characteristics of Web interface.
- 4) Compute merits of graphical systems
- 5) Explain any ten disadvantages of Graphical system
- 6) Show how manipulations are done from indirect to direct interface?
- 7) Explain the popularity of web-user interface
- 8) Explain the characteristics of the GUI
- 9) Explain the characteristics of an intranet versus the internet
- 10) Prepare at least ten differences between GUI versus web page design
- 11) Explain the principles of user interface design
- 12) State and explain various principles of Xerox STAR
- 13) Discuss the popularity of graphics.
- 14) Explain direct and indirect manipulations?

- 15) Explain the advantages and disadvantages of graphical system?
- 16) Discuss about CUI.
- 17) Demonstrate about web interface designs
- 18) What characteristics that differ in web interface and GUI?
- 19) Explain extranet? How it is different from internet?
- 20) List and explain about the web usability characteristics which are wasteful of people's time.

UNIT-3

(ALL BLOOMS LEVEL 2 and 3)

20 questions (2m or 2.5 or 3m)

Long Answer Questions

- 21) Distinguish important human characteristics in design.
- 22) Explain the user's knowledge and experience in considerations in design
- 23) Why people have trouble with computers explain in brief
- 24) Explain the users psychological and physical characteristics in considerations in design
- 25) Show the common usability problems in graphical systems.
- 26) Demonstrate about Business definition and requirements analysis.
- 27) Explain the obstacles and pitfalls in the development path.
- 28) Summarize Five design commandments
- 29) Explain about human interaction speeds
- 30) Predict the difficulties with poor design
- 31) Estimate the several interaction styles?
- 32) Show how the perception is important in design?
- 33) Discuss about telnet.
- 34) Explain the importance of user's tasks and needs important in design of a system?
- 35) Compute the definition of basic business functions?
- 36) Discuss in detail the process of determining basic business functions.
- 37) Explain various methods of requirement analysis in detail.
- 38) Distinguish direct and indirect methods of requirement analysis.
- 39) Explain the user's mental models and systems conceptual models
- 40) Explain the determining the basic business functions in detail.

UNIT-4

(ALL BLOOMS LEVEL 2 and 3)

20 questions (2m or 2.5 or 3m)

Long Answer Questions

1. Explain in detail about visually pleasing composition

2. Generalize the flow of screen navigation and explain it.
3. Summarize the technological considerations of interface design
4. Estimate the different types of statistical graphs in detail
5. Demonstrate the goals of user interface designer?
6. Infer the problems with poor design given the factors?
7. Explain the screen design goals
8. Discuss how a poor screen design can distract the user and what a user expects in good screen design
9. Explain screen? What is the purpose of a screen?
10. Discuss how to plan a screen
11. Explain the purpose of a screen design?
12. Explain about organizing and ordering of screen elements.
13. What is the role of screen navigation and flow in good screen design?
14. State and explain various qualities which provides visually pleasing composition and give suitable example for each quality
15. Give guidelines for displaying amount of information on screen
16. Discuss the technique used for visual emphasis of important elements on a screen.
17. Explain the mechanisms which convey the depth of levels or 3-D appearance in detail
18. Demonstrate the guidelines for presenting information on screen
19. Distinguish the display/read-only screens? Give a brief account of the guidelines to organize such screens.
20. Discuss about typography

VLSI

Unit-1

20 Long Questions 2M/2.5M/3M (Blooms level-2&3)

1. Sketch and explain the Ion -lithography process.
2. Explained about different steps involved in the IC fabrication briefly.
3. Sketch and Explain CMOS fabrication process using P well.
4. Explain two commonly used methods for obtaining integrated capacitor.
5. Sketch and explain the formation of the inversion layer in P-channel Enhancement MOSFET.
6. Explain the different steps of CMOS n-well process devices.
7. Explain in detail the working of NMOS transistor & its fabrication process
8. Explain in detail the BICMOS n-well fabrication process.
9. Explain the following:
 - (a) Oxidation.
 - (b) Diffusion.
10. Sketch and explain CMOS fabrication process using TWIN TUB.
11. Explain the additional layers added for Bi CMOS devices?
12. Sketch and explain the formation of inversion layer in n-channel Enhancement MOSFET.
13. Explain about various processing steps involved in IC technology for the fabrication of MOS ICs.
14. What is moors law? Explained its relevance with respect to evaluation of IC technology.
15. Compare between CMOS and BIPOLAR technologies
16. Explain in detail about integrated passive components
17. Compare between MOS and CMOS technologies.
18. Write short notes on encapsulation and metallization.
19. Explain the operation of Enhancement transistor.
20. Write short notes on CMOS nanotechnology.

Unit-2

20 Long Questions 2M/2.5M/3M (Blooms level-2&3)

1. Explain different forms of pull ups used as load, in CMOS and in enhancement & depletion modes of NMOS.
2. Explain various regions of CMOS inverter transfer characteristics.
3. Explain an n MOS transistor model indicating all parameters.
- 4 Explain the pull up to pull down ratio of an NMOS inverter driven by pass transistor.
5. Explain the NMOS inverter transfer characteristics.
- 6 Explain the possibility of using a CMOS inverter as an amplifier.
7. Calculate the equation for I_{ds} of an n-channel enhancement MOSFET operating in saturation region .
8. Calculate the equation for I_{ds} of an n-channel enhancement MOSFET operating in non saturation region
9. Explain how the Bi CMOS inverter performance can be improved.
10. Define threshold voltage of a MOS device and explain its significance.
11. Calculate drain source resistance for an NMOS Transistors is operated in the triode region with the following parameters $V_{GS} = 4V$; $V_{tn} = 1V$; $V_{DS} = 2$; $W/L = 100$; $\mu_n C_{ox} = 90 \text{ A/V}^2$
12. Explain circuit diagram of a Bi CMOS inverter with no static current.
13. Explain the pull up to pull down ratio of an NMOS inverter driven by another NMOS
14. Derive the expression for figure of merit w_o of an MOSFETS
15. Explain the CMOS inverter transfer characteristics.
- 16 Calculate drain current for an NMOS Transistors is operated in the triode region with the following parameters $V_{GS} = 4V$; $V_{tn} = 1V$; $V_{DS} = 2$; $W/L = 100$; $\mu_n C_{ox} = 90 \text{ A/V}^2$
- 17 Calculate transconductance for an NMOS Transistors is operated in the saturated region with the following parameters $V_{GS} = 5V$; $V_{tn} = 1.2V$; $V_{DS} = 2$; $W/L = 110$; $\mu_n C_{ox} = 110 \text{ A/V}^2$
- 18 Derive the equation for R_{ds} of an n channel enhancement MOSFET in linear region.
- 19 Derive an equation for transconductance of an n-channel enhancement MOSFET operating in active region
20. Draw the circuits for nmos ,pmos and cmos inverter and explain about their operation and compare them.

Unit-3

20 long questions 2M/2.5M/3M (Blooms level 2&3)

1. Design a stick diagram and layout for two input CMOS NAND gate indicating all the regions & layers of transistor.
2. Give the cell description of an inverter and channel less gate arrays.
3. Design a stick diagram and layout for the NMOS logic shown $Y = (A + B)C$.
4. What is a stick diagram? Draw the stick diagram and layout for a CMOS inverter.
5. What are the effects of scaling on V_t ?
6. Discuss the design rules for wires.
7. Design a stick diagram for the CMOS logic shown below $Y = (A + B + C)$
8. Design a stick diagram and layout for the NMOS logic shown $Y = (A + BC)$.
9. Write short notes on Scaling.
10. Draw the stick diagram and layout for the NMOS logic shown $Y = (AB + CD)$.
11. Explain various steps in VLSI design flow.
12. Give typical design specifications in manufacturing VLSI chip.
13. Compare NMOS and CMOS Design styles.
14. Discuss the design rules for Contact Cuts.
15. Discuss the Lambda based design rules for CMOS.
16. Discuss the design rules for wires.
17. Draw the layout diagram for NMOS Inverter and NAND gates.
18. Draw the layout diagram for CMOS Inverter and NOR gates.
19. What is Scaling and discuss about the various types of scaling.
20. Write about any four Scaling factors for device parameters.

Unit-4

20 long questions 2M/2.5M/3M (Blooms level 2&3)

1. Describe the following briefly

(a) Cascaded inverters as drivers. (b) Super buffers.

2. Write short notes on Sheet resistance.

3. Write short notes on Area Capacitance.

4. Explain clocked CMOS logic and Dynamic CMOS logic.

5. Explain Pseudo NMOS logic AND CMOS Domino logic.

6. Calculate the rise time and fall time of the CMOS inverter $(W/L)_n = 6$ and $(W/L)_p = 8$, $K'_n = 150 \mu A/V^2$, $V_{tn} = 0.7V$, $K'_p = 62 \mu A/V^2$, $V_{tp} = -0.85V$, $V_{DD} = 3.3V$. Total out-put capacitance = 150 fF.

7. Design a XOR using CMOS logic.

8. Explain NOR CMOS logic operation.

9. Write advantages and disadvantages of Dynamic logic.

10. Define Fan-in and Fan-out and its effects on propagation delay.

11. What is switch logic and how it can be implemented using Transmission Gate.

12. What is delay unit and derive its equation.

13. Discuss about Inverter delays.

14. Write short notes on driving large capacitive loads.

15. Write short notes on wiring capacitances.

16. Write short notes on choice of layers.

17. Derive the expression for rise and fall time.

18. Calculate ON Resistance for N-CH sheet resistance = $10^4 \Omega/\text{square}$ and P-CH sheet resistance = $2.5 \times 10^4 \Omega/\text{square}$. ($Z_{pu} = Z_{pd} = 1:1$)

19. Calculate ON Resistance from VDD to VSS for inverter, if N-CH sheet resistance = $2 \times 10^4 \Omega/\text{square}$ and $Z_{pu} = 2:2$, $Z_{pd} = 1:1$

20. Calculate gate Capacitance of $2\mu\text{m}$ technology minimum sized transistor with gate to channel capacitance $=8 \times 10^4 \text{ pf}/\mu\text{m square}$.

IV B.TECH I SEM
MID I QUESTION BANK
WNMC

20 long answer questions of 2 m or 2.5 m or 3m (blooms level 2 & 3) from each unit(for unit 1,2,3,4)

UNIT-1 (ALL BLOOMS LEVEL 2 and 3)

20 questions(2m or 2.5 or 3m)

Long Answer Questions

1. Differentiate between Cellular Networks with Wireless networks?
2. Differentiate between Infrared vs Radio communication
3. Show the protocol architecture of GSM system?
4. Explain about the physical layer of Bluetooth?
5. Explain novel application of mobile computing system?
6. Explain in detail about traffic and control channels in GSM?
7. Illustrate the protocol stack of Bluetooth with the core protocol elements?
8. Explain about the physical layer in the protocol architecture of HIPERLAN?
9. Explain about the architectural description of mobile computing?
10. Describe the characteristics of communication devices?
11. Describe the different types of handovers that are used in GSM?
12. Explain about GPRS architecture reference model?
13. Discuss possible collisions caused by data transmission in standard GSM, HSCSD and GPRS?
14. Explain in detail about GSM services?
15. Explain about localization and calling procedure in GSM?
16. Discuss the reasons for a handover in GSM and the problems associated with it?
17. Summarize the properties of Mobile computing?
18. Differentiate between the Infrastructure and AdHoc WLAN with neat diagram?
19. Discuss the limitations of mobile and handheld devices?
20. Explain Bluetooth Architecture?

UNIT-2 (ALL BLOOMS LEVEL 2 and 3)

20 questions(2m or 2.5 or 3m)

Long Answer Questions

1. Explain FDMA with a neat sketch?
2. Examine the reasons of failure in MAC schemes of wired networks and in wireless networks?
3. Show hidden and exposed terminal problems? Suggest solution for both the problems?
4. Explain Multiplexing? Why it is needed? What are the different kind of multiplexing techniques?explain them.
5. Explain near and far terminal problem in wireless networks? What is the solution for it?
6. Explain about SDMA?
7. Differentiate CSMA,DAMA and PRMA techniques?
8. Distinguish between classical and slotted ALOHA multiple access techniques.Also discuss Polling scheme?
9. Show the advantages of reservation schemes? How are collisions avoided during data transmission?
10. Interpret the conditions of MACA fails in case of hidden and exposed terminals?
11. Explain MACAW protocol?
12. Compare and Contrast SDMA,TDMA,FDMA and CDMA techniques?
13. Discuss briefly about spread aloha multiple access(SAMA)?
14. Explain about CDMA system?
15. Describe the performance of TDMA in highly congested environment?
16. Predict a multiple access scheme which give good performance in all situations?
17. Discuss in detail about MACA.How the problems of hidden and exposed terminals are overcome by MACA?
18. Illustrate how starvation can be avoided in all multiple access schemes which you have studied? Explain in detail?
19. Explain the different mobile phone technologies?
20. Explain how fixed TDM algorithms are useful for implementing TDM?

