AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November-2020
PRE-STRESSED CONCRETE
(Civil Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) What is prestress? List the general principles of prestressing.   7M
    b) A beam is of simply supported span 8m. the size of the beam is   7M
        350mm X 700mm. a prestressing force of 1000kN was applied.
        The cable is parabolic with an eccentricity of 100mm at the centre
        and at the zero supports. It is subjected to a UDL of 25kN/m,
        compute the extreme stresses at mid span.
                                    (OR)
2. a) What is post tensioning in pretressed concrete structures? Explain   7M
        Gifford – Udall System with neat sketch.
    b) What are pre fabricated elements. Explain.   7M

UNIT-II

3. a) What are the long term losses of prestress concrete beams?   7M
        Explain

    b) A pretensioned beam 250mm wide and 300mm deep is   7M
        prestressed by 12wires each of 7mm diameter initially stressed to
        $1200N/mm^2$ with their centroids located at 100mm from the soffit.
        Estimate the final percentage loss of stress due to elastic
        deformation, creep, shrinkage and relaxation using IS 1343.
                                    (OR)
4. a) Outline the assumptions made in analysis of flexure.   7M
    b) A pretensioned prestressed concrete beam having a rectangular   7M
        section, 150mm wide and 350 mm deep, has an effective cover of
        50 mm. if fck = 45 N/sqmm, fp=1500 N/sqmm, and the area of
        prestressing steel is 500sqmm. Determine the ultimate flexure
        strength of the section using IS: 1343 code provisions.

UNIT-III

5. Write all the design consideration steps of an **I** section beam as per IS code.   14M

(OR)

6. The end block of a prestressed concrete beam of size 150 x 400mm. the effective prestressing force is 500kN. The distributed plate is 150mm wide and 150mm deep concentrically located at the ends. Evaluate the maximum tensile stress and bursting tension. Use Guyon's method.   14M

UNIT-IV

7. What are the advantages of composite construction and list the types of composite construction with neat sketches.   14M

(OR)

8. A composite beam of rectangular section is made up of a potential inverted T-beam having a slab thickness of 100 mm and width 400 mm respectively. The rib size is 100 *200 mm . The cast in situ slab has a thickness and width 400*300 mm. If the differential shrinkage is $125*10^{-6}$ units,estimate the shrinkage stresses developed in the precast and cast in situ slab.   14M

UNIT-V

9. A simply supported beam of 10m span with rectangular section 200 x 400mm is prestressed by a single cable in which the total tensile force is 250kN. The centre line of the cable is parallel to the axis of the beam and 75mm above the soffit at middle third of span and bent straight over third of span. If Ec= 35kN/mm^2, determine the deflection (i) Due to prestress only (ii) due to prestress and self-weight (iii) magnitude of the concentrated load at one third span point which would result in limiting deflection to span/500.   14M

(OR)

10. a) Discuss the importance of deflection control of prestressed concrete beams.   7M

    b) A prestressed concrete beam of span 12m is of size 300 X 300mm. it is prestressed by a straight cable at an eccentricity of 160mm. the prestressing force of 1200kN and the stress in steel is 1200 N/mm^2. The live load is 10kN/m.
Determine the central deflection of the beam under
      (i) 1.5 times the cracking load
      (ii)   2.0 times the cracking load   7M

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CODE: 16EE3019   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

PLCS & SCADA THEORY
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Categorize and explain industrial automation.	7M
	b)	Organize the functional elements of industrial automation.	7M

(OR)

2.	a)	Explain different sensing elements used in industrial automation.	7M
	b)	Explain role of controller in automation.	7M

UNIT-II

3.	a)	Give the block diagram of PLC system and explain the function of various components of PLC.	7M
	b)	What is PLC system? Explain the importance of interfacing in PLC system.	7M

(OR)

4.	a)	Outline the architecture of PLC	10M
	b)	What are the disadvantages of PLC?	4M

UNIT-III

5.	a)	Draw and explain the PLC equivalent of AND and OR gates.	7M
	b)	Implement the PLC ladder diagram for the Boolean algebra expression	7M

$$(A+B) \bullet (C+D) + E = M$$

(OR)

6.	Organize different steps involved in large process ladder diagram construction.	14M

UNIT-IV

7.	Explain on-delay timer and off-delay timer with an example	14M

(OR)

8.	a)	Explain latching in PLC.	7M
	b)	Explain different mathematical operations using PLC functions	7M

UNIT-V

9.	a)	What is SCADA? Draw and explain functional architecture of SCADA.	10M
	b)	Give advantages and disadvantages of SCADA systems.	4M

