AR13

CODE: 13CE3015 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, October-2021

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) Write the different types of foundations
   b) What are the functions of foundations in a building
   c) What is the difference between one way and two-way slabs?
   d) Write any two assumptions for flat slabs.
   e) What are the different types of forces act on the bridge
   f) What are the component parts of the bridge?
   g) Mention the different types of piles based on shape?
   h) Mention the different types of piles based on mode of load transfer?
   i) In what ways, circular water tank preferred over rectangular water tank?
   j) Name the different types of liquid retaining structures?

PART-B

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

UNIT-I

2. Design a spread footing to carry an axial load of 1200kN through a column of size 450 mm x 450 mm having bars 4-25 diameter bars. Bearing capacity of soil is 105kN/$m^{2.}$ Assume footing to be 1.25m below ground level and concrete of grade M25 and Fe 415 steel. 12M

(OR)

3. The size of a RC column is 300mm x 600mm. the column has to support a load of 1400kN. Design the foundation for this column if safe bearing capacity of the soil is 150kN/m^2. The width of the footing can not exceed 2.5m. use M25 for concrete and Fe 500 steel. Use LSM 12M

UNIT-II

4. Design a circular slab for a room 5m in diameter with simply supported edge. Total superimposed load is 5kN/m^2. Use M25 mix and Fe 415 grade steel 12M

(OR)

5 A flat slab is supported on 600 mm dia circular columns spaced 8m x 6m apart in both the directions. The column head has a diameter of 120 cm. the live load on the flat slab is 4kN/$m^{2.}$ determine the moments in the flat slab along its 8 m span. 12M

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UNIT-III

6.		Design a deck slab for the following particulars Clear span= 5.5m, width of footpath =1m on either side Wearing coat thickness = 100mm, Loading = IRC class A Material M35 concrete and Fe 415 steel.	12M
		(OR)	
7.	a)	Write the component parts of sub structure and super structure of the bridge.	6M
	b)	Classify the different types of the bridges and highway loading standards.	6M

UNIT-IV

8.		The foundation for the structure comprising **six** piles of square cross section has to support a service load of 3600kN. The piles are driven through a hard stratum and bear on hard rock. Design the reinforcement in the pile assuming the pile to be 5m long and use M20 grade concrete and Fe 415 steel.	12M
		(OR)	
9.		What are the guide lines for the design of Pile caps	12M

UNIT-V

10.		Design a square water tank having inner dimensions of 7.5 m x 7.5 m x 2.65 m high. The free board is 15cm. Use M30 and Fe415.	12M
		(OR)	
11.		Design a circular water tank of 1000kL capacity which is to be placed 1m below the Ground Level. The net safe capacity of the earth is 80kN/m^2. Use M30 grade concrete and Fe 415 grade HYSD bars.	12M

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CODE: 13ME3020 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, October-2021

HEAT TRANSFER

(Mechanical Engineering)

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

PART-A

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

1. a) State Fourier's Law of conduction.
   b) Define Thermal conductivity.
   c) Define fin effectiveness.
   d) What is the use of Heislers chart?
   e) What is meant by forced convection?
   f) What are the various types of convection?
   g) What is pool boiling?
   h) Give the merits of drop wise condensation?
   i) Explain Kirchoffs law.
   j) What is meant by Fouling factor?

PART-B

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

UNIT-I

2. Derive general heat conduction equation in Cartesian co-ordinate system. [12M]

(OR)

3. a) Briefly explain the various mechanisms of heat transfer. [6M]
   b) A furnace wall is made of 5 cm fire brick, 10 cm common brick, 3 cm of magnesia and 2 mm of steel plate on the outside. The inside and the outside surface temperatures are 1000ºC and 100ºC respectively. Calculate the temperature between layers and rate of heat transfer. Assume the thermal conductivities of fire brick, common brick, Magnesia and steel are 1.25 W/m-K, 0.5 W/m-K, 0.09 W/m-K and 80 W/m-K respectively. [6M]

UNIT-II

4. a) Derive an expression for temperature distribution for a fin insulated at the tip? [6M]
   b) Calculate the amount of energy required to solder together two very long pieces of bare copper wire 1.5 mm in diameter with solder that melts at 190°C.The wires are positioned vertically in air at 20°C.Assume that the heat transfer coefficient on the wire surface is 20 W/m^{2}K and thermal conductivity of wire alloy is 330 W/mK. [6M]

(OR)

5. a) What is lumped parameter system? Derive an equation for temperature distribution of a lumped heat capacity system. [6M]
   b) A 2.5 cm thick and 8 cm long fin has its base on a plane plate which is maintained at 1200C. The ambient air temperature is 100C. The conductivity of the fin material is 80 W/m-K and the heat transfer coefficient h= 150 W/m2 –K. Assume that the tip of the fin is insulated. Determine: [6M]
   (i) Temperature at the end of the fin
   (ii) Temperature at the middle of the fin
   (iii) Total heat dissipated by the fin.