UNIT-3

(ALL BLOOMS LEVEL 2 and 3)

20 questions(2m or 2.5 or 3m)

Long Answer Questions

1. Describe the requirements for a mobile IP? Explain?
2. Interpret IP packet delivery in Mobile IP? Explain?
3. Describe data transfer from a mobile node to a fixed node and vice versa?
4. Discuss about agent advertisement and delivery?
5. Explain the registration of a mobile node via the foreign agent and direct registration of a mobile node with the home agent?
6. Illustrate why and where is encapsulation needed. Explain how tunneling works in general and especially for mobile IP using IP-in-IP minimal and generic routing encapsulation respectively.
7. Explain the inefficiencies of mobile IP regarding data forwarding from a corresponding node to a mobile node.
8. Examine the basic purpose of DHCP?
9. Explain the entities of DHCP?
10. Explain how can DHCP can be used for mobility and support of mobile IP?
11. Discuss the entities of Mobile IP?
12. Discribe data transfer from a mobile node to a fixed node and vice versa?
13. Discuss the advantages and disadvantages of those three methods?
14. Examine the optimization and what additional problems do these causes?
15. Explain about the entities used in mobile IP?
16. Explain about how communication takes place using Home agent and Foreign agent?
17. Explain tunneling and encapsulation in mobile IP.
18. Explain the general problems of mobile IP regarding security and support of quality of service?
19. Discuss how optimization in achieved in mobile IP.
20. Describe Dynamic host configuration protocol

UNIT-4

(ALL BLOOMS LEVEL 2 and 3) 20 questions(2m or 2.5 or 3m)

Long Answer Questions

1. Differentiate the error rates in wired networks and mobile networks?
 2. Explain the comparison of several enhancements to TCP for mobility?
 3. Explain selective retransmission and transaction oriented TCP?
 4. Explain in detail classical enhancements to TCP for mobility?
 5. Illustrate why we cannot change TCP completely just to support mobile users? what are the consequences of it?
 6. Examine how handover takes place in Indirect TCP?
 7. Explain snooping TCP. What are its advantages and disadvantages?
 8. Describe Indirect TCP access point is seen as the mobile host for the fixed host and as fixed host for mobile host.
 9. Explain the working of Indirect TCP?
 10. Summarize the application uses TCP and other application use UDP and assume there is congestion in the network. How performance of two application differ?
 11. Explain the applications in which packet delayed is equivalent to packet lost?
 12. Explain the applications for which packet loss can create server problems explain it
-
13. Discuss congestion control in traditional TCP also explain the concepts of slowstart and congestion threshold?
 14. Differentiate different TCP enhancements?
 15. Explain the working of transaction oriented TCP?
 16. Explain in detail about the selective retransmission technique in TCP
 17. Explain the mechanism of Transmission/Timeout freezing in TCP
 18. Illustrate the goals and working of M-TCP also discuss the advantages and disadvantages of Mobile TCP
 19. Distinguish between Snooping TCP and M-TCP
 20. Examine how Indirect TCP hides the problems of Wireless links from fixed hosts?

COMPUTER NETWORKS

IV-1 B.Tech

MID-1

UNIT-1

1. Explain the Layers of TCP/IP Protocol.
2. Describe OSI Reference Model with a neat diagram
3. Explain the advantages of Digital signal over Analog signal.
4. Write a short note on the following along with their types/ examples?
Analog Vs Digital
5. Define the term Network. What is a criterion that must be satisfied by every Network?
6. Write any 4 major differences between OSI and TCP/IP?
7. Explain the uses of a computer network.
8. Explain the different networks based on their sizes.
9. Describe in detail the different addressing schemes.
10. Define the following terms
a) Wavelength b) Time domain c) Frequency domain
11. Explain the different topologies of a network
12. Write short notes about internet
13. Write short notes on protocols and standards.
14. Explain the following. i. Bit rate ii Throughput iii Bandwidth
15. Explain the responsibilities of data link layer in OSI reference model
16. Explain the responsibilities of physical layer in OSI reference model
17. Explain the responsibilities of network layer in OSI reference model
18. Explain the responsibilities of network layer in Internet model
19. Explain the responsibilities of Transport layer in OSI reference model
20. Explain the responsibilities of Transport layer in Internet model

UNIT II

1. Explain and compare various types of multiplexing techniques?
2. Discuss about the Protocols a) HDLC b) PPP ?
3. Write short notes on Line coding? Explain the various Line coding Techniques?
4. Define the following i) Amplitude ii) Frequency iii) Time period iv) Bit v) Data rate?
With necessary diagrams.
5. Compare Guided and Unguided transmission media?
6. Compare circuit switching and packet switching methods. Explain about Switch and Telephone network.
7. Discuss in detail Virtual circuit Networks
8. Discuss in detail Datagram Networks
9. Write short notes on Modes in optical Fiber
10. Write short notes on the following.
(a) Bit rate & Baud rate (b) Nyquist theorem
11. Discuss in detail FDM technique.
12. Discuss in detail TDM technique.
13. Discuss in detail WDM technique.

14. List the major components of telephone network and explain the standards of Dial up Modems.
15. Discuss about Circuit Switching Mechanism?
16. Write short notes on Guided media.
17. Write short notes on un Guided media.
18. Explain the methods of analog to analog conversion
19. Explain the different digital to analog techniques.
20. Explain in detail PCM technique related to ADC.

UNIT-3

1. Explain the usefulness of concept of redundancy in error detection and correction.
2. Define Hamming and minimum hamming distances.
3. Explain the working of Go-back-n ARQ sliding window protocol.
4. Explain the concept of selective repeat ARQ protocol with a suitable example.
5. Explain the concept of stop and wait ARQ protocol with a suitable diagram.
6. Draw and explain about HDLC protocol.
7. Explain PPP(Point-to-point protocol) in detail.
8. Explain the Protocols of a noiseless channel.
9. Distinguish between error control and flow control.
10. Explain different methods of framing.
11. Explain how CRC at encoder is generated for the given input data 1001 and divisor as 1011?
12. Define cyclic code and explain CRC technique with an example.
13. Explain simple parity check code and hamming code.
14. Describe how errors can be detected and corrected using block coding?
15. Explain the two types of errors.
16. Define byte stuffing and bit stuffing?
17. Explain the frame formats of HDLC protocol?
18. Explain the frame formats of PPP frame?
19. Illustrate division in the CRC decoder for the code word as 1001110 and divisor as 1011?
20. Draw and explain the structure of encoder and decoder in error correction?

UNIT-4

- 1) Explain the working of CSMA/CD.
- 2) Distinguish between 1-persistence, non-persistence and p-persistence CSMA?
- 3) Explain why collision detection is not possible in a wireless LAN.

- 4) Distinguish between random access and controlled access MAC protocol?
- 5) Define CDMA.
- 6) Explain the vulnerable time and throughput of a pure ALOHA protocol.
- 7) Explain the frame format for bluetooth.
- 8) Distinguish between piconet and scatternet?
- 9) Explain the various layers in Bluetooth architecture?
- 10) Draw and explain MAC frame format.
- 11) Explain briefly about the gigabit Ethernet design?
- 12) Explain the functioning of MAC sublayer and physical layer in fast ethernet?
- 13) Draw and explain 802.3 frame format?
- 14) Define channelization. Explain FDMA channelization protocol ?
- 15) Distinguish between write through and write-back policies pointing out their merits and demerits?
- 16) Explain strobe control method of Asynchronous data transfer?
- 17) Differentiate random access protocol with controlled access protocol.
- 18) Explain briefly about the CSMA/CA protocol?
- 19) Explain in detail the operation of slotted ALOHA.?
 - 20) Calculate the throughput of a pure ALOHA system which produces 1000 frames/sec, which it transmits 200-bit frames on a shared channel of 200kbps ?

UNIT-I

1. Discuss about the adjacencies available among Pixels
2. How many additions and multiplications require to compute the 2- D FFT of an $N \times N$ image.
3. State and prove separability property of 2D-DFT.
4. $N \log_2 N$ additions and $1/2 N \log_2 N$ multiplications are needed to compute the FFT of N points.
5. State and prove Translation property
6. Define Discrete Cosine Transform in 2D Form
7. Explain the process of Image acquisition.
8. Discuss different elements used in digital image processing system
9. Distinguish between uniform sampling and non uniform sampling with respect to Images.
10. What are the advantages of non uniform sampling.
11. Obtain Haar transform matrix for $N=8$.
12. State and prove separability property of 2D-DFT.
13. Explain any four basic relationships between pixels?
14. What are the different transforms used in DIP?
15. Explain the most advantageous one in detail?
16. State and prove Distributive property
17. State Scaling property
18. State and prove Hoteling Transform
19. What are the Applications of Digital Image Processing?
20. Explain the Operation of Discrete Cosine Transform.

UNIT-II

1. Discuss the concept of derivative filters? How they are used in Image enhancement?
2. Discuss following histogram techniques for Image enhancement
3. How many additions and multiplications require to compute the 2- D FFT of an $N \times N$ image.
4. Discuss following histogram techniques for Image enhancement.
 - (a) Histogram specification. (b) Local enhancement.
5. Explain about Histogram specification with necessary derivations
6. What is meant by local enhancement? Discuss its importance
7. What is meant by image enhancement? Discuss the need for enhancement

- 8 Discuss the spatial domain methods for image enhancement.
- 9 Write in detail about histogram processing?
10. What is the Need for Image Enhancement?
- 11.Explain the operation of Histogram Manipulation?
12. Explain the operation of Gray level Slicing?
- 13.Explain the operation of Bit plain Slicing?
14. Explain the operation of Histogram Equalization?
15. What is mean by Histogram Specification?
16. Explain about Sobel Operator?
17. Explain about Prewitt Operator?
18. Explain the operation of Derivative Operators?
19. Explain the Median Filtering?
20. What is meant by Global enhancement? Discuss its importance

UNIT-III

1. Discuss the frequency domain techniques of Image enhancement in detail.
2. Discuss the frequency domain techniques of Image enhancement in detail.
3. Discuss Image smoothing with the following
 - (a) Low pass spatial filtering
 - (b) Median filtering.
4. Distinguish between spatial domain techniques and frequency domain techniques of Image enhancement.
5. What is meant by image enhancement? Discuss the need for enhancement
6. Discuss the spatial domain methods for image enhancement.
7. Show that a high pass-filtered image in the frequency domain can be obtained by using the method of subtracting a low pass filtered image from the original.
8. What is an image filter? Discuss about Ideal High pass filter?
9. Discuss About Smoothing & sharpening methods in Spatial Domain?
10. Explain Image sharpening Using Butterworth filters And Draw its Frequency response plot?
11. Differentiate B/w Ideal and Butterworth filter in the Spatial domain?
12. Explain the method to set the cut off frequencies in ILPF?
13. Explain the concept of homomorphic filtering

14. Explain on procedure to derive frequency domain filtering from spatial domain?
15. Correspondence between filtering in the spatial & frequency domains?
16. Explanation on the basic steps for filtering used to enhance an image in frequency domain ?
17. Write short Notes on Ideal Low Pass Filer?
18. Write short Notes on Ideal High Pass Filter?
19. Write short Notes on homomorphic filtering?
20. Write short Notes on Butterworth filter?

UNIT-IV

1. Give the difference between Enhancement and Restoration?
2. What are the properties of median filters?
3. Explain Weiner filtering approach for image restoration?
4. Write short notes on Inverse Filtering?
5. List the algebraic approach in Image restoration?
6. Write notes on least square error filter?
7. Describe constrained least square filtering for image restoration and derive its transfer function?
8. Explain in detail the interactive restoration of an image
9. Differentiate B/w Ideal and Butterworth filter in the Frequency domain?
10. Discuss About Smoothing & sharpening methods in the Frequency Domain?
11. Compare image enhancement and restoration techniques?
12. Give the probability density functions for Rayleigh noise models?
13. Give the probability density functions for the Erlang noise models?
14. Give the probability density functions for Salt and Pepper noise models
15. Discuss on Inverse Filtering?
16. Discuss the properties of median filters?
17. Write notes on Weiner filtering?
18. Give short Notes on Image Restoration?
19. Discuss About sharpening methods in the Frequency Domain?
20. Write short Notes on Interactive Restoration?

Unit-I

1. Explain in brief the characteristics of an Embedded System
2. Explain in brief what are the various components of Embedded System.
3. Describe the distinction between requirements and specification.
4. Explain in detail design process of an embedded system.
5. Explain Structural description.
6. Explain several types of relations that exist between objects and classes.
7. Explain design of model train controller in detail.
8. Explain design of GPS system in detail.
9. Explain Behavioural description.
10. Explain Formalisms For System design.
11. Explain various design metrics in an embedded systems
12. Distinguish between top down and bottom up design process in embedded systems?
13. Explain behavioural description?
14. Explain signal, call event, timeout event
15. Explain digital command control?
16. Explain conceptual specification of model train control?
17. Describe sequence diagram in UML?
18. Distinguish between architecture and components of embedded system design process
19. Describe the challenges in embedded computing design?
20. Describe the characteristics of embedded computing applications?

Unit II

1. Explain the flags that are stored in the PSW?
2. Illustrate the register that holds the serial data interrupt bits TI and RI?
3. Illustrate number of register banks and their addresses?
4. Explain about the ports that are used for external memory access?
5. Explain the address of a subroutine that handles a timer 1 interrupt?
6. Explain how an I/O can be both an input and output?
7. Describe which bits in which registers must be set to give the serial data interrupt the highest priority?
8. Describe address of the PCON special-function register?
9. Explain which bits in which register(s) must be set to make $\overline{\text{INT0}}$ and $\overline{\text{INT1}}$ edge triggered?
10. Explain serial communication modes supported by 8051?
11. Explain interrupt structure of 8051?
12. Explain the memory structure of the 8051?
13. Explain the I/O structure of 8051?

14. Explain the multiprocessor communication in 8051?
15. Illustrate the block diagram of 8051?
16. Explain various modes available for timer in 8051?
17. Discuss in detail about serial data communication circuit in 8051?
18. Draw the Memory Organization of 8051 and explain in detail.?
19. Explain the pin description of 8051?
20. Explain the 8051 Oscillator and clock?