(OR)

10.	a)	Explain remote terminal unit in detail.	7M
	b)	Briefly explain the selection of SCADA systems.	7M

CODE: 16ME3021
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

THERMAL ENGINEERING - II
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Sketch and explain the use of ORSAT apparatus. [7M]
   b) In a steam power plant the steam supply is at 15bar and dry and saturated. The condenser pressure is 0.4 bar, Calculate the Carnot and Rankine efficiencies of the cycle. Neglect pump work. [7M]

(OR)

2. a) Draw the layout of a Rankine cycle with a neat sketch and also derive efficiency equation with T-S and H-S charts. [7M]
   b) In a steam turbine steam at 20bar, 360^0C is expanded to0.08 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes , find per kg of steam the net work and the cycle efficiency. [7M]

UNIT-II

3. a) Describe with a neat sketch the construction and working of a Cochran boiler. [7M]
   b) What are the differentiating features between a water tube and a fire tube boiler? [7M]

(OR)

4. a) Explain with a neat sketch working of a Benson boiler. [7M]
   b) Derive expression for maximum discharge through a chimney. [7M]

UNIT-III

5. a) Derive the relationship between area- velocity of a nozzle. [7M]
   b) Compare the merits and demerits of surface condenser over jet condenser [7M]

(OR)

6. a) Derive an expression for maximum discharge through convergent divergent nozzle for steam. [7M]
   b) Differentiate between Jet and Surface condensers [7M]

UNIT-IV

7. a) A stage of a steam turbine is supplied with steam at a pressure 50 bar and 350^0C and exhausts at a pressure of 5 bar. The isentropic efficiency of the stage is 0.82 and the steam consumption is 2270kg/min.Determine the power output of the stage. [7 M]
   b) Give the differences between impulse and reaction turbines. [7M]

(OR)

8. Derive the condition for maximum efficiency of a reaction turbine. [14M]

UNIT-V

9. a) Explain the effect of regenaration on Brayton cycle. [7M]
   b) Explain the working of ram jet engine with neat sketch [7M]

(OR)

10. In a gas turbine plant , working on a Brayton cycle with a regenerator of 75% effectiveness the air at inlet to the compressor is at 0.1 MPa , 30^0C the pressure ratio is 6 and the maximum cycle temperature is 900^0C . If the turbine and compressor have each an efficiency of 80 % find the percentage increase in the cycle efficiency due to regeneration. [14 M]

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

COMPUTER ORGANIZATION AND ARCHITECTURE
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Explain basic operational concepts of computer with neat diagram.   7M
   b) With a neat block diagram, explain the different functional units of a digital computer   7M

(OR)

2. a) Compute the content of 8 bit register namely R1 containing a value of $+98_{10}$ and with initial carry bit as 1 after performing following shift or rotate operations by 2 times (i)SHR R1,2 (ii) SAR R1,2 (iii) ROR R1,2 (iv) RCR R1,2   8M
   b) Explain with examples about various types of logical micro operations with examples.   6M

UNIT-II

3. a) Explain Booth algorithm and multiply the following pair of signed 2's complement numbers using Booth algorithm. Assume A is the multiplicand and B is Multiplier. A= 010111(+23) & B=110110(-10)   7M
   b) Distinguish between fixed point and normalized floating point representations with examples.   7M

(OR)

4. a) Give the circuit arrangement for binary division, Perform restoring division (A/B) on the 5-bit unsigned numbers, A=10100 and B=00101 and compute remainder and quotient by constructing chart.   7M
   b) Perform the non restoring division for the given binary numbers where dividend is 11011_2 and divisor is 0101_2 with all cycles   7M

UNIT-III

5. a) Explain virtual memory management concept and its implementations.   7M

    b) With a neat diagram explain the internal organisation of a 2M x 8 dynamic memory chip   7M

(OR)

6. a) Describe any two mapping functions in cache   8M

    b) Explain the memory hierarchy with respect to speed, size, and cost with a neat diagram   6M

UNIT-IV

7. a) What is interrupt nesting, explain with a neat diagram the implementation of interrupt priority, using individual interrupt request and acknowledge lines   8M

    b) Give comparison between memory mapped IO and I/O mapped I/O   6M

(OR)

8. a) Explain I/O processor and its important with neat diagram.   6M

    b) With a neat diagram explain DMA controller   8M

UNIT-V

9. a) What are the basic concepts of micro programmed control.   7M

    b) What is parallel processing? Explain any parallel processing mechanism   7M

(OR)

