

AR13

CODE: 13CE3018

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech II Semester Regular / Supplementary Examinations, April-2017

TRANSPORTATION ENGINEERING-II
(Civil Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define Relative stiffness of slab to sub-grade.
b) Define tie bar
c) Differentiate Spalling and traverse crack.
d) Define sleeper Density
e) Draw a neat sketch of permanent way
f) List out the measures to be taken to reduce creep of rails
g) What are the different types of rail joints
h) What is wind rose diagram
i) Define hangar
j) What are the correction consider to find the runway length

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. (a) Explain in detail the importance of various joints in rigid pavement 6M
(b) What are the factors which affects pavement design? 6M
(OR)
3. (a) Explain the Design procedure of IRC for flexible pavement. 6M
(b) What are stresses acting on rigid pavements? Explain briefly with neat sketch 6M

UNIT-II

4. (a) Explain the construction procedure of bituminous concrete pavement. 6M
(b) Explain the construction procedure of cement concrete pavement. 6M
(OR)
5. (a) Write the importance of highway drainage. How do you provide drainage in water logged areas 6M
(b) Explain different cracks in flexible pavements 6M

UNIT-III

6. Write about the highway cost and highway finance in India 12M
(OR)
7. (a) Explain about benefits for highway users 6M
(b) Discuss about the methods in economic analysis for highways 6M

UNIT-IV

8. (a) What are the requirements of an ideal rail joint? Explain any two joints used in Indian Railway lines with neat sketches. 6M

(b) What is meant by a crossing? Discuss various types of crossings used in Indian railways. 6M

(OR)

9. (a) What is a marshalling yard? Explain with a neat sketch, the working of a hump type of marshalling yard. 6M

(b) Explain any two theories of creep with neat sketches 6M

UNIT-V

10. (a) What is a wind rose diagram? Explain different types of wind rose diagrams. 6M

(b) Describe the importance of runway lighting. Explain threshold lighting with the help of sketches. 6M

(OR)

11. Explain about Exit taxiway and factors for the location of an Exit taxiway. 12M

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

1. a) Define data representation.
b) List out various computer types.
c) List out various notations in register transfer language.
d) Explain about auto increment and auto decrement addressing modes.
e) Differentiate RAM and ROM
f) What is the importance of cache memory.
g) List out the different I/O devices.
h) Write about I/O accessing.
i) Explain about parallel processing?
j) Write about RISC pipeline?

PART-B**Answer one question from each unit****[5 x 12=60M]****UNIT-I**

2. a) Describe the role of system software to improve the performance of a computer. 6M
b) Explain about floating point representation with an example. 6M

(OR)

3. a) Explain about the basic organization of a computer and list out the types of computers 6M
b) Explain about fixed point representation with an example. 6M

UNIT-II

4. a) Design a 4-bit arithmetic circuit using multiplexers and explain with function table? 6M
b) Explain about various computer instruction formats with examples 6M

(OR)

5. a) Explain about computer registers with common bus system. 6M
b) Draw the flowchart for instruction cycle and explain briefly. 6M

UNIT-III

6. a) Explain the method of translating virtual address to physical address. 6M
b) Write about the memory hierarchy and explain the organization of main memory. 6M

(OR)

7. a) Differentiate set-associate and associative mapping techniques in cache memory 6M
b) Briefly explain about demand paging and segmentation. 6M

UNIT-IV

8. a) Explain about DMA Controller with diagram. 6M
b) Briefly give the overview of different I/O devices. 6M

(OR)

9. a) Explain about I/O channel and processor? 6M
b) Differentiate programmed I/O and interrupt initiated I/O 6M

UNIT-V

10. a) Explain about vector processing with diagrams? 6M
b) Explain about arithmetic pipeline? 6M

(OR)

11. a) Write down the different techniques to handle branch instructions and explain? 6M
b) What is cache coherence? Explain its importance. 6M

AR13

CODE: 13ME3020

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech II Semester Regular / Supplementary Examinations, April-2017

HEAT TRANSFER (Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) State the difference between conduction and convection heat transfer
b) Define fin efficiency and effectiveness
c) What is the significance of biot number?
d) What is meant by laminar flow and turbulent flow?
e) What are the dimension less parameters used in forced convection?
f) What is meant by film wise condensation?
g) What is meant by effectiveness of heat exchanger?
h) State planks distribution law?
i) What is the purpose of radiation shield?
j) Define Radiosity and irradiation

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Discuss the effects of various parameters on the thermal conductivity of solids. 4
b) Electrical copper wire of diameter 1.5 mm is to be insulated with a material having thermal conductivity 0.1 W/mK and is exposed to an environment at $h_0=50 \text{ W/m}^2 \text{ K}$. 8
(i) State whether the insulation is effective or not.
(ii) If found effective what is the critical thickness of insulation
- (OR)
3. a) Derive the expression for overall heat transfer coefficient in case of a composite cylinder exposed to convective environment on both sides. 5
b) A composite wall is formed of a 2.5 cm copper plate ($k = 355 \text{ W/m.K}$), a 3.2 mm layer of asbestos ($k = 0.110 \text{ W/m.K}$) and a 5 cm layer of fiber plate ($k = 0.049 \text{ W/m.K}$). The wall is subjected to an overall temperature difference of 560°C (560°C on the Cu plate side and 0°C on the fiber plate side). Estimate the heat flux through this composite wall and the interface temperature between asbestos and fiber plate. 7