Unit -III

1. Explain the process of assembly language with an example?
2. Explain the addressing modes of 8051 with the example?
3. Identify the addressing mode used by each of the following?
 - a. MOV A,R4
 - b. MOV A, #30H
 - c. ADD A,40H
 - d. SWAP A
 - e. MOVC A, @A+DPTR
4. Explain the instructions used to access external RAM?
5. Explain the instructions to access external program memory?
6. Explain the PUSH and POP instructions in 8051?
7. Explain the exchange instruction supported by 8051?
8. Explain the Byte level logical instruction of 8051?
9. Explain the Bit level logical instruction of 8051?
10. Explain the rotate instructions of 8051?
11. Explain addition and subtraction instructions of 8051 with example?
12. Explain the DAA instruction of 8051?
13. Explain the JUMP instruction and its range of 8051?
14. Explain the various types of jump instructions according to range?
15. Explain the CALL and RET instructions of 8051?
16. Draw and explain interrupt structure of 8051?
17. Explain how to enable and disable interrupts?
18. Describe the vector address of each interrupt source?
19. Describe the interrupt priority?
20. Explain the programming of timer and serial interrupt?

Unit-IV

1. Explain how PSOC works as a single chip solution for embedded systems design.
2. Illustrate the features of PSOC
3. Explain the differences between PSOC and Microcontroller.
4. Explain about PSOC core
5. Explain about Watch dog timer and Sleep timer in PSOC

6. Explain the concept on on-the-fly programming
7. Explain the advantages of PSOC microcontroller
8. Illustrate the need of low power consumption in microcontroller based systems.
9. Explain about analog blocks in PSOC
10. Explain about digital blocks in PSOC
11. Explain the internal register organization of CPU blocks in PSOC.
12. Explain hardware programming through PSOC controller
13. Explain the input/output pin configurability in PSOC.
14. Discuss how I/O pins of PSOC are controlled using PSOC creator.
15. Explain about USB I/O pin.
16. Illustrate the designing steps involved in designing an embedded system hardware using PSOC creator.
17. Explain about Flag register in PSOC.
18. Explain about MAC in PSOC.
19. Explain about frequency generator in PSOC.
20. Explain various configurations of digital peripherals of PSOC.

MS Questions for mid exams:

Unit I: Introduction to management:

Short-answer Questions

1. Define management as a process.
2. What does a modern manager need to know, in the words of Tom Peters, for better management?
3. Mention any four features of management.
4. Why is management important?
5. Name at least six challenges to management.
6. If administration is considered as the top function in the organization, what shall it refer to?
7. Define organization.
8. Name at least six variables that make the organization balanced.
9. Name any three points that explain the significance of organization.
10. Why is management considered both an art and science?
11. Write short notes on a) Planning b) Motivation.
12. Write short notes on a) Directing b) Coordinating.
13. Write short notes on planning and controlling.
14. Mention any six principles of management, as given by Fayol, in brief.
15. Mention the elements of scientific management.
16. Explain why scientific management is still respected.
17. What were the conclusions from Hawthorne experiments?
18. Explain expectancy theory of motivation?
19. Define objective. Give two examples.
20. How do you distinguish specific objectives from general objectives, give any four managerial objectives.

Long answer Questions

1. Explain what you understand by 'managerial objectives'. What could be the different objectives that management can set for itself? Illustrate.
2. Explain the concept of social responsibility. Explain the activities of any four of the business organizations which undertake activities related to community development in your town.
3. Explain the broad classification of activities supported by the Indian corporate sector for community development. Illustrate.
4. Illustrate how marketing strategies and commitment to social needs can be integrated by a business unit in its development? Identify.
5. Scientific management did much more than what was planned. Do you agree? Discuss.
6. Explain the principles of management as outlined by Henri Fayol.
7. Give a brief account of the developments in management thought during the human relations period.
8. Explain and evaluate the process of scientific management.

9. What were the areas of interest for Frank and Lillian Gilbreth? Give an outline for their contribution.
10. What are the assumptions of Douglas McGregor about the behavior of managers?
11. Explain the different views expressed on the functions of management.
12. Discuss management as process.
13. The logical sequence of management functions cannot be subordinated even by a function. Do you agree? Support your answer.
14. Define management. Explain its nature and features.
15. Along with successful and professionally managed companies, we also find such business organizations which refuse to give good service to customers and still thrive. What do you suggest to get these organizations more professionalized?
16. Explain the importance of management. Are management and administration are similar? Discuss.
17. Define organization. Is it necessary to create an organization?
18. Discuss the challenges to management in the new millennium.
19. Mention the different needs as identified by Abraham Maslow. Give an example of each.
20. What activities can a university undertake to demonstrate its commitment to social development? Identify.

Unit II: Designing operational structure:

Short answer questions

1. Explain organizing.
2. Differentiate between organization and organizing.
3. Draw an organization chart (indicating not more than three levels).
4. What do you understand by organization manual?
5. Explain the significance of informal organization.
6. What do you understand by organizational hierarchy?
7. Explain the relationship between authority and responsibility.
8. Differentiate between flat organization and tall organization.
9. Evaluate flat organizations.
10. Evaluate line organization.
11. Evaluate matrix organization.
12. Explain organization on formal or informal?
13. What is organizational hierarchy?
14. Explain the span of management?
15. What is flat organization?
16. What is staff organization?
17. What is functional departmentation?
18. Explain product based organization?
19. Explain the territorial organization?
20. What is team structure?

Long answer questions

1. Discuss the process of organizing. Explain the principles to be observed while creating an organization structure.
2. What do you mean by departmentation? Evaluate any three methods of departmentation.
3. Discuss the utility of organization structure in an organisation.
4. Explain the Line & Staff organization listing its merits & demerits.
5. List and explain the various principles to be followed while designing an effective organization.
6. Write short notes on:
 - a. Committee organization
 - b. Matrix organization
7. Illustrate with an example for each type of organization- Functional organization, Team Structure, Boundary less organization?
8. Enumerate the principles of organization. Explain any three in detail.
9. Write a short note on:
 - a. Span of Control
 - b. Authority & Responsibility
10. Write a short note on:
 - a. Unity of command
 - b. Division of work
11. Write a short note on:
 - a. Vertical/ tall organization
 - b. Flat/ horizontal organization
 - c. Cellular organization
12. Explain the features of Virtual organization with its advantages and disadvantages.
13. Explain the modern trends in the organizational structure designs?
14. Explain brief about the organizational chart?
15. Write briefly about types of organization?
16. Explain the principles of organization?
17. Explain the factors determination of degree of decentralization?
18. Write the basic concepts of related to organization?
19. Evaluate the organizational chart?

20. Write the relationship between management and organization?

III Unit: Operation management

Short Questions:

1. Write the short note on agglomeration economics?
2. Explain goal of plant layout?
3. What is the relevance of plant layout studies?
4. What is the consequence of poor plant layout?
5. What is the product layout?
6. Explain the combination of layout?
7. What are the factors of the affecting productivity?
8. Write any two techniques of enhancing productivity?
9. Explain the futures of job production?
10. What is productivity versus production?
11. Explain the benefits of work study?
12. What is method study?
13. Write the process chart symbols?
14. What is outline process chart?
15. What is two handed process chart?
16. What is standard time?
17. Write the work sampling?
18. Explain the sampling risk?
19. What is variable and attribute?
20. Explain the characteristics curves?

Long Questions:

1. What kind of Plant Layout is applicable for an IT Industry?
2. Explain the recording techniques used under Method study?
3. Explain briefly different methods of production with their features?
4. For a particular task (element) 40 observations were taken by a time study observer. Analyze whether or this number of observations is sufficient for 5% accuracy with 95% confidence limits. Indicate the minimum no. of observations required.
 - i. Time seconds (x) 4 5 6 7 8
 - ii. Frequency (f) 10 5 10 10 5
5. Explain the concepts of statistical control. Explain how you can construct control charts for the variables?

6. What do you understand by acceptance sampling? Explain the concepts of singles and doubles sampling plans?
7. Define work study. Discuss its relevance in the modern context. Illustrate
8. Discuss any two techniques of recording the current method of doing the job?
9. What do you understand by plant layout? Explain its system?
10. "Product layout is better than process layout" do you agree with this statement, support your answer?
11. Explain any two techniques of enhancing productivity?
12. Explain the methods study. How do you carry out it?
13. What do you understand the work measurement? Explain how you determine standard time?
14. The following data represents the number of defects found on each sewing machine cabinet inspected. Plot R bar chart with control limits. Comment on the chart.

Sample no	1	2	3	4	5	6	7	8	9	10
No of defects	8	10	7	9	6	7	8	9	4	5

15. Construct the R chart from the following information and state whether the process is in control

Sample	1	2	3	4	5	6	7	8	9	10
R	23	39	14	5	20	17	21	11	40	10

16. Describe the basic procedure of method study?
17. Explain briefly about work study and its benefits?
18. Describe the factors affecting productivity?
19. What are the differences between job production, batch production and mass production?
20. Explain the contribution of Gilbreth to work study and write the applications?

Unit IV: Material management:

Long Questions:

1. Explain the objectives of purchasing function? How do you organize the purchasing department?
2. What do you understand by EOQ? Derive a formula to determine it?
3. Define marketing? Explain how is it different from selling?
4. What are the factors that determine the choice of channels of distribution?
5. Define purchasing function. What are its objectives?
6. What do you mean by Economic order quantity? Derive a formula to determine it.
7. Define various stock control levels.

8. Explain materials management as a process.
9. Discuss the duties of a store keeper.
10. Explain centralized purchasing & De-centralizes purchasing giving their suitability and limitations.
11. Explain the necessity of maintain inventory in stores and explain the reasons of poor inventory control?
12. The following data has been supplied by a retail shopkeeper in Abids.
 - a. Jan 19 Opening stock of 4000 units @ Rs 600 each
 - b. Feb 7 Bought 200 units @ Rs 720 each
 - c. Mar 4 Sold 72 units @ Rs 1200 each
 - d. Apr 18 Bought 200 units @ Rs 750 each.
 - e. May 15 Sold 50 units @ Rs 1200 each
 - i. Prepare stores ledger accounts and show how the stock records
 - ii. Would appear under FIFO & LIFO.

13. Determine EOQ in the following cases:
 - a. The annual demand for ready- made T- shirts of Wardrobe Ltd HYD is 50000 per year. The cost of placing an order is Rs 800 and the cost of carrying one unit in inventory for one year is Rs 10, which includes cost of insurance, storage costs and other related costs.

 - b. The following information is related to a cement company: Annual demand- 24000 units; unit price- Rs 24, cost of placing an order- Rs 40, Storage costs- 3% per month, and interest rate 1% per month.

14. Determine the various stock control levels with the following
Information: Normal usage - 5000 units per day
Minimum usage - 2400 units per day
Maximum usage - 7700 units per day
Lead time - 10 to 20 days
EOQ - 8000 units

15. Identify and briefly discuss the functions of marketing?
16. Mention and evaluate the channels of distribution?
17. Discuss the various stages in product life cycles?
18. Why do manufacture the favours intermediaries?
19. Explain the definition of marketing and its functions?
20. Discuss the duties of a store keeper.

Short Questions:

1. Write a note on storage facilities.
2. What is economic order quantity?
3. Explain the store ledger account?
4. Write about FIFO?
5. What is integrated materials management?
6. Explain the stock out costs?
7. Define the vendor rating?
8. Explain the material requirement planning?
9. What is inventory management?
10. What is negotiation?
11. Explain the classification and codification?
12. What is market segmentation?
13. Explain the manufactures and intermediaries?
14. What are the utilities of marketing?
15. Explain the market function in risk taking?
16. What is marketing versus selling?
17. Define marketing mix?
18. Explain any two types of channels of distribution?
19. Define product life cycle?
20. Write the short on simple average method?

MICROWAVE ENGINEERING

UNIT-I

1. Explain about microwave spectrum bands and application of microwaves?
2. Explain about the waveguides?
3. Show that the complete solution and Boundary conditions for TM waves in Rectangular wave guides?
4. Show that the complete solution and Boundary conditions for TE waves in Rectangular wave guides?
5. Examine about phase velocity & Group velocity? And obtain the Individual expressions for Phase velocity & Group velocity? And prove that $V_p \cdot V_g = c^2$
6. Determine the cutoff wavelength for the dominant mode in a rectangular waveguide of breadth 10 cms. For a 2.5GHz signal propagated in this waveguide in the dominant mode. Calculate the guide wavelength, the group and the phase velocities?
7. Derive the wave equations? Shows that these represent wave propagation in freespace with velocity of light?
8. Explain about
 - i) Guide Wavelength
 - ii) Phase Velocity
 - iii) Group Velocity
9. Derive the Expression for Phase Velocity and Group Velocity?
10. Explain about wave impedance in TE wave and TM wave?
11. Determine the cutoff wavelength for the dominant mode in a rectangular waveguide of breadth 10 cms. For a 2.5 Ghz signal propagating in this waveguide in the dominant mode, Calculate the guide wavelength, the group and the phase velocities?
12. The dimensions of a guide are 2.5×1 cms. The frequency is 8.6GHz. Find the following
 - i) Possible modes
 - ii) cutoff frequencies
 - iii) guide wavelength
13. A rectangular waveguide has $a=4$ cms , $b=3$ cms, as its sectional dimensions. Find all the modes which will propagate at 5 GHz?
14. A rectangular wave guide with dimension of 3×2 cms operates in the TM_{11} mode at 10 GHz. Determine the characteristic wave impedance?
15. A rectangular waveguide 3×1 cms operating at a Frequency Of 9GHz in TE_{10} Mode. Calculate The Maximum Power Handling Capacity Of The Waveguide If The Maximum Potential Gradient Of The Signal Is 3kv/Cm.
16. Derive the wave equation for a TM wave and obtain all the field components in a rectangular waveguide?
17. Derive the wave equation for a TE wave and obtain all the field components in a rectangular waveguide?
18. How are waveguides different for normal two wire transmission lines? Discuss the similarities and dissimilarities?
19. What are TEM, TE, TM and HE modes. Sketch the field pattern for dominant mode in a rectangular waveguides?