10. a) Distinguish between microinstruction sequencing and execution concepts.   7M

    b) Write the sequence of control steps to execute the instruction ADD $(R_3), R_1$ on a single bus architecture   7M

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CODE: 16CS3019   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November-2020
ARTIFICIAL INTELLIGENCE
(Common to CSE & IT)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	List and Explain the Control Strategies of Artificial Intelligence.	7M
	b)	Brief note on Steepest-Ascent Hill Climbing Algorithm.	7M
		(OR)	
2.	a)	Explain the Water – Jug Problem in detail.	7M
	b)	Summarize the key dimensions of Problem Analysis.	7M

UNIT-II

3.	a)	Explain the three representations of a Tic-Tac-Toe problem.	7M
	b)	Discuss about Resolution Technique.	7M
		(OR)	
4.		Consider the following sentences, write the facts using Predicate Logic.	

    i.   Marcus was a Man.
    ii.   Marcus was a Poet.
    iii. All Poets were Good
    iv. Everyone is loyal to someone.   14M

Convert into Facts. (6M). Translate into clause form (4M). Explain Each (4M).

UNIT-III

5.	a)	Mention the issues in Knowledge Representation.	7M
	b)	Consider the world of household robot. Explain the objects and its relationships.	7M
		(OR)	
6.	a)	Discuss about Forward Chaining Rule Systems with its Advantages.	7M
	b)	Explain about Baye's Probability Theorem.	7M

UNIT-IV

7.	a)	Describe about Goal Stack Planning.	7M
	b)	Explain the Learning Structure with neat diagram.	7M
		(OR)	
8.	a)	Write the STRIPS implementation algorithm for Blocks World Problem.	7M
	b)	Brief note on Components of a Planning System.	7M

UNIT-V

9.	a)	Summarize the Applications of Expert Systems.	7M
	b)	Discuss about Meta Knowledge.	7M
		(OR)	
10.	a)	Explain the MYCIN System rules to represent the Domain knowledge.	7 M
	b)	Describe about Expert System Shells.	7 M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, October / November-2020

TELECOMMUNICATION SWITCHING SYSTEMS

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain basics of switching system.	(7M)
	b)	Explain principles of cross bar switching.	(7M)

(OR)

2.	a)	Discuss evolution of Telecommunications	(7M)
	b)	Explain classification of switching systems.	(7M)

UNIT-II

3.	a)	Explain Time division space switching with neat diagram.	(7M)
	b)	Discuss in detail about Centralized SPC.	(7M)

(OR)

4.	a)	Explain Time division time switching.	(7M)
	b)	Discuss in detail about Distributed SPC approach.	(7M)

UNIT-III

5.	a)	Explain the functions of subscriber loop interface.	(7M)
	b)	Discuss numbering plan in telecommunications	(7M)

(OR)

6.	a)	Explain common channel signalling technique.	(7M)
	b)	Explain charging plan in telecommunications.	(7M)

UNIT-IV

7.	a)	Draw block diagram of data communication network and explain function of each block	(7M)
	b)	Describe OSI layered architecture.	(7M)

(OR)

8.	a)	Define protocol. Distinguish between connectionless and connection-oriented protocols.	(7M)
	b)	Explain public switched data network.	(7M)

UNIT-V

9.	a)	Draw ISDN architecture and explain its working.	(7M)
	b)	Explain Broadband ISDN.	(7M)

(OR)

10.	a)	Distinguish among circuit switching, message switching and packet switching techniques.	(7M)
	b)	Describe conceptual view of ISDN.	(7M)

CODE: 13CE3015   **SET-II**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November-2020

DESIGN OF CONCRETE STRUCTURES –II
(Civil Engineering)

Time: 3 Hours   **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) What are critical sections for bending, one way shear and two way shear in isolated footings?
   b) Write about different types of footings.
   c) Compare simply supported and fixed end
   d) Write any two assumptions for flat slabs.
   e) What are the component parts of the bridge?
   f) How the impact load is considered in the bridges?
   g) What are the situations to go for Pile foundation?
   h) What is meant by pile cap?
   i) Mention different types of water tanks.
   j) What is the use of elevated water tank?