UNIT-II

4. a) What is meant by lumped capacity? What are the physical assumptions necessary for a lumped capacity unsteady state analysis? 4
b) A stainless steel rod of outer diameter 2 cm originally at a temperature of 320°C is suddenly immersed in a liquid at 120°C for which the convective heat transfer coefficient is $120 \text{ W/m}^2\text{K}$. Determine the time required for rod to reach a temperature of 200°C . $k=60 \text{ W/mK}$, $\rho=7800 \text{ kg/m}^3$, $C = 0.46 \text{ Kj/kgK}$ 8

(OR)

5. a) Distinguish between steady state and unsteady state heat conduction. **4**
 b) Two long rods of same diameter, one made of brass ($k=85 \text{ W/m}^0\text{C}$) and other made of copper ($k=375 \text{ W/m}^0\text{C}$) have one of their ends inserted into the furnace. Both the rods are exposed to the same environment. At a distance 105mm away from the furnace end, the temperature of the brass rod is 120^0C . At what distance from the furnace end, the same temperature would be reached in the copper rod? **8**

UNIT-III

6. a) How do you assess the heat transfer over a flat plate for combined laminar and turbulent condition? Explain **3**
 b) Atmospheric air at 45^0C flows over a flat plate of $(4 \times 1) \text{ m}^2$ maintained at 80^0C with a velocity of 10m/s. Calculate the distance from the leading edge at which transition occurs. Find the thickness of the hydrodynamic boundary layer and thermal boundary layer at 0.6m from the edge. **9**

(OR)

7. a) Which configuration, vertical or horizontal position, of plate dimensions will yield more heat transfer? **4**
 b) A duct of air-conditioning system is rectangular in cross-section ($40\text{cm} \times 80\text{cm}$) and has air at atmospheric and at 20^0C flowing with velocity of 7m/s. estimate heat loss per meter length per unit temperature difference. Use the properties of air kinematic viscosity = $15.06 \times 10^{-6} \text{ m}^2/\text{s}$, thermal diffusivity = $7.71 \times 10^{-2} \text{ m}^2/\text{hr}$ and thermal conductivity = 0.0259 W/mK **8**

UNIT-IV

8. a) Explain the development of boundary layer on a vertical plate in natural convection. **4**
 b) A steam carrying pipe of 20 cm diameter whose surface is maintained at 160^0C is in horizontal position and is exposed to surrounding air at 20^0C . Calculate the heat loss from the pipe per metre length. **8**

(OR)

9. a) A heat exchanger of total outside area of 17.5 m^2 is to be used for cooling oil at 200^0C with a mass flow rate of 2.77 kg/sec having a specific heat of 1.9 kJ/kg K . Water at a flow rate of 0.83 kg/sec is available at 20^0C as a cooling agent. Calculate the exit temperature of the oil the heat exchanger is a counter flow type. Take $U=300 \text{ W/m}^2\text{K}$ **6**
 b) A double pipe, parallel flow heat exchanger uses water at an initial temperature of 150^0C to cool oil ($C_p = 2100 \text{ J/kg K}$), flowing at 1000 kg/h from 60^0C to 35^0C . If the water leaves at 25^0C , Determine the value of overall heat transfer coefficient for an area of 1 m^2 **6**

UNIT-V

10. a) Explain the reciprocity theorem of shape factor **4**
 b) The cross section of a very long black body enclosure consists of a semicircle with its diameter D at the base. The temperature of semicircle is 1000 K and that of diameter is 500 K . Determine the shape factors for diameter-semicircle combination and the radiation heat transfer rate per unit width (in terms of D) Stefan-Boltzmann constant = $5.64 \times 10^{-8} \text{ W/m}^2\text{K}^4$. **8**
- (OR)
11. a) Define Radiosity, Irradiance and emissive power and write down the relation between them **4**
 b) Two large black plates are maintained at 1000^0C and 500^0C respectively. Calculate the net rate of radiation exchange them. If the temperature of the cooler plate is raised to 700^0C how much percentage of heat transfer will reduce. **8**

AR13

SUB CODE:13EC3021

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech II Semester Regular / Supplementary Examinations, April-2017

VLSI DESIGN (Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) interpret the condition of applying logic – 0 to gate which transistor will ON in CMOS
- b) Relate the stick colours of Poly, n-diffusion, p-diffusion and Metal?
- c) Sketch the Depletion mode NMOS transistor transfer characteristics ?
- d) Identify Why PMOS transfer strong logic-1 and poor logic-0?
- e) Sketch the stick diagram of CMOS Inverter?
- f) Analyse Why do you think design rules are necessary?
- g) List out different MOS layers?
- h) State merits of CMOS technology?
- i) Differentiate dynamic and Static power in VLSI circuits?
- j) Define stuck at Zero?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Analyse the fabrications steps involved in a PMOS process ? **6M**
- b) Can you illustrate the importance of Photo Lithography process during fabrication process? **6M**