20. Explain about the Characteristic equation and cutoff frequency?

UNIT-II

1. Explain about Power transmission and power losses in a rectangular waveguide?
2. Derive the Expression for cutoff frequency in a rectangular cavity resonator?
3. Explain about Micro strip lines? And characteristic impedance of micro strip lines?
4. Explain about quality factor of micro strip lines? And losses of micro strip lines?
5. Explain about Cavity Resonator? And also explain about types of Cavity resonators?
6. Derive the field expression for TE mode in a rectangular Cavity Resonator?
7. Derive the field expression for TM mode in a rectangular Cavity Resonator?
8. Explain about Quality factor of Cavity Resonators? And also explain about coupling coefficient?
9. Explain about Losses in micro strip lines?
10. Explain about Cavity resonators? And also explain about applications of Cavity Resonators?
11. Show that the complete solution and Boundary conditions for TE waves in Rectangular Cavity Resonators?
12. Show that the complete solution and Boundary conditions for TM waves in Rectangular Cavity Resonators?
13. Calculate the lowest resonant frequency of a rectangular cavity resonator of dimension $a=2$ cms, $b=1$ cms and $d=3$ cms?
14. Calculate the resonant frequency of a circular resonator of following dimension. Diameter= 12.5 cms, and length= 5 cms, for TM_{012} mode?
15. Calculate the resonant frequency of a circular resonator of following dimension. $a=12.5$ cms, and $b=5$ cms, and $l=4$ cms, when the mode of operation is TE_{101} mode?
16. Derive the field expressions for a rectangular cavity resonator. Plot the field pattern for the dominant mode of propagation in such a resonator for TE and TM modes?
17. Calculate a coaxial line has the following physical dimensions diameter of inner conductor is 0.49 cms, inner conductor of outer conductor is 1.10 cm, polyethylene dielectric is 2.3 , Calculate i) Inductance per unit length ii) the capacitance per unit length iii) the characteristic impedance iv) velocity of propagation
18. Calculate the breakdown of an air filled coaxial cable operating frequency of 9.375 GHz. Assume ratio of b/a is 2.3 and $(b+a) < \lambda/4$ to exclude higher order modes and a dominant mode propagating?
19. Calculate rectangular waveguide $a=4$ cms, $b=3$ cms mode which will propagate at 5 GHz?
20. For the above expression $R=0.05$ W/M AND $g=0$. Determine the attenuation and phase constant, phase velocity, relative permittivity and power loss if the coaxial line length is 50 m. the input power to the system is 480 w at a frequency of 3 GHz.

Unit III

1. Define and explain the significance of the following terms as applicable to a directional coupler.
 - i. Coupling
 - ii. Directivity
 - iii. Insertion loss.

2. Explain for what purpose the posts and screws are used in wave guide

3. Explain With reference to a 4-port symmetrical 2-hole coupler, define and distinguish between the terms : Coupling, Directivity, Isolation and Insertion Loss. How can this coupler be configured as a forward directional coupler ?

4. List out the output characteristics of a Magic Tee, when
 - i. in-phase inputs are fed at both the main arm ports, and
 - ii. input is fed at the series arm port.

5. With reference to a 4-port symmetrical 2-hole coupler, define and distinguish between the terms : Coupling, Directivity, Isolation and Insertion Loss. How can this coupler be configured as a forward directional coupler ? How can the coupling be varied in this case ?

6. List out the output characteristics of a Magic Tee, when
 - i. in-phase inputs are fed at both the main arm ports, and
 - ii. input is fed at the series arm port.

7. Describe the phenomenon of loop coupling between a coaxial line and a waveguide in detail

8. explain short notes on the principle of working of a Dielectric Phase Shifter, and mention its applications

9. Explain wave guide discontinuities

10. Describe waveguide windows

11. Explain H plane tee
12. Calculate the coupling factor of a directional coupler when incident power is 600mW and power in Auxiliary waveguide is 350 microwatts
13. Define E plane tee

14. Calculate the power in the main arm and auxiliary arm for a directional coupler with the incident power 550mwatts. The coupling factor is 30 db
15. Define Magic tee
16. Explain coupling factor and directivity
17. Define waveguide irises
18. Explain waveguide tees

19. Describe a directional couplers and its parameter
20. Describe coupling probes and loops

UNIT IV

1. Explain the Scattering Matrix for a 3-port circulator.
2. explain S-matrix and input VSWR of A matched Isolator having an Insertion Loss of 0.6 dB and an Isolation of 20 dB.
3. Obtain the S - matrix for a magic Tee with respect to its properties
4. Obtain the S-Matrix of a 2-port junction having single shunt susceptance of $j20$ milli mhos connected between the two ports having $Z_0 = 50$ ohms.
5. A reciprocal 2 port microwave network has a VSWR of 1.5 and an insertion loss of 2 dB. Find the magnitudes of S parameters for this circuit.
6. Obtain the S-Matrix of a 2-port junction having single shunt susceptance of $j20$ milli mhos connected between the two ports having $Z_0 = 50$ ohms.
7. A reciprocal 2 port microwave network has a VSWR of 1.5 and an insertion loss of 2 dB. Find the magnitudes of S parameters for this circuit.
8. Write the S - matrices for
 - i. a simple ideal rectangular wave guide section
 - ii. a simple ideal dielectric phase shifter in a rectangular wave guide.
9. Scattering matrix is a unitary matrix. Prove this statement.
 10. Explain ferrite components briefly
 11. Describe schematically working of a gyrator
 12. Explain working principle of circulator
 13. What is an isolation and how it provides stability to microwave sources
 14. Describe faraday rotation
 15. How ferrites are used as microwave components
 16. Define the properties of an isolator
 17. Calculate the scattering coefficients of a matched isolator having insertion loss of 0.5dB and isolation 25dB.
 18. Explain the applications of ferrite components in microwave
 19. Describe working of an isolator
 20. Explain a gyrator

Unit-1

20 Long Questions 2M/2.5M/3M (Blooms level-2&3)

1. Sketch and explain the Ion -lithography process.
2. Explained about different steps involved in the IC fabrication briefly.
3. Sketch and Explain CMOS fabrication process using P well.
4. Explain two commonly used methods for obtaining integrated capacitor.
5. Sketch and explain the formation of the inversion layer in P-channel Enhancement MOSFET.
6. Explain the different steps of CMOS n-well process devices.
7. Explain in detail the working of NMOS transistor & its fabrication process
8. Explain in detail the BICMOS n-well fabrication process.
9. Explain the following:
 - (a) Oxidation.
 - (b) Diffusion.
10. Sketch and explain CMOS fabrication process using TWIN TUB.
11. Explain the additional layers added for Bi CMOS devices?
12. Sketch and explain the formation of inversion layer in n-channel Enhancement MOSFET.
13. Explain about various processing steps involved in IC technology for the fabrication of MOS ICs.
14. What is moors law? Explained its relevance with respect to evaluation of IC technology.
15. Compare between CMOS and BIPOLAR technologies
16. Explain in detail about integrated passive components
17. Compare between MOS and CMOS technologies.
18. Write short notes on encapsulation and metallization.
19. Explain the operation of Enhancement transistor.
20. Write short notes on CMOS nanotechnology.

Unit-2

20 Long Questions 2M/2.5M/3M (Blooms level-2&3)

1. Explain different forms of pull ups used as load, in CMOS and in enhancement & depletion modes of NMOS.
2. Explain various regions of CMOS inverter transfer characteristics.
3. Explain an n MOS transistor model indicating all parameters.
- 4 Explain the pull up to pull down ratio of an NMOS inverter driven by pass transistor.
5. Explain the NMOS inverter transfer characteristics.
- 6 Explain the possibility of using a CMOS inverter as an amplifier.
7. Calculate the equation for I_{ds} of an n-channel enhancement MOSFET operating in saturation region .
8. Calculate the equation for I_{ds} of an n-channel enhancement MOSFET operating in non saturation region
9. Explain how the Bi CMOS inverter performance can be improved.
10. Define threshold voltage of a MOS device and explain its significance.
11. Calculate drain source resistance for an NMOS Transistors is operated in the triode region with the following parameters $V_{GS} = 4V$; $V_{tn} = 1V$; $V_{DS} = 2$; $W/L = 100$; $\mu_n C_{ox} = 90 \text{ A/V}^2$
12. Explain circuit diagram of a Bi CMOS inverter with no static current.
13. Explain the pull up to pull down ratio of an NMOS inverter driven by another NMOS
14. Derive the expression for figure of merit w_o of an MOSFETS
15. Explain the CMOS inverter transfer characteristics.
- 16 Calculate drain current for an NMOS Transistors is operated in the triode region with the following parameters $V_{GS} = 4V$; $V_{tn} = 1V$; $V_{DS} = 2$; $W/L = 100$; $\mu_n C_{ox} = 90 \text{ A/V}^2$
- 17 Calculate transconductance for an NMOS Transistors is operated in the saturated region with the following parameters $V_{GS} = 5V$; $V_{tn} = 1.2V$; $V_{DS} = 2$; $W/L = 110$; $\mu_n C_{ox} = 110 \text{ A/V}^2$
- 18 Derive the equation for R_{ds} of an n channel enhancement MOSFET in linear region.
- 19 Derive an equation for transconductance of an n-channel enhancement MOSFET operating in active region
20. Draw the circuits for nmos ,pmos and cmos inverter and explain about their operation and compare them.

Unit-3

20 long questions 2M/2.5M/3M (Blooms level 2&3)

1. Design a stick diagram and layout for two input CMOS NAND gate indicating all the regions & layers of transistor.
2. Give the cell description of an inverter and channel less gate arrays.
3. Design a stick diagram and layout for the NMOS logic shown $Y = (A + B)C$.
4. What is a stick diagram? Draw the stick diagram and layout for a CMOS inverter.
5. What are the effects of scaling on V_t ?
6. Discuss the design rules for wires.
7. Design a stick diagram for the CMOS logic shown below $Y = (A + B + C)$
8. Design a stick diagram and layout for the NMOS logic shown $Y = (A + BC)$.
9. Write short notes on Scaling.
10. Draw the stick diagram and layout for the NMOS logic shown $Y = (AB + CD)$.
11. Explain various steps in VLSI design flow.
12. Give typical design specifications in manufacturing VLSI chip.
13. Compare NMOS and CMOS Design styles.
14. Discuss the design rules for Contact Cuts.
15. Discuss the Lambda based design rules for CMOS.
16. Discuss the design rules for wires.
17. Draw the layout diagram for NMOS Inverter and NAND gates.
18. Draw the layout diagram for CMOS Inverter and NOR gates.
19. What is Scaling and discuss about the various types of scaling.
20. Write about any four Scaling factors for device parameters.

Unit-4

20 long questions 2M/2.5M/3M (Blooms level 2&3)

1. Describe the following briefly
 - (a) Cascaded inverters as drivers.
 - (b) Super buffers.
2. Write short notes on Sheet resistance.
3. Write short notes on Area Capacitance.
4. Explain clocked CMOS logic and Dynamic CMOS logic.
5. Explain Pseudo NMOS logic AND CMOS Domino logic.
6. Calculate the rise time and fall time of the CMOS inverter $(W/L)_n = 6$ and $(W/L)_p = 8$, $K'_n = 150 \mu A/V^2$, $V_{tn} = 0.7V$, $K'_p = 62 \mu A/V^2$, $V_{tp} = -0.85V$, $V_{DD} = 3.3V$. Total out-put capacitance = 150 fF.
7. Design a XOR using CMOS logic.
8. Explain NOR CMOS logic operation.
9. Write advantages and disadvantages of Dynamic logic.
10. Define Fan-in and Fan-out and its effects on propagation delay.
11. What is switch logic and how it can be implemented using Transmission Gate.
12. What is delay unit and derive its equation.
13. Discuss about Inverter delays.
14. Write short notes on driving large capacitive loads.
15. Write short notes on wiring capacitances.
16. Write short notes on choice of layers.
17. Derive the expression for rise and fall time.
18. Calculate ON Resistance for N-CH sheet resistance = $10^4 \Omega/\text{square}$ and P-CH sheet resistance = $2.5 \times 10^4 \Omega/\text{square}$. ($Z_{pu} = Z_{pd} = 1:1$)
19. Calculate ON Resistance from V_{DD} to V_{SS} for inverter, if N-CH sheet resistance = $2 \times 10^4 \Omega/\text{square}$ and $Z_{pu} = 2:2$, $Z_{pd} = 1:1$
20. Calculate gate Capacitance of $2\mu\text{m}$ technology minimum sized transistor with gate to channel capacitance = $8 \times 10^4 \text{ pf}/\mu\text{m square}$.