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. Design a square footing for a rectangular column 300 mm x 500 mm, reinforced with 6-25Φ bars, and carrying a service load of 1250 kN. Assume soil with an allowable pressure of 200 kN/m^2 at a depth of 1.25 m below ground. Assume Fe415 grade steel for both column and footing, and M20 grade concrete for the footing and M25 grade concrete for the column.   12M

(OR)

3. Design rectangular footing for a circular column, 500 mm in diameter, reinforced with 8-25Φ bars, and carrying an axial load of 2500 kN. There is a spatial restriction of 2.5 m on one of the plan dimensions. Assume soil with a safe bearing capacity of 300 kN/mm^2 at a depth of 1.5 m below ground. Assume Fe 415 grade steel for both column and footing, and M20 grade concrete for the footing and M30 grade concrete for the column.   12M

UNIT-II

4. A circular room has 5 m diameter from inside. Design a circular roof slab for room, to carry a superimposed load of 3800 N/m^2. Assume that the slab is simply supported at the edges. Use M15 grade concrete and Fe415 steel.   12M

(OR)

5. Design the interior panel of a flat slab 5.6 m x 6.6 m in size, for a super-imposed load of 7.75 kN/m^2. Provide two-way reinforcement. Use M20 concrete and Fe415 steel.   12M

UNIT-III

6. a) Briefly explain different types loads to be considered in designing super structures of bridges.   6M

    b) Determine the Live load moment (Class AA wheeled vehicle) of interior panel of size 2.3 x 3.87 m in a T-beam bridge.   6M

(OR)

7. Design a solid slab bridge for class A loading for the following data: 12M
    Clear span = 5 m
    Clear width of roadways = 7.5 m
    Average thickness of wearing coat = 75 mm   Use M20 mix.

UNIT-IV

8. Design a pile under a column transmitting an axial load of 1000 kN. The pile is to be driven to a hard stratum available at a depth of 9 metres. Use M20 concrete and Fe 415 steel   12M

(OR)

9. An RC column, 400 mm x 400 mm carrying a load of 800 kN is supported on three piles 500 mm x 500 mm in section. The centre to centre distance between the piles is 2 m. Design a suitable pile cap. Use M20 concrete and Fe 415 steel.   12M

UNIT-V

10. Design the side walls of a circular tank with fixed base for capacity of 400,000 litres. The depth of water is to be 4m, including a free board of 0.25 m. Use M20 concrete and mild steel reinforcement. The tank is free at the top and rests on the ground. Take unit weight of water as 9.8 kN/m^3.   12M

(OR)

11. Design the top dome and top ring beam of an Internal tank of capacity 10,00,000 litres. The height of the staging is 15m.   12M

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November-2020
HEAT TRANSFER
(Mechanical Engineering)

Time: 3 Hours   **Max Marks: 70**

Note: Heat and Mass Transfer data book is allowed.
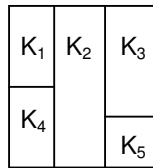   **Symbols and abbreviations have their regular meaning.**

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) Define convection heat transfer coefficient.
    b) Draw electrical network to represent conduction heat transfer trough the following composite slab. Assume temperature difference across the slab.

K_1	K_2	K_3
K_4		
		K_5

    c) Define fin effectiveness.
    d) Write any two basic assumptions of lumped heat capacity analysis.
    e) What is no-slip boundary condition?
    f) Write expressions for Prandtl number and Rayleigh number.
    g) Write conditions for hydrodynamically fully developed flow for internal forced convection flow though circular pipes.
    h) Expand LMTD. Write its expression for a parallel concentric pipe heat exchanger.
    i) Define emissivity of a material.
    j) Write mathematical expression for reciprocity rule of shape factors.

PART-B
Answer one question from each unit   **[5x12=60M]**

UNIT-I
2. a) If an 20 cm Tungsten Steel (10% W) pipe is covered with a 5 cm layer of Celluloid insulation. If the pipe carries steam so that the inner surface is at $430^{o}C$ and the outer insulation surface is at $38^{o}C$, what is the heat loss per hour from 32 m of this pipe?   4
    b) Derive the generalized heat conduction equation in three dimensional Cartesian coordinates. Reduce it to Laplacian form.   8

(OR)

3. a) Explain various modes of heat transfer.   4
    b) A wall is composed of a 12.5 cm thick layer of material A and a 21 cm thick layer of material B. The temperature of the outer surface of layer A is known to be $265^{o}C$ when the outer temperature at layer B is at $30^{o}C$. A layer of 2.54 cm thick insulation ($k = 0.094$ W/mK) is added to the outer surface of layer B. Under these conditions it is observed that the surface of layer A rises to $320^{o}C$, the junction between layer B and the insulation (formerly the outer surface of layer B) becomes $220^{o}C$. If the insulation surface is measured to be $26^{o}C$, what is the rate of heat flow, per square meter of wall area, before and after the insulation is added?   8