(OR)

3. a) Explain the Depletion Mode MOSFET characteristics **6M**
- b) Can you illustrate the importance of Ion Implementation process during fabrication process? **6M**

UNIT-II

4. a) Design AND & OR Gate using Pass Transistor **6M**
- b) Explain Latch Up using diagrams **6M**

(OR)

5. a) Compute the drain to source current I_{ds} versus V_{ds} relationships for both saturation and resistive region? **8M**
- b) Predict How can you get better figure of merit and what way it effects the output logic? **4M**

UNIT-III

6. a) Draw Stick diagram for NMOS Inverter **6M**
- b) Draw layout for 2 input NAND Gate **6M**

(OR)

7. a) Draw stick diagram for $Y=AB+C$ **6M**
- b) Draw stick diagram for $Y=AB+CDE$ **6M**

**COMPUTER GRAPHICS
(Computer Science Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is a "Pixel"?
- b) What are different types of Flat Panel Displays?
- c) Define "Line segment".
- d) What are different types of Seed fill Algorithms?
- e) Give 2D Transformation matrix for Rotation of the object about the origin.
- f) What is Clipping?
- g) What is Spline?
- h) What are Different types of Perspective Projections?
- i) List the advantages of the Z-buffer algorithm.
- j) Define Morphing?

PART-B**Answer one question from each unit****[5 x 12=60M]****UNIT-I**

2. With a neat cross-sectional view explain the functioning of CRT [12M]
(OR)
3. a) What are the application areas of computer graphics?. [6M]
b) Explain the Raster display System. [6M]

UNIT-II

4. a) Write the Bresenham's Line drawing algorithm. [6M]
b) Generate a Line between (5,5) and (13,9) using Bresenham's algorithm. [6M]
(OR)
5. a) Write the algorithm for Boundary fill technique [6M]
b) Differentiate between flood fill and boundary fill algorithms with suitable examples [6M]

UNIT-III

6. a) Derive the 2D transformation matrix for rotation about origin? [6M]
b) Derive the Window-to-Viewport Transformation. [6M]
(OR)
7. Explain the Cohen – Sutherland line clipping with example [12M]

UNIT-IV

8. a) Derive the matrix form for the Hermit interpolation. [6M]
b) Explain about 3D transformations. [6M]
(OR)
9. Derive the Transformation matrix of general Perspective Projection. [12M]

UNIT-V

10. a) Write about Painters Algorithm. [6M]
b) Describe the Z-buffer algorithm. [6M]
(OR)
11. a) Write about design of animation sequences. [6M]
b) Write about various computer languages for animations. [6M]

AR13

CODE: 13IT3003

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech II Semester Regular / Supplementary Examinations, April-2017
OBJECT ORIENTED ANALYSIS AND DESIGN
(Information Technology)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are UP phases?
b) Define usecase
c) Explain class in OOAD
d) Explain inheritance
e) Explain communication diagrams
f) Define sequence diagrams
g) Explain the composition.
h) Define timing diagrams
i) What is meant by states?
j) Define State machine

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Define requirements. Explain how requirements are obtained for a specific problem 6
b) Write a short notes on classes and use-cases 6
(OR)
3. a) Describe the structure of Unified Modeling Language. 6
b) What is Unified Process? Explain each phase with its goals and objectives 6

UNIT-II

4. a) What is a class? Discuss in detail various attributes associated with a class in UML. 7
b) Write a short note on object construction and destruction 5
(OR)
5. a) Write a short note on dependency, generalization and inheritance 6
b) Draw the activity diagram for Library book renewal 6

UNIT-III

6. a) What is a message? Explain about various communications that are involved in messaging. 6
b) Explain activity diagrams 6
(OR)
7. a) Draw the activity diagram for ATM systems. 6
b) Explain the following terms related to activity diagram: 6
i) Activities ii) Action nodes iii) Activity partitions

UNIT-IV

- | | | | |
|----|----|--|---|
| 8. | a) | Explain the differences between Aggregation and Composition | 6 |
| | b) | What is a Template? How it is rendered in UML? Briefly explain with an example | 6 |
| | | (OR) | |
| 9. | a) | Differentiate between interface realization and inheritance | 6 |
| | b) | What is the purpose of templates? Explain how UML represents Templates. | 6 |

UNIT-V

- | | | | |
|-----|----|---|---|
| 10. | a) | Briefly explain the implementation workflow with a neat diagram | 7 |
| | b) | Give the state machine diagram for ATM withdrawal | 5 |
| | | (OR) | |
| 11. | a) | Define State Machine. Write about Composite States | 6 |
| | b) | What is the need for deployment diagram? Explain | 6 |