QUESTION BANK
SUBJECT: CAD/CAM (57024)
UNIT: 1

1. Define cad/cam.
2. Explain the role of computers in manufacturing industry.
3. Explain any two display devices.
4. What are the types of plotters?
5. Explain the mechanical engineering applications for cad.
6. Briefly describe the floppy disk device used in computers.
7. Explain basic structure of CPU.
8. What is meant by product life cycle? Briefly describe with a neat sketch?
10. What are CAD /CAM? What are the advantages of CAD /CAM?
11. What are the various input devices? Explain in detail
12. What is various output Devices? Explain in detail?
13. What is the basic structure of CAD/CAM? Explain about various storage devices?
23. Briefly explain about the applications of CAD/CAM?
14. Explain the benefits of computer aided design.
15. What is meant by product life cycle? Briefly describe with a neat sketch.
16. Briefly explain the working of refresh display and DVST.
17. Explain the concept of various coordinate system required for geometric display systems. Give an example.
18. What are various Memory types? Explain briefly.
19. Discuss about hard copy devices. Explain briefly.
20. Explain about CAD/CAM hardware.

UNIT: 2

1. Explain different types of coordinate systems with a neat sketch.
2. Explain DDA algorithm/ flow chart for a line.
3. Define transformation geometry for rotation.
4. Specify the 3D transformation matrix for translation.
5. Specify the 3D transformation matrix for scaling.
6. Define transformation geometry for scaling.
7. Explain the database structure for graphics modeling with a neat sketch.
8. Explain Different types of 3D geometric transformations.
9. Explain clipping? Give its advantages compared to line clipping
10. Explain clipping with necessary sketches
11. Discuss about reflection transformation. Explain reflection through a plane, line and a point.
12. Explain the basic principle of (i) the DDA and (ii) Bresenham's algorithms for the linear interpolation for graphics terminals.
13. Explain the importance of clipping. Give the details of method used for line clipping?
14. Explain the method of back face removal. Give its advantages and disadvantages with reference to hidden line removal.
15. Draw a line (2, 3) to (6, 7) using DDA line generation?
16. What is database structure? Explain the popular database model with an example.
17. Consider the line from (0, 0) to (5, 5).use the simple DDA to rasterize the line.
18. Explain the Z-buffer algorithm for hidden surface removal.
19. The line defined by two end points A (1, 1) and B (2, 4) is rotated by 30° .Determine the transformed line.
20. Find out the raster locations by Bresenham's algorithm for the end points of a straight line (20, 10), (30, 18)?

UNIT: 3

1. What are the requirements for geometric modeling?
2. Specify the three principal classifications of the geometric modeling systems with neat sketches.
3. Explain curve representation for a circle with implicit and parametric forms
4. Explain the geometric models for solid model with neat sketch.
5. Explain the geometric models for surface model with neat sketch.
6. Explain the geometric construction models
7. What are the different modeling facilities available in geometric modeling.
8. Briefly explain the various graphic transformations required for manipulating the geometric information?
9. Describe with the help of neat sketches the major surfaces entities provided by the CAD/CAM systems?
10. Briefly explain various geometric construction methods in CAD system?
11. What are the requirements of geometric modeling?
12. A cubic Bezier curve is defined by the control points as (20, 20), (60, 80), (120,100) and (150, 21).Find the midpoint of the curve?
13. How do you classify the various modeling systems on the basis of their capabilities?
14. Give a classification of the different surfaces that can be used in geometric modelling applications?
15. What are the primitive elements in cad? Give the classification of geometric modeling systems based on their capabilities.
16. Find the midpoint of a Hermite cubic spline with the two points as [1, 1] and [6, 5] and the tangent vectors as [0, 4] and [4, 0].
17. Explain the Curve representation methods.
18. Explain the surface representation methods.
19. What is the modeling facilities desired in geometric modeling?
20. Find the midpoint of the curve.

UNIT: 4

1. What are the basic geometric commands in Auto cad?
2. Briefly explain about solid modeling with neat sketch.
3. What are the editing facilities available in Auto cad?
4. What are the different types to mention a circle and arc in Auto cad?
5. Briefly explain about solid modeling.
6. What are the editing commands and explain with neat sketches.
7. What are the properties and conventions to be followed while using layers?
8. What is the display control commands used in Auto cad?
9. Find all the layer-related commands on your system. Specify how to select/deselect layers, assign entities to layers, assign layers to entities, assign colors to layers, modify layer colors and modify layers of existing entities.
10. What are the display and editing commands in AutoCAD?
11. What is the advantage of parametric programming in designing curves and surfaces? Discuss.
12. Specify the range of applications for which typical geometric model information is Required?
13. Explain extrude and loft commands in CAD software package.
14. Briefly explain about the various display control commands used in CAD software.
15. Explain various methods of dimensioning systems in CAD?
16. What is importance of layers in drafting? Explain with an example.
17. Explain the constructive solid geometry for the representation of solids.
18. What are the various basic geometric commands used in CAD software, explain it?
19. Explain various types of coordinate systems used in CAD software?
20. Explain solid modeling?

ICS I Mid question paper

UNIT-I

1. Distinguish between direct and indirect methods of measurement with suitable examples?
2. Explain the following functional blocks by means of examples.
 - i. Variable conversion element
 - ii. Data manipulation element
 - iii. Data transmission element
3. What are desired modifying and interfering inputs for an instrumentation system? How do you counter the effects of modifying and interfering inputs by the methods of signal filtering? Explain by means of suitable examples?
4. What are the different sources of errors in measurements and measuring instruments? Explain?
5. Different static performance characteristics are
 - i. Accuracy
 - ii. Precision
 - iii. Resolution
 - iv. Sensitivity
 - v. Linearity
6. What is instrument? Explain different type of instruments with their suitable examples?
7. Generalized configurations and functional description of measuring instruments?
8. Explain Bourdon tube pressure gauge with neat sketch?
9. Explain methods of measurements
 - i. Direct comparison
 - ii. Indirect comparison
10. Importance of measurements?
11. What is a standard? Explain classification of standards?
12. What is calibration? Performance characteristic of instruments?
13. Explain dead time and dead zone?
14. Classification of Errors?
15. Explain basic principle of measurement system?
16. Functions of an instrument?

17. Explain about null and deflection type instrument?
18. Types of measurement applications?
19. Explain BIAS error?
20. Briefly explain about automatic and manual instruments with their examples?

UNIT-II

1. What are desirable properties of piezo electric materials? Mention few piezo electrical materials?
2. Explain the working of a total radiation pyrometer with a neat sketch state its advantages and disadvantages?
3. By means of sketches explain the working principle of RTD? Why protection is needed for the sensing element?
4. Explain working principle of thermocouples with their neat sketch? What is ambient temperature composition?
5. Explain the working of LVDT by means of neat sketches?
6. Define temperature and write classification of thermometers?
7. What is transducer and write the function of transducer?
8. Classification of transducers?
9. Explain the piezo electrical transducer?
10. Explain about liquid-in-glass tube type thermometer and its function?
11. Explain about thermo couple with neat sketch?
12. Write about photo electrical transducers and their function?
13. Explain about types of photo electrical transducers and their working principles?
14. Discuss about pyrometer and its working principles?
15. Distinguish between RTD and thermocouple?
16. Explain about the thermistor?
17. Briefly explain type of thermometers?
18. What is Error and how to find out error?
19. Explain about pyrometer?
20. Write about photo emissive transducer?

UNIT-III

1. What is a diaphragm gauge? Explain construction working with a neat sketch?
2. Explain the basic working principle of bellows pressure gauge?
3. Explain the working principle of McLeod gauge?
4. Explain the working principle of Pirani thermal conductivity gauge?
5. What is the basic principle in thermal conductivity gauge? Explain the working principle of this gauge?
6. Explain how sensitivity can be increased by using inclined tube manometer. Describe its construction, advantages and limitations.
7. How do you measure the pressure with the help of U-tube manometer and Micro manometer
8. A McLeod gauge having $V = 200\text{cm}^3$ and a capillary diameter of 2 mm is used to measure the gas pressure. What will be the pressure of gas corresponding to a capillary reading of 4cm?
9. A platinum resistance thermometer has a resistance of 140.5Ω and 100.0Ω at 100 and 0°C respectively if its resistance becomes 305.3Ω when it is contact with a hot gas, determine the temperature of the gas take the temperature coefficient of platinum as 0.0039°C .
10. Explain classification of pressure measuring devices?
11. Briefly explain Dead weight pressure gauge with advantages and disadvantages?
12. Discuss about Bourdon tube pressure gauge and their working principle?
13. What are the low pressure measuring instruments with their examples?
14. Discuss about Ionization pressure gauge and their advantages and disadvantages?
15. Explain different types of differential manometers write their advantages and limitations?
16. Classification of different types of manometers explain with neat sketch?
17. Explain any two types of manometers with their neat sketch?
18. What is pressure and how to measure the pressure what are the instruments are there and units for pressure measurement?
19. Explain about low pressure measuring instruments with neat sketch?

20. Explain advantages of McLeod gauge and their limitations?

UNIT-IV

1. Sketch and working of a capacitive type level gauge. Show that level is directly proportional to the Capacitance measured.
2. Explain construction, working and applications of ultrasonic flowmeter with suitable diagram.
3. Describe in detail with neat sketches Float operated Rheostat
4. Describe in detail with neat sketches Hook Level indicator
5. Enumerate the principle of operation, construction details, advantages and limitations of Rota meter
6. List out the advantages and disadvantages of In direct method level measurement
7. Explain how a wire mounted normal to probe axis", type hot wire anemometer is used in flow measurement. Enumerate the principle of operation and its limitations.
8. Explain with a neat sketch, the principle of operation of various solid level indicators
9. Describe in detail with neat sketches Turbine Flow meter
10. List out the importance of calibration of flow measuring instruments.
11. Discuss about measurement of levels?
12. Explain classification of measurement of levels?
13. Explain about float gauges with neat sketch?
14. Explain about ultrasonic level indicator?
15. Discuss about Hook type level indicator?
16. Explain about flow measurement?
17. Discuss different types of flow measuring instruments?
18. What is the function of Rota meter explain with neat sketch?
19. What are the mechanical flow meters are there discuss with neat sketch?
20. Explain basic principle of Hot wire anemometer?

UNIT- I:

1. (a) Discuss the limitations of OR?
(b) A company makes three products P, Q and R and each product is to be processed in 3 departments. The time taken for these are listed in the table shown.

Product	Time in hours/unit		
	Department A	Department B	
P	4	3	2
Q	5	2	2
R	3	3	4
Total available time	75	70	10

Solve the optimum product mix if the profit for each of the products is Rs.3, Rs. 5 and Rs.3.50 respectively.

2. (a) Explain briefly the general methods used for solving OR models.
(b) Solve the following LPP by graphical method.

$$\text{Minimize } Z = 20X_1 + 10X_2$$

Subject to

$$X_1 + 2X_2 \leq 40$$

$$3X_1 + X_2 \geq 30$$

$$4X_1 + 3X_2 \geq 60$$

$$\text{and } X_1, X_2 \geq 0$$

3. (a) What are the characteristics of OR?
(b) Solve the following LP Problem by two phase method
Maximize $Z = 5x_1 + 8x_2$

subject to the constraints

$$3x_1 + 2x_2 \geq 3$$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5$$

$$x_1, x_2 \geq 0.$$

4. (a) Define iso- profit and iso-cost lines. How do these help to obtain a solution to an LP problem?

(b) Use the graphical method to solve the following LP Problem

$$\text{Minimize } Z = 20x_1 + 10x_2$$

Subject to the constraints

$$x_1 + 2x_2 \leq 40$$

$$3x_1 + x_2 \geq 30$$

$$4x_1 + 3x_2 \geq 60.$$

$$x_1, x_2 \geq 0$$

5. (a) A farmer has 100 acre farm. He can sell all tomatoes, lettuce, or radishes he can raise. The price he can obtain is Rs 1.00 per kg for tomatoes, Rs 0.75 a head for lettuce and Rs 2.00 per kg for radishes. The average yield per acre is 2000 kg of tomatoes, 3000 heads of lettuce and 1000 kgs of radishes. Fertilizer is available at Rs 0.50 per kg and the amount required per acre is 100 kgs each for tomatoes and lettuce, and 50 kgs for radishes. Labour required for sowing and harvesting per acre is 5 man-days for tomatoes and radishes, and 6 man-days for lettuce. A total of 400 man-days of labour are available at Rs 20.00 per man-day. Formulate this as a Linear-Programming model to maximize the farmers total profit.

(b) Describe briefly the different phases of operations research.

6 Use big -M method to solve the following

$$\text{Maximize } Z = 6x_1 + 4x_2$$

$$\text{Subject to } 2x_1 + 3x_2 \leq 30, 3x_1 + 2x_2 \leq 24, x_1 + x_2 \geq 3,$$

$$x_1, x_2 \geq 0$$

7 (a) Explain duality? What is the significance of dual variable in a LP model?