UNIT-II
4. a) A infinitely long fin is attached to a base with temperature T_b and exposed for convection with a fluid having temperature T_∞ and coefficient h. Derive an expression for temperature distribution along the fin length.   4
    b) A Chromel-Alumel thermocouple (wire diameters = 0.125 cm) is attached to a surface at $125\,^{o}C$ and extends into air at $26\,^{o}C$ with convection coefficient $h = 12$ W/m^{2o}C. Estimate the rate of heat loss from the surface due to the attachment of the thermocouple.   8

5. a) Explain in detail about the Lumped Heat Capacity analysis and write its application.   4
    b) Stainless steel AISI 304 cylinders of length 60 mm and diameter 80 mm initially at a   8
        temperature of 220 ^{0}C are quenched in an oil bath maintained at a temperature of 20 ^{0}C
        with h = 500 W/m^{2}K, for a time period of 3 minutes. Calculate the temperatures at the
        centre of the cylinders, at the centre of a circular face, and at the mid plane of the side.
        The properties of stainless steel at 120 ^{0}C are:
        ρ = 7900 kg/m^3, c = 525 J/kgK, k = 17.4 W/mK and α = 4.19 x 10^{-6} m^2/sec

UNIT-III

6. a) Define the following terms and explain their significance: 4
        i.   Bulk mean temperature   ii. Hydraulic diameter
    b) Air at a temperature of 27 ^{0}C is moving at a velocity of 0.3 m/s past a 40 W incandescent   8
        bulb. The bulb may be treated as a sphere of 50 mm diameter with its surface at a
        temperature of 127 ^{0}C. Estimate the heat transfer coefficient and compute the percentage
        of power lost due to convection.

(OR)

7. a) Explain the concept of boundary layer formation for external forced convection flow over   4
        a flat plate.
    b) Air at 65.5 ^{o}C flows over a heated flat plate at 122 ^{o}C with a velocity of 0.92 m/s.   8
        Determine the local heat transfer coefficient at a distance of 0.61 m from the leading edge
        of the plate and heat transfer for 0.61 m length taking the width of the plate as 1.0 m.
        consider v = 0.223 x 10^{-4} m^2/s and k = 0.0364 W/mK.

UNIT-IV

8. a) Define   i). Grashoff number, ii) Rayleigh number.   4
        Explain their significance in natural convection heat transfer.
    b) Air at 25 ^{0}C flows normally to 0.03 m outer diameter water pipe with a velocity of 1 m/s.   8
        If the surface temperature of the pipe is 75 ^{0}C, estimate the heat transfer per unit length.
        Use the correlation Nu = 0.683 $(Pr)^{0.333}$ $(Re)^{0.466}$. The relevant properties of air are:
        Thermal conductivity is 0.0282 W/(m.K). Kinematic viscosity is 1.795x10^{-5} m^2/s. Pr is
        0.698

(OR)

9. a) Explain various regimes of pool boiling with a neat sketch.   4
    b) In a shell-and-tube heat exchanger with 8 tube passes through the shell, hot engine oil   8
        available at 160 ^{0}C flows through the shell and water through the tubes. Water at the rate
        of 2.5 kg/sec is heated from 15 ^{0}C to 85 ^{0}C and there are ten tubes per pass. The diameter
        of each tube is 2.5 cm and the average convection coefficient h$_o$ = 400 W/m^{2}K. Determine
        the flow rate of oil if its exit temperature is to be 100 ^{0}C.

UNIT-V

10. a) What is Kirchoff's law. Explain   4
    b) A boiler furnace lagged with plate steel (ϵ = 0.6) is laid with fire clay bricks   8
        (ϵ = 0.8) on the inside. The distance between the lagging and setting brick is
        300 mm and it may be assumed small compared with the size of the furnace. Calculate
        the loss of heat per unit area between the lagging and setting if these are at 400 K and
        323 K respectively. A radiation shield of Emissivity 0.6 is now introduced between the
        brick setting and lagging of the furnace. Compute the radiant flux between these and
        the percentage reduction in heat transfer.

(OR)

11. a) Write the significance of radiation shields in radiation heat transfer.   4
    b) The surface of a double walled spherical vessel used for storing liquid oxygen is made   8
        up of material silver having an emissivity of 0.03. The temperature of the outer surface
        of the inner wall is – 153 0C and the temperature of the inner surface of the outer wall
        is 27 0C. The spheres are 42 cm and 60 cm in diameter, with the space between them is
        evacuated. Calculate the radiation heat transfer through the walls into the vessel and the
        rate of the evaporation of liquid oxygen if its vaporization is 220 kJ/kg.