UNIT-III

6. a) Explain about Newton's Law of cooling and heat transfer coefficient. [6M]
   b) Atmospheric air at 20°C is flowing parallel to a flat plate at a velocity of 2.8 m/s. assuming cubic velocity profile and using exact Blasius solution, estimate the boundary layer thickness and the local coefficient of drag at x=1.2 m from the leading edge of the plate. Take the kinematic viscosity of air at 20°C = 15.4 X 10-6 m2/s. [6M]

(OR)

7. a) Describe the Rayleigh's method for dimensional analysis. [6M]
   b) Air at 15 ºC and at a pressure of 3 atmospheres is flowing along a flat plate at a velocity of 5 km/sec. If the plate is one meter wide and at a temperature of 70ºC, find the quantities given below at x= 0.5 m. [6M]
   (i) Hydrodynamic Boundary layer thickness. (ii) Local friction factor
   (iii) Average friction (iv) Local heat transfer co-efficient

UNIT-IV

8. a) Explain briefly about different types of heat exchangers. [6M]
   b) Derive an expression for Logarithmic mean temperature difference (LMTD) in the case of counter flow heat exchanger. [6M]

(OR)

9. a) Differentiate between the mechanism of film wise and drop wise condensation. [6M]
   b) The flow rates of hot and cold water streams running through a parallel flow heat exchanger are 0.2 kg/s and 0.5 kg/s respectively. The inlet temperatures on the hot and cold sides are 75ºC and 20ºC respectively. The exit temperature of hot water is 45ºC. If the individual heat transfer coefficients on both sides are 650 W/m^2 ºC, calculate the are of the heat exchanger. [6M]

UNIT-V

10. a) What is Stefan-Boltzmann Law? Explain the concept of total emissive power of a surface. [6M]
    b) Write Short notes on: [6M]
    i) Absorptivity ii) Emissivity iii) Reflectivity

(OR)

11. a) Explain the concept of grey body? [6M]
    b) A black body of total area 0.080 m^2 is completely enclosed in a sphere bounded by 20 cm thick walls. The walls have a surface area 1.5 m^2 and the thermal conductivity is 3.1 W/mºC if the inner surface of the enveloping wall is to be maintained at a temperature of 245ºC and the outer wall surface is maintained at a temperature of 30oC calculate the temperature of the black body. [6M]

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CODE: 13EC3021 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, October-2021

VLSI DESIGN

(Electronics & Communication Engineering)

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

PART-A

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

1. a) Compare CMOS with bipolar technologies.
   b) Define the terms SSI, MSI, LSI and VLSI.
   c) When the channel is said to be pinched –off?
   d) Define trans-conductance of MOS transistor.
   e) What are the limitations of scaling?
   f) Draw the stick diagram for CMOS inverter.
   g) Draw and explain fan-in and fan-out characteristics of CMOS design.
   h) Write short notes on area capacitances of layers.
   i) What is controllability in CMOS testing?
   j) List out fault models in CMOS testing.

PART-B

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

UNIT-I

2. a) With neat sketch explain BICMOS fabrication. 6M
   b) Explain about the NMOS enhancement mode transistor action. 6M

(OR)

3. a) With neat sketches explain the CMOS p-well fabrication process indicating the masks used. 6M
   b) Explain the processing steps used in IC fabrication process. 6M

UNIT-II

4. a) Derive the relationship between drain to source current Ids verses drain to source voltage Vds in non-saturated and saturated region. 6M
   b) Explain the Latch-up effect in CMOS circuits with suitable diagrams. 6M

(OR)

5. a) Determine pull-up to pull-down ratio of an NMOS inverter when driven through one or more pass transistors 8M
   b) Explain the functioning of pass transistor. 4M

UNIT-III

6. a) Design a layout for CMOS 2-input NOR gate. 6M
   b) Explain about Constant field scaling. 6M

(OR)

7. a) Design a stick diagram for two input n MOS NAND and NOR gates? 6M
   b) Discuss design rules for wires. 6M

UNIT-IV

8.	a)	Discuss the general arrangement of a 4-bit arithmetic process.	6M
	b)	Explain switch logic with example	6M
		(OR)	
9.	a)	What is meant by sheet resistance R_s? Explain the concept of R_s applied to MOS transistors.	6M
	b)	Define standard unit capacitance? Explain.	6M

UNIT-V

10.	a)	Explain about Design-capture tools?	6M
	b)	What is the need of testability? Explain design for testability.	6M
		(OR)	
11.	a)	Explain about system level test techniques	6M
	b)	What are the design strategies for testing?	6M

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CODE: 13CS3018 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, October-2021

COMPUTER GRAPHICS

(Computer Science & Engineering)

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

PART-A

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

1. a) Define display file
   b) Define pixel
   c) What is scaling?
   d) What is DDA?
   e) What is a key frame?
   f) What is an outcode?
   g) What is 3D primitive?
   h) Define projection
   i) What is Back-Face?
   j) What is Z-buffer?

PART-B

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

UNIT-I

2. Explain Raster scan system with diagram **(12M)**

(OR)

3. a) Explain display files **(6M)**
   b) Discuss display processors **(6M)**

UNIT-II

4. a) Discuss Bresenham's line algorithm **(6M)**
   b) Discuss mid-point algorithm for circle generation **(6M)**

(OR)

5. a) Write an algorithm for simple DDA. **(6M)**
   b) Write about flood-fill algorithm. **(6M)**

UNIT-III

6. a) Explain (a) Translation (b) Rotation **(6M)**
   b) Write a short notes on reflection and shear. **(6M)**

(OR)

7. a) Write about cohen-sutherland line clipping algorithms **(6M)**
   b) Explain Sutherland – Hodgeman clipping algorithm **(6M)**

UNIT-IV

8. Explain Beziere curve and B splines **(12M)**

(OR)

9. Derive general parallel projection transformation **(12M)**

UNIT-V

10. a) Explain scan line algorithm **(6M)**
    b) Write about back face detection. s **(6M)**

(OR)

11. a) Discuss steps in design sequence of animation **(6M)**
    b) Explain morphing **(6M)**