(b) Applying the concept of duality, solve the LPP

$$\text{Maximize } Z = 3x_1 + x_2$$

$$\text{Subject to } x_1 - x_2 \leq 1, x_1 + x_2 \leq 4, x_1 - 3x_2 \leq 3,$$

$$x_1, x_2 \geq 0$$

- 8 (a) What is an unbounded solution? Explain.
 (b) Use the graphical method to solve the following LP Problem
 Maximize $Z = 3x_1 + 4x_2$
 Subject to $x_1 - x_2 = -1$, $x_1 + x_2 \leq 30$, $x_1 \geq 0$, $x_2 \geq 0$.
- 9 (a) Define and explain the terms
 a. Feasible solution
 b. Basic solution
 c. Basic feasible solution
 (b) Solve the following LP Problem by two phase method
 Maximize $Z = 5x_1 - 2x_2 + 3x_3$
 Subject to $2x_1 + 2x_2 - x_3 \geq 2$, $3x_1 - 4x_2 \leq 3$, $x_2 + 3x_3 \leq 5$
 $x_1, x_2, x_3 \geq 0$
10. Solve the following LLP using Simplex method.
 Minimize $Z = 2X_1 + X_2$
 Subject to $3X_1 + X_2 = 3$, $4X_1 + 3X_2 \geq 6$, $X_1 + 2X_2 \leq 4$ and $X_1, X_2 \geq 0$
11. Find the minimum value of $Z = 4X_1 + 2X_2$
 Subject to $X_1 + 2X_2 \geq 2$, $3X_1 + X_2 \geq 3$, $4X_1 + 3X_2 \geq 6$ and $X_1, X_2 \geq 0$
 By graphical method.
12. Find the maximum value of $Z = 5x_1 + 7x_2$
 Subject to $X_1 + X_2 \leq 4$, $3x_1 + 8x_2 \leq 24$, $10x_1 + 7x_2 \leq 35$
 $X_1, X_2 \geq 0$
 Use the graphical method.
13. Find the minimum value of $Z = 4X_1 + 2X_2$
 Subject to $X_1 + 2X_2 \geq 2$, $3X_1 + X_2 \geq 3$, $4X_1 + 3X_2 \geq 6$ and
 $X_1, X_2 \geq 0$
 By graphical method.
14. Solve the below LPP
 Maximize $z = 18x_1 + 16x_2$
 subject to
 $15x_1 + 25x_2 \leq 375$
 $24x_1 + 11x_2 \leq 264$
 $x_1, x_2 \geq 0$
15. Solve by simplex method
 Maximize $z = 6x_1 - 2x_2$ subject to
 $2x_1 - x_2 \leq 2$
 $x_1 \leq 3$
 $x_1, x_2 \geq 0$
16. Minimize $z = 200x_1 + 300x_2$ subject to
 $2x_1 + 3x_2 \geq 1200$
 $x_1 + x_2 \leq 400$
 $2x_1 + 1.5x_2 \geq 900$
 $x_1, x_2 \geq 0$ Solve by simplex method
17. Explain the structure of an LPP with examples?

18. Use big –M method to solve the following
 Maximize $Z = 8x_1 + 5x_2$
 Subjected to $2x_1 + 4x_2 \leq 45$
 $3x_1 + 2x_2 \leq 40$
 $x_1 + x_2 \geq 30$
 $x_1, x_2 \geq 0$.
19. Define the algorithm of simplex method to solve an LPP?
20. Give step-by-step procedure to solve LPP by BIG-M method?

UNIT-II

1. Solve the following transportation problem.

	A	B	C	D	Supply
I	9	16	15	6	15
II	2	1	3	5	25
III	6	4	7	3	20
Demand	10	15	25	10	

2. Solve the following transportation problem, the matrix represents the times t_{ij} :

		To				
		P	Q	R	S	Availability
From	A	6	7	3	7	5
	B	7	9	1	5	7
	C	6	5	16	7	8
	D	18	9	10	2	10
	Demand	10	5	10	5	

3. Transbulk company has three warehouses A,B and C of capacities 50,60 and 40 respectively and four stores P,Q,R and S of capacities 20,70,50 and 10 respectively. Cost (in hundreds of rupees) of shipping one unit of commodity from various warehouses to different stores are as follows:

Warehouse/Stores	P	Q	R	S
A	5	15	7	6
B	8	7	9	1
C	1.5	9	8	8

Workout the transportation schedule by using Vogel’s approximation method and find the minimum transportation cost.

4. Consider the following transportation problem and find an optimum solution

Demand points

		1	2	3	4	Supply
Source	1	2	3	11	7	6
	2	1	0	6	1	1
	3	5	8	15	9	10
Demand		7	5	3	2	17

5. A company has factories at A, B and C which supply to the warehouses at D, E, F and G. The factory capacities are 230, 280 and 180, respectively for regular production. If overtime production is utilized, the capacities can be increased to 300, 360 and 190, respectively. Increment unit overtime costs are Rs. 5, Rs. 4 and Rs. 6, respectively. The current warehouse requirements are 165, 175, 205 and 165, respectively. Unit shipping costs in rupees between the factories and the warehouse are given in table 2. Determine the optimum distribution for the company to minimize the total cost.

		TO			
		D	E	F	G
FROM	A	6	7	8	10
	B	4	10	7	6
	C	3	22	2	11

6. Calculate the optimal solution for a given TP.

	D1	D2	D3	D4	
1	1	2	1	4	30
2	3	3	2	1	50
3	4	2	5	9	20
	20	40	30	10	

7. Calculate the optimal solution for a given TP.

	1	2	3	4	
A	6	7	3	7	5
B	7	9	1	5	7
C	6	5	16	7	8
D	18	9	10	2	10

8. Optimize the following Transportation Problem.

demand				
	8	5	6	120
Supply	15	10	12	80
	3	9	10	80
	130	80	50	

9. Determine the Optimum basic feasible solution to the following Transportation problem.

	D1	D2	D3	available
O1	50	30	220	1
O2	90	45	170	3
O3	250	200	50	4
required	4	2	2	

10. Calculate the optimum assignment for the given problem.

	a	b	c	d	e
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

11. Calculate the minimum cost assignment for the following problem.

	I	II	III	IV	V
A	6	5	8	11	16
B	1	13	16	1	10
C	16	11	8	8	8
D	9	14	12	10	16
E	10	13	11	8	16

12. Solve the following minimal assignment problem

Job	Machinist			
	1	2	3	4
A	12	30	21	15
B	18	33	9	31
C	44	25	24	21
D	23	30	28	14

13. (a) Give the mathematical representation of an assignment problem
 (b) The assignment cost of assigning any one operator to any one machine is given in the following table.

Machine	Operators			
	I	II	III	IV
A	10	5	13	15
B	3	9	18	3
C	10	7	3	2
D	5	11	9	7

Solve the optimal assignment by Hungarian method

14. (a) Explain the various steps in the Hungarian Method used for solving assignment problems.
 (b) A batch of 4 jobs can be assigned to 5 different machines. The set up time (in hours) for each job on various machines given below.

		Machine				
		1	2	3	4	5
Job	1	10	11	4	2	8
	2	7	11	10	14	12
	3	5	6	9	12	14
	4	13	15	11	10	7

Write an optimal assignment of jobs to machines which will minimize the total set up time.

15. The profits after assigning the machines to jobs is given as follows. Solve the problem to maximize the profits

	J1	J2	J3	J4	J5	J6
M1	5	3	7	6	5	3
M2	7	6	1	4	2	8
M3	6	2	4	3	4	5
M4	4	6	4	7	3	8

16. (a) What is the difference between assignment problem and travelling salesman problem?

(b) A salesman has to visit five cities A, B, C, D and E. The distance (in hundred km) between the five cities are as follows.

		To				
		A	B	C	D	E
From	A	-	7	6	8	4
	B	7	-	8	5	6
	C	6	8	-	9	7
	D	8	5	9	-	8
	E	4	6	7	8	-

If the salesman starts from city A and has to come back to city A, which route he should select so that the total distance travelled by him is minimized.

- 17 Explain the algorithm for solving transportation problem by northwest corner rule? With example?
- 18 Explain the algorithm for solving transportation problem by Vogel's approximation rule? With example?
- 19 Explain the algorithm for solving transportation problem by Assignment method? With example?
- 20 Explain the algorithm for solving transportation problem by least cost method? With example?

UNIT-III

1. Calculate the sequence that minimizes the total elapsed time (in hours) required to complete the following jobs on three machines ABC in the order BAC

Job Number	1	2	3	4
Machine A	9	7	3	7
Machine B	5	5	6	12
Machine C	1	2	4	3

2. Calculate the sequence of jobs that minimize the total elapsed time to complete the jobs with sequence M1 M2.

Job	1	2	3	4	5
MachineM1	4	5	4	9	6
MachineM2	5	4	1	7	4

Also find the total elapsed time and idle times of each machine

3. Explain the Johnson's algorithm of processing h jobs through two machines.
4. We have 5 jobs, each of which must go through machines A, B and C in the order ABC. Processing times (in hours) are given in the following table. Calculate

Job	1	2	3	4	5
Machine A	8	10	6	7	11
Machine B	5	6	2	3	4
Machine C	4	9	8	6	5

5. A company has 4 machines on which to do 3 jobs. Each job can be assigned to one and only one machine. The cost of each job on each machine is given in the following table.3

Job	Machine			
		W	X	Y
A	18	24	28	32
B	8	13	17	19
C	10	15	19	22

Calculate the job assignments which will minimize the cost?

6. (a) The yearly cost of two machines A and B, when money value is neglected is shown below. Calculate their cost patterns if money is worth 10 per cent per year and hence find which machine is more economical.

Year :	1	2	3
Machine A (Rs):	1,800	1,200	1,400
Machine B (Rs):	2,800	1,200	1,400

- (b) Explain the term 'present worth factor'.

7. A scooter cost Rs 6,000 when new. The running cost and salvage value at the end of different years are as follows: (in Rs):

Year:	1	2	3	4	5	6	7
Running cost:	1,200	1,400	1,600	1,800	2,000	2,000	2,400
Values:	4,000	2,666	2,000	1,500	1,000	600	600

If the interest rate is 10 per cent per year and running costs are assumed to have occurred mid year, find when the scooter should be replaced.

8. (a) Equipment A costs Rs.9000. Annual operating costs are Rs.200 for the first year and then increases by Rs.2, 000 every year. Determine the best age at which to replace the equipment.

(b) Equipment B costs Rs.10; 000. Annual operating costs are Rs.400 for the first year and then increases by Rs.800 every year. Now you have a equipment of type A which is one year old. Should you replace it with B, if so when?

9. A manufacturer is offered two machines A and B. A is priced at Rs.5000 and running costs are estimated at Rs.800 for each of the first five years, increasing by Rs.200 per year in the sixth and subsequent years. Machine B, which has the same capacity as A, costs Rs.2500 but will have running costs of Rs.1200 per year for six years, increasing by Rs.2000 per year thereafter. If the money is worth 10% per year, which machine should be purchased assuming that both machines will eventually be sold for a scrap at a negligible value?

10. (a) Explain the replacement strategy for items of low cost which fail suddenly.

(b) The following failure rates have been observed for a certain type of light bulb.

End of Week:	1	2	3	4	5	6	7	8
Probability of failure:	0.05	0.13	0.25	0.43	0.68	0.88	0.96	1.00

The cost of replacing an individual bulb is Rs. 2.25. The decision is made to replace all bulbs simultaneously at fixed intervals, and also to replace individual bulbs as they fail in service. If the cost of group replacement is 60

Paise per bulb and the total number of bulbs is 1,000, what is the best interval between group replacements?

11. Write short note on group replacement.

12. Determine the best sequence for '5' jobs that will minimize the elapsed time T, if each of the '5' jobs must go through machines A, B and C in the order ABC, The processing times are.

Job	Processing time		
	A	B	C
1	8	5	4
2	10	6	9
3	6	2	8
4	7	3	6
5	11	4	5

13. Calculate the following sequencing problem to minimize the time elapsed with sequence M1&M2

Job	1	2	3	4	5
Machine M1	7	10	8	9	7
Machine M2	2	1	4	0	5

Also find the total elapsed time and idle times of each machine.

14. Write short note on sequencing.

15. What are the conditions to be satisfied to convert a 'n' jobs 3 machine problem into 'n' jobs 2 machine problem? Explain the method clearly?

16. Decision has to be made for group replacement versus individual replacement policy for 500 fluorescent tubes of a particular make in the university campus. Failure rate for the tubes were recorded as under

End of Month	1	2	3	4	5	6
Probability of failures	0.11	0.3	0.25	0.2	0.1	0.04

Cost of replacing an individual tube is Rs. 55/- and when replaced as group it is Rs.35/- Find out whether group replacement policy is economical or not. If economical at the end of which month should the tubes be replaced as a group?

17. Describe various sequencing models?explain?
 18. Give the justification of johnson's rule for sequencing n jobs x 2 machines?
 19. What are the assumptions made in sequencing problem?
 20. Discuss the use of probabilities in replacement policies?

UNIT IV

1. Differentiate between strictly determinable games and non-determinable games.
2. With the help of an appropriate example establish the relationship between 'Game theory' and 'Linear Programming'.
3. Solve the game theory method given in the table by reducing to 2 x2 game by graphical method.
4. Explain the theory of dominance in the solution of rectangular games
5. In a game of matching coins with two players, suppose A wins one unit of value when there are two tails and loses 1/2 unit of value when there is one head and one tail. Determine the pay o_ matrix, the best strategies for each player and the value of the game to A.
6. Two players A and B showing each other, put on a table a coin, with head or tail up. A wins Rs 8 when both the coins show head and Re 1 when both are tails. B wins Rs 3 when the coins do not match. Given the choice of being matching player (A) or non-matching player (B) which one would you choose and what would be your strategy?
7. Define:
 - i. Competitive game;
 - ii. Pure strategies;
 - iii. Mixed strategies

- iv. Two-person zero-sum (or rectangular) game,
v. Payoff matrix.
8. Player A and B, each take out one or two matches and guess how many matches the opponent has taken. If one of the players guesses correctly, then the loser to pay him as many rupees as the sum of the number held by both players. Otherwise, the payoff is zero. Write down the payoff matrix and obtain the optimal strategies of both players.
 9. Explain Minimax and Maximin principal used in the theory of games.
 10. Solve the games by using maximin (minimax) principle whose payoff matrix

Player A	Player B			
	B_1	B_2	B_3	B_4
A_1	1	7	3	4
A_2	5	6	4	5
A_3	7	2	0	3

11. Discuss equivalence of matrix game and the problem of linear programming. Explain the method of solving a zero-sum two persons game as a linear programming problem.
12. Solve For the following pay-off matrix, determine the best strategies and the value of the game.