AR13

CODE: 13EC3021   SET-1
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November-2020

VLSI DESIGN
(Electronics & Communication Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) What are the steps involved in IC fabrication.
    b) Define moore's law.
    c) Define threshold voltage of a MOS device
    d) Draw MOS transistor circuit model.
    e) Define and give the expressions for any two scaling factors of MOS device parameters
    f) Draw the stick diagram for NMOS inverter.
    g) What is switch logic?
    h) Define Sheet resistance (R_s).
    i) What is observabiltity in CMOS testing?
    j) Explain the need of CMOS testing?

PART-B

Answer one question from each unit   [5x12=60M]
UNIT-I

2. a) With neat sketches explain the CMOS n-well fabrication process indicating the masks used.   8M
    b) Explain about various IC technologies   4M
                        (OR)
3. a) What are the steps involved in the nMOS fabrication? Explain with neat sketches.   8M
    b) Compare CMOS, Bipolor technologies?   4M

UNIT-II

4. a) Derive the expression for the ratio between Zp.u and Zp.d if an nMOS inverter is to be driven from another nMOS inverter.   6M

    b) Draw and explain alternative forms of pull-up   6M

(OR)

5. a) Explain and derive the expressions for MOS transistor parameters gm, gds and ω0.   6M

    b) Explain various regions of CMOS inverter transfer characteristics.   6M

UNIT-III

6. a) Design a layout diagram for CMOS 2-input NAND gate.   6M

    b) What is a stick diagram and explain about different symbols used for components in stick diagram.   6M

(OR)

7. a) Illustrate the lambda-based design rules with neat sketches.   6M

    b) Explain about constant voltage scaling.   6M

UNIT-IV

8. a) Explain the structured design approach of parity generator.   6M

    b) Explain the design of a 4-bit shifter.   6M

(OR)

9. a) Explain constituents of wiring capacitance?   6M

    b) What is inverter delay? How delay is calculated to for multiple stages?   6M

UNIT-V

10. a) Explain about manufacturing test principles?   6M

    b) Explain about Built in self test (BIST)?   6M

(OR)

11. a) Explain about chip level techniques?   6M

    b) Explain design –verification tools?   6M

AR13

CODE : 13CS3018   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November-2020

COMPUTER GRAPHICS
(Computer Science and Engineering)

Time: 3 Hours   **Max. Marks: 70**

PART-A

Answer all the questions   **[10 x 1=10]**

1. a) Distinguish between window and view port.
    b) What happens when Translation takes place?
    c) What are polygon tables?
    d) List different 2D transformations?
    e) Write about Blending functions?
    f) What do you mean by Z-Buffer?
    g) Mention any three interactive input methods?
    h) Find the amount of memory required by an 8 bit frame buffer each of red, green and blue having 1024×768 resolution?
    i) What are the steps involved in 3D rotations?
    j) Compare Bezier Surfaces and B-Spline Surfaces

PART-B

Answer one question from each unit   **[5 x 12=60M]**

UNIT-I

2. a) Write and explain about Raster Scan systems.
    b) What is Frame Buffer, and explain about refreshing and scan conversion?

(OR)

3. Explain the construction and working of CRT in brief.

UNIT-II

4. a) Apply Bresenham's line drawing algorithm for the points (20, 10) and (30, 18).
    b) Calculate the points to draw an circle having radius = 5 and center is (0, 0).

(OR)

5. Randomize a line between (5, 5) and (8, 8) by using DDA Algorithm?

UNIT-III

6. Explain the procedure for writing Cohen-Sutherland algorithm with a neat labeled diagram and explain it with an example.

(OR)

7. Explain in detail about Matrix representation in 2D transformations.

UNIT-IV

8. a) Explain the geometric transformation of the scaling rotation and translation.

    b) Suppose the point (2, 3) is rotated counter clock wise about Z axis by an angle of $\pi/6$ radians. Then what is the rotated point.

(OR)

9. Derive the matrix form for the following basic geometric transformations in 3-D graphics: (i) Rotation   (ii) Mirror reflection

UNIT-V

10. Short notes on the following:

    i)   Z-Buffer   ii) The Painters algorithm   iii) Back face Removal

(OR)

11. a) Describe the steps in design sequence of animation.

    b) Write about morphing techniques.

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