	J	K	L
P	60	50	40
Q	70	70	50
R	80	60	75

13. Find the best strategy and the value of the following game.

	I	II	III
I	-1	-2	8
II	7	5	-1
III	6	0	12

14. Solve the following game by algebraic method.

		Player B	
		B1	B2
Player A	A1	-2	-4
	A2	-1	3
	A3	1	2

15. An engineering student was frequently absent to the classes in a semester. To safe guard himself, he can choose one of the alternatives given below and the professor also had four strategies. The student has approximated the probable percent of marks in the following pay off matrix against various strategies.

The student strategies are showing reasons as

- S1 = Due to ill health
- S2 = To attend sister's marriage
- S3 = Went on project work
- S4 = Attend inter college celebrations

The professor's strategies are

- P1 = Not giving attendance
- P2 = Giving exam tough
- P3 = Evaluating strictly
- P4 = Complaining to principal.

The payoff is

	P1	P2	P3	P4
S1	55	53	32	62
S2	40	30	74	50
S3	57	54	44	53
S4	54	54	72	56

Use dominance principle so that the student may choose his optimal strategy.

16. Write short notes on solution of games with saddle points.

17. Give the algorithm of finding saddle points in a rectangular game.

18. List out the assumptions made in the theory of game?

19. Explain how you can apply linear programming to game theory.

20. Solve the following game

	B1	B2	B3	B4
A1	-5	-2	0	7
A2	5	-6	-4	8
A3	4	0	2	3

Power plant engineering I Mid question paper

UNIT –I

1. Draw a chart showing operations and devices used in coal handling plant?
2. What is the importance of thermal power development in the country? Describe its development during the last six plans period.
3. Discuss the various factors to be considered while selecting the site for steam power plant. Discuss its advantages and disadvantages?
4. Describe the future planning of power generation in India?
5. Explain the different components used in steam power plant?
6. Classify the basic coal ingredients and how do they affect furnace design?
7. Describe different types of coal conveyors?
8. Draw a general layout of the thermal power plant and explain the working of different circuits?
9. Describe the hydraulic ash handling system with neat diagram?
10. Explain the different types of coal handling equipments with neat diagram?
11. Demonstrate ash plant handling of coal? What are the different methods of out plant handling?
12. Differentiate Central power plant and industrial power stations?
13. List out the essential requirements of steam power plant?
14. How the site for the steam power plant is selected?
15. Explain coal storage systems? Also explain cylindrical bunker?
16. Explain Pneumatic ash handling system and stem jet ash handling system?
17. Explain advantages of mechanical handling system over manual handling system of coal?
18. Explain belt conveyor and screw conveyor?
19. Compare Vee bucket elevator with pivoted bucket conveyor?
20. Differentiate grab bucket conveyor and flight conveyor?

Unit-II

1. Explain basic requirements of combustion equipment.
2. Explain factors to be considered for selection of combustion equipment.
3. Explain the advantages and disadvantages of stroker firing combustion.

4. State the working principal of over feed stokers and its advantages and disadvantages.
5. State the working principal of travelling grate stokers and its advantages and disadvantages.
6. Explain spreader stokers and its advantages and disadvantages.
7. Explain the principle of operation of under feed stokers.
8. Illustrate multi retort under feed stoker.
9. Explain pulverised fuel firing.
10. Compare unit system and central system of pulverised fuel firing.
11. Explain advantages and disadvantages of pulverised fuel firing over stoker firing.
12. Demonstrate ball and race mill.
13. Explain long flame burners and turbulent burner.
14. Compare tangential burner with cyclone burner.
15. Explain fluidised bed combustion.
16. Explain Hydraulic ash handling system.
17. What is dust collector and classify dust collectors.
18. Explain different types of dust collectors.
19. Define Chimney Draught and classify Draught.
20. Compare forced , induced and balanced draught systems.

UNIT-III

1. Explain with the help of a block diagram the fuel storage and supply system of diesel power plant.
2. Name the essential components and their functions in a diesel power plant.
3. In a gas turbine power plant working on Joule cycle, air is compressed from 1 kg/cm² and 170C through a pressure ratio of 6. It is then heated in the combustion chamber to 2000C and expanded to a pressure of 1kg/cm². Calculate the following
 - (a) Cycle efficiency
 - (b) Work ratio
 - (c) Specific work out put.
4. (a) List the advantages of super charging of diesel engines.
5. Explain the following
 - i. Fuel injection system
 - ii. Air supply system
 - iii. Exhaust system
5. Describe the following system in brief with respect to Diesel Power Plant.
 - (a) Air supply system
 - (b) Starting system
 - (c) Governing system

6. (a) Mention the advantages and disadvantages of a diesel power plant over a gas Turbine power plant.
(b) Give a maintenance schedule for Diesel engine power plant.
7. (a) In what fields Diesel electric power plants are used?
(b) What are the essential components of Diesel electric plants? Explain.
8. (a) What are the functions of spillways, baffle piers and drainage gallery in a Hydraulic power plant?
(b) What are storage and pond age in a power plant?
9. Explain with the help of a block diagram the water cooling system of diesel Power plant?
10. Explain the operation of a fuel pump? How the fuel supply to the engine is Regulated.
11. Explain super charging and turbo-charging of diesel engine?
12. Explain advantages and Disadvantages of liquid cooling system over the air cooling system of diesel engine power plant?
13. Explain various liquid cooling systems of diesel engine power plant?
14. Explain air cooling system of diesel engine power plant? Give advantages and disadvantages?
15. Explain the wet sump lubrication systems of diesel engine power plant?
16. Compare the Dry sump lubrication system with Mist lubrication system of diesel engine power plant?
17. Compare wet sump lubrication system, dry sump lubrication and mist lubrication system?
18. Explain the methods of starting and stopping of engines.
19. Differentiate between common rail injection system, individual pumping system and distributor system.
20. Explain the operation of diesel power plant?

UNIT-IV

1. Explain closed cycle gas turbine with diagram?
2. Explain open cycle gas turbine with diagram?
3. Differentiate open cycle gas turbine and closed cycle gas turbine?
4. Explain combined power cycle gas turbine with diagram?
5. Draw and explain the layout with auxiliaries of gas turbine power plant?
6. Compare open cycle gas turbine, closed cycle gas turbine and combined power cycle gas turbine?
7. Describe the working of constant pressure cycle gas turbine?
8. Compare constant pressure cycle gas turbine and constant volume cycle gas turbine?
9. Calculate the below factors of a simple gas turbine plant operating on Brayton cycle. The maximum and minimum temperatures are 1000K and 288K respectively. The pressure if the unit consumes 2 tonnes of oil per hour of C.V 46500 KJ per kg, determine the power generated. The mechanical efficiency is 90% and generation efficiency is 85%. a) Turbine Efficiency
10. Describe the working of a closed cycle gas turbine power plant. Mention its advantages and disadvantages.
11. A gas turbine plant is designed to develop 5 MW power. The inlet pressure and temperature of the air to the compressor is 1 bar and 30°C. The pressure ratio of the cycle is 5. A reheat is used between two turbines at a pressure of 2.24 bar. Calculate the overall efficiency of the cycle and mass flow rate assuming the following data. Isentropic η of the compressor = 80% Isentropic η of the turbines = 85%. $C_{p,a} = 1$ KJ/kg-k, $C_{p,g} = 1.15$ KJ/kg-k, $\gamma = 1.4$ for air $\gamma = 1.33$ gases. Neglect the mass of the fuel.
12. Explain the differences between open and closed cycle MHD systems and discuss their relative merits.
13. An open cycle gas turbine power plant works on Brayton cycle. The maximum pressure and temperature of the cycle are limited to 5 bar and 900 K. The pressure and temperature of the entering into the compressor are 1 bar and 27°C. Reheating is used at a pressure of 2.5 bar where the temperature of the gases is increased to its original turbine inlet temperature. The air flow per second through the plant is 10 kg/sec. Determine a) The thermal efficiency and plant capacity in MW. The exhaust pressure of the turbine is also 1 bar. Assume the compression and expansions are isentropic. Take $\gamma = 1.4$ for air and gases, $C_p = 1$ KJ/kg-K for air and gases and C.V of fuel = 40,000 KJ/kg.

14. Calculate the below factors of a simple gas turbine plant operating on Brayton cycle. The maximum and minimum temperatures are 1000K and 288K respectively. The pressure if the unit consumes 2 tonnes of oil per hour of C.V 46500 KJ per kg, determine the power generated. The mechanical efficiency is 90% and generation efficiency is 85%. Specific work output

15. A gas turbine plant is designed to develop 5 MW power. The inlet pressure and temperature of the air to the compressor is 5 bar and 70°C. The pressure ratio of the cycle is 5. A reheat is used between two turbines at a pressure of 3.24 bar. Calculate the overall efficiency of the cycle and mass flow rate assuming the following data. Isentropic η of the compressor = 80% Isentropic η of the turbines = 85%. $C_{p,a} = 1$ KJ/kg-k, $C_{p,g} = 1.15$ KJ/kg-k, $\gamma = 1.4$ for air $\gamma = 1.33$ gases. Neglect the mass of the fuel.

16. With a neat sketch explain the working of a simple constant pressure gas turbine. Mention its advantages and disadvantages.

17. What are the different methods used to improve the thermal efficiency of the open Cycle gas turbine plant? Draw and explain with neat sketches.

18. Calculate the power developed, thermal efficiency of an open cycle constant pressure gas turbine in which air enters the compressor at a flow rate of 3 kg/sec and pressure of 1 bar and temperature of 20°C. The pressure of the air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air fuel ratio used is 90:1. Assume $C_p = 1.0$ KJ/KgK and $\gamma = 1.4$ for air and gases, calorific value of fuel = 41800KJ/Kg.

19. Calculate power output in kw of an electric generator geared to gas turbine. When air enters the compressor at 15°C at the rate of 16 kg/sec. The gas turbine unit has a pressure ratio of 6:1 and maximum cycle temperature of 610°C. The isentropic efficiencies of compressor and turbine are 80% and 82% respectively. Take $C_p = 1.0$ kJ/kgK and $\gamma = 1.4$ for compression process and take $C_p = 1.11$ kJ/kgK and $\gamma = 1.333$ for combustion process?

20. Calculate

- i. The pressure and temperature of the gases entering the power turbine
- ii. The net power developed by the unit per kg/s mass flow
- iii. The work ratio
- iv. The thermal efficiency of the gas turbine unit

Air is drawn in gas turbine unit at 15°C and 1.01 bar and pressure ratio is 7:1. The compressor is driven by H.P turbine and L.P turbine derives a separate shaft. The isentropic efficiencies of compressor and H.P. and L.P. turbines are 0.82, 0.85 respectively. And maximum cycle temperature is 610°C. Take $C_{p,a} = 1.005$ kJ/kgK and $\gamma = 1.4$ for compression process and take $C_{p,g} = 1.15$ kJ/kgK and $\gamma = 1.333$ for combustion and expansion processes. Neglect the mass of fuel.

ROBOTICS

UNIT I

- 1) What are the advantages and disadvantages of magnetic grippers? Explain the two categories of magnetic grippers.
- 2) Explain the degrees of freedom of a robot with sketches.
- 3) Explain the difference between hard automation, flexible automation and Robotics
- 4) Explain the various types of joints used in robotics with sketches.
- 5) Distinguish between servo and non – servo grippers. What are the actuators used for such Grippers. Explain
- 6) Design A vacuum gripper is to be designed to handle flat plate glass in an automobile wind shields Plant. Each plate weighs 28lb. A single section cup will be used and the diameter of the suction Cup is 60in. Determine the negative pressure required(compared to atmospheric pressure of 14.7lb/sq.in) to lift each plate. Use a safety factor of 1.5 in your computation.
- 7) Explain the Eagleburger's factor in gripper selection and design
- 8) What is a compliant gripper? Why are compliant fingers used?
- 9) Sketch any Four of the following robots indicating the joints and degrees of freedom:
 - (a) Polar robot
 - (b) Cylindrical robot
 - (c) Cartesian robot
 - (d) SCARA robot
 - (e) Gantry robot
 - (f) Jointed arm robot.
- 10) Explain Automation in Robotics?
- 11) Describe Robot architecture?
- 12) Write classification of robots by control system?
- 13) Explain degrees of freedom of a robot with different sketches?
- 14) Describe different types of Robot configuration?
- 15) Define end effectors? And classify the end effectors?
- 16) Derive the formula for Gripper force analysis?

- 17) What are the four types of actuation mechanisms? Explain with sketches?
- 18) Explain Automation in Robotics?
- 19) Describe Robot architecture?
- 20) Write classification of robots by control system?

UNIT II

- 1) Explain the Eulerian angle system I?
- 2) What do you mean by Homogeneous co – ordinates? For the point $2i-3j+7k$ perform the following operations
 - i) Rotation 60° about the OY axis
 - ii) Then translate 10 units along OZ axis .
- 3) Explain composite rotation matrices.
- 4) Explain the inverse link coordinate transformation
- 5) Draw and explain with an example the composite rotation algorithm
- 6) Determine the Homogeneous transformation matrix to represent the following sequence of Operations.
 - (i) Rotation 60° about the OX axis
 - ii) Then translate 4 units along X- axis
- 7) Design a jointed-arm robot manipulator with its x, y, and z axes aligned with a reference cartesian coordinate frame but located at $(x, y, z) = (10 \text{ ft}, -5 \text{ ft}, 0 \text{ ft})$. The end-of-arm of the robot is currently at $(x, y, z) = (12 \text{ ft}, 2 \text{ ft}, 2.5 \text{ ft})$ relative to the reference coordinate frame. An end effector of 10 in. in length is attached to the end-of-arm and is pointing vertically down. Relative to the tip of the end effector is a cube, with 6 in. on a side, and with its nearest corner positioned + 1 ft in the x direction, + 2 ft in the y direction, and 0 ft in the z direction from the tip of the end effector.
 - (a) Make a sketch of the workcell.
 - (b) Identify all transforms numerically.
 - (c) Show by means of the transform graph how you would solve for the transform for the cube relative to the end effector. That is, determine all transforms needed to and the transform of the cube relative to the end effector. [SET2,Sept 2011,JNTUH]
- 8) Analyze A frame UB was moved along its own n-axis a distance of 5 units and then rotated about its o-axis an angle of 60° , followed by a rotation of about the z-axis; it was then translated about it's a-axis 3 units and finally rotated about x-axis 45° .

- (a) Calculate the total transformation performed
- (b) What angles and movements would we have to make if we were to create the same location and orientation using Cartesian configurations [SET3, Sept 2011, JNTUH]
- 9) Discuss the operation of rotation about an arbitrary axis represented by a vector and derive the rotation matrix and give geometric interpretation?
- 10) The co-ordinates of a point q_{abc} is given by $(753)^T$ which is rotated about the OX-axis of the Reference frame OXYZ, by angle of 60° . Determine the coordinates of the point q_{xyz} ?
- 11) Derive the composite rotation matrix for the rotations about the Cartesian axes. Write the rules applied in arriving at composite rotation matrix.
- 12) A point $p_{abc} = (2, 3, 4)^T$ has to be translated through distance of +4 units along OX-axis and -2 units along OZ-axis. Determine the co-ordinates of the new point p_{xyz} by homogeneous transformation?
- 13) Explain the geometric interpretation of homogeneous transformations.
- 14) The coordinates of point Q w.r.to base reference frame is given by $[4, 2\sqrt{3}, 5]$. Determine the Co-ordinates of Q w.r.to mobile rotated frame of the robot. If the angle of rotation with the OX is 60° .
- 15) Draw any two Euler angle systems and show rotation and angles?
- 16) Find the rotation matrices if the end effector is rotated about
- (i) x-axis by 60° (ii) y-axis by 30° (iii) z-axis by 60°
- 17) Explain the geometric interpretation of homogeneous transformations.
- 18) The coordinates of point Q w.r.to base reference frame is given by $[4, 2\sqrt{3}, 5]$. Determine the Co-ordinates of Q w.r.to mobile rotated frame of the robot. If the angle of rotation with the OX is 60° .
- 19) Draw any two Euler angle systems and show rotation and angles?
- 20) Find the rotation matrices if the end effector is rotated about
- (i) x-axis by 60° (ii) y-axis by 30° (iii) z-axis by 60°

UNIT III

- 1) Discuss the DH symbolic notation and explain the DH method of assignment of co-ordinate Frames.
- 2) Analyze the following link parameter table find the T matrix representing the position and

Orientation of the end effector

Table : Link parameter table of Cylindrical Robot.

Axis	θ	d	a	α
1	θ_1	0	0	0
2	90°	d2	0	$+90^\circ$
3	0	d3	0	$+90^\circ$
4	θ_4	d4(constant)	0	0

3) Evaluate a 3-DOF articulated arm, Determine the joint Displacement for known position and orientation of the end of the arm position

4) What are the coordinate frames for an articulated robot arm (3-axis) using D-H convention.

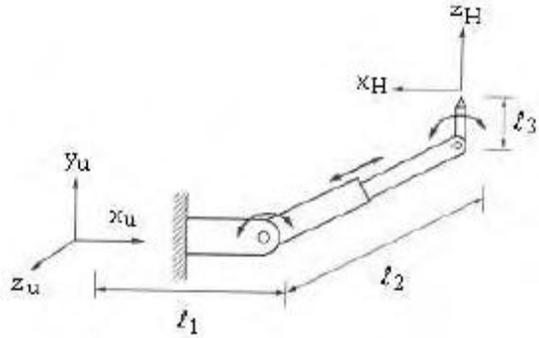
5. Analyze the United States Robots Maker 110 manipulator. This is a $-ve$ -axis spherical coordinate robot with a pitch-roll spherical wrist. Use the last half of the D-H algorithm to fill in the kinematic parameters for the Maker 110 in the table, consistent with the link-coordinate diagram. Indicate which parameters are the joint variables.

Axis	θ	d	a	α	Home
1					
1					
2					
3					
4					
5					

6. Determine the coordinate frames for an articulated robot arm (3-axis) using D-H convention.

7. Design a special three-degree-of-freedom spraying robot has been designed as shown in figure 7.

- (a) Assign the coordinate frames based on D-H representation.
- (b) Fill out the parameters table.
- (c) Write all the A matrices.
- (d) Write the UTH matrix in terms of the A matrices.



- 8) Derive the kinematic equations for the SCARA robot giving co-ordinate frame diagram and The kinematic parameters?
- 9) Derive the kinematic equation for the elbow manipulator with co-ordinate frame Diagram and kinematic parameters?
- 10) Explain geometric solution of inverse kinematic with an example of two-degree system Manipulator?
- 11) Explain numerical solutions for a 3-DOF manipulator?
- 12) Discuss about direct and inverse kinematics?
- 13) Explain DH convention briefly?
- 14) Define and Illustrate the link and joint parameters Explain their uses?
- 15) Derive the arm matrices for a cylindrical robot. Hence obtain the kinematic equations for The same?
- 16) Explain geometric solution of inverse kinematic with an example of two-degree system Manipulator?
- 17) Explain numerical solutions for a 3-DOF manipulator?
- 18) Discuss about direct and inverse kinematics?
- 19) Explain DH convention briefly?
- 20) Derive the arm matrices for a cylindrical robot. Hence obtain the kinematic equations for The same?

UNIT IV

- 1) What is a Geometric jacobian? Explain.
- 2) Find the jacobian matrix of a planar two link revolute jointed Manipulator
- 3) Determine Jacobian, Singularities and Joint velocities for a 3 DOF planar area with the revolute joints.
- 4) Explain how you solve simple inverse kinematic algorithm.
- 5) Find the manipulator jacobian matrix $J(q)$ of the five axis Spherical coordinate robot.
- 6) Establish the dynamic model of a one axis robot (Inverted Pendulum) with Lagrangian – Euler formulation.
- 7) Derive the expression for joint toques for a planar R-P robotic manipulator using Lagrangian – Euler Formulation.
- 8) Explain (1) Jacobian of articulated arm.
(2) Singularities and Joint velocities of a 2DOF arm.
- 9) Determine Jacobian manipulator
- 10) Evaluate prismatic joint jacobian?
- 11) Define Joint velocities for a 3-DOF planar arm with the revolute joints.
- 12) Explain (6) Prismatic Joint Jacobian.
- 13) Analyze Rotary Joint Jacobian.
- 14) What are the singularities of a manipulator? How are they classified and determined?
- 15) Determine the Jacobian of the 3 DOF Euler wrists?
- 16) Explain (1) Prismatic Joint Jacobian.
- 17) What is Rotary Joint Jacobian.Explain briefly
- 18) What are the singularities of a manipulator? How are they classified and determined?
Explain briefly?
- 19) Determine the Jacobian of the 3 DOF Euler wrist?
- 20) Analyze Singularities of jacobian

Sub: UNCONVENTIONAL MACHINING PROCESSES I mid question paper
MID-1

UNIT – I

1. Distinguish between the Conventional and unconventional machining process.
2. Explain various considerations used in the selection of modern machining process.
3. Explain the need for non-traditional machining process and how it benefits the manufacturing industries.
4. Classify the various modern machining processes.
5. Explain how the Material properties influence the selection of machining properties ?
6. List the disadvantages of Modern machining processes over conventional machining process.
7. Describe the need for modern machining process.
8. List the general disadvantages of traditional machining process.
9. Explain the reasons why the unconventional machining processes are used.
10. Explain the need for the use of unconventional machining processes compared to the conventional ones.
11. Compare the mechanical and electrical energy process in terms of physical parameters, shape capabilities, process capabilities and process economy.
12. Discuss the needs for unconventional machining process.
13. Compare conventional and unconventional machining processes.
14. Explain the classification of unconventional machining processes.
15. What do you understand by chip less machining and what harmful effect may such machining have? Explain.
16. Compare among various non-traditional machining processes in terms of the following. (1) Cavity-sinking (through) operation (2) pocketing operation (3) Through cutting operations.
17. Compare the mechanical and electrical energy processes in terms of physical parameters. Shape capabilities, Process capability, and Process economy.
18. Explain the reasons for the development of Unconventional Machining Process.

Discuss about the criteria recommended in selection of these processes.

19. Compare between traditional and unconventional machining processes in terms of cost,

20. Show different non-conventional processes, present in the form of a table, various process parameters recommended.

UNIT – II

1. Explain various elements of ultrasonic machining.

2. List the advantages and disadvantages of ultrasonic machine.

3.. Explain the process of ultrasonic machining.

4. List out applications and limitations of USM.

5. Explain how the grain size of abrasives influence surface finish in ultrasonic machining.

6. Describe about the recent developments in ultrasonic machining?

7.Explain various factors affecting the material removal rate in ultrasonic machining process.

8. Discuss about the various elements of ultrasonic machining process

9. Explain the working of an USM machine with the help of neat sketch.

10. Explain the applications and limitations of ultrasonic machining process.

11. Explain the following in details:

a) Types of transducers for USM.

b) Speed mechanism in USM.

c) USM typical applications.

d) Abrasives for USM.

12. Explain the functions of transducer and horns used in USM. List the tools materials used.

13. Explain the working principle of the USM process with its advantages and disadvantages.

14. Describe the effect of operating parameters on metal removal rate. List the applications of USM.

15.Explain the USM machine setup and discuss various feed mechanisms.

16. Discuss the influence process parameters and applications of USM

17. Write short notes on piezoelectric crystals?

18. State magnetostrictive effect?

19. List the magnetostrictive materials employed in USM?

20. Describe the purpose of concentrator used in USM

UNIT – III

1. Explain the process of abrasive jet machining? How is it different from sand blasting.
2. Explain the designed properties of abrasive materials used in abrasive jet machining.
3. Describe the effects of distance of nozzle from work on the diameter of cut in abrasive jet machining.
4. Distinguish between water jet machining and abrasive water jet machining.
5. Explain the desired properties of abrasive materials used in abrasive jet machining ?
6. List out the limitations of Abrasive Jet machining? List various applications of AJM.
7. Explain the working of water jet machining. List its advantages over abrasive jet machining ?
8. Explain how material is removed in Abrasive Water Jet Machining
9. Discuss the effects of the following parameters on working accuracy and rate of metal removal of AJM
10. Explain the principle of AJM. Mention some of the specific applications.
11. Discuss in detail about the AJM process variables that influence the rate of material removal and accuracy in the machining.
12. Explain the method of AJM with help of schematic diagram.
13. List out the advantages and limitations of AJM.
14. Explain the process parameters in WJM process.
15. Draw and explain the process of AJM .List its application and limitations.
16. Explain the process parameters that influence WJM. List the applications and limitations of WJM
17. Discuss the application and limitation of WJM.
18. Explain the principle of AWJM. Mention some of the specific applications.
19. Explain the process parameters in AWJM process.
20. Describe the effects of distance of nozzle from work on the depth of cut in abrasive water jet machining.

UNIT – IV

1. Explain the process of electrochemical deburring process.
2. Discuss about the economics of ECM.
3. Explain the process of electro chemical grinding.
4. Explain the factors which influence surface finish and accuracy in ECM.
5. Explain the process of electro chemical grinding ?
6. Explain the process of Electro Chemical Deburring ? why is it preferred over conventional de burring.
7. Explain the process of Electro chemical honing.
8. Explain the principle of ECM with the help of neat sketch
9. Describe the factors that should be considered in selecting the tool materials in ECM?
10. Describe the influence of Electro Chemical Machining on the Mechanical properties of machined components.?
11. Explain the ECM process. Explain how a replica of the tool is obtained.
12. Explain the working principle of electrochemical discharge grinding and discuss the process capabilities.
13. Explain the principle of ECG and ECH.
14. What are the main advantages, disadvantages and applications of ECM process?
15. List the requirements of tool material for ECM. Write the commonly used tool materials.
16. Describe the chemistry involved in ECM process.
17. Discuss about the effect of high temp and pressure of electrolyte on the ECM process.
18. Discuss about the economics of ECM.
19. List out the advantage of EGC over conventional grinding. (4) (iii)
20. Explain in detail the ECM process with neat sketch and also mention the advantages and apps.