

# AR13

CODE: 13CE3018

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

TRANSPORTATION ENGINEERING - II  
(Civil Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
  - a) What is a wearing course?
  - b) What is Radius of Relative Stiffness of slab to subgrade.
  - c) What is seal coat?
  - d) How pavements are strengthened?
  - e) List the components of permanent way?
  - f) List various types of rails?
  - g) What is B/C ratio method?
  - h) What is point in railway engineering?
  - i) What is control tower?
  - j) What is the purpose of taxiway?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2.
  - (a) Explain about the effect of repetition of load on thickness of a pavements (6M)
  - (b) How dowel bar length is calculated? What are the design steps to be followed? (6M)

(OR)

3.
  - (a) What is Pavement serviceability? What are the factors affecting PSI? (4M)
  - (b) Determine spacing of contraction joints of 6.5cm thick slab having 30cm thickness and  $f=1.5$  for the following cases. (8M)  
For plain cement concrete, allowable  $Sc=0.6 \text{ kg/cm}^2$   
For reinforced cement concrete, 1cm dia bars at 0.3m spacing

### UNIT-II

4.
    - (a) Briefly explain about bituminous road construction (6M)
    - (b) What is the importance of highway drainage? (6M)
- (OR)
5.
    - (a) Explain briefly about failures of flexible pavements with neat sketch (6M)
    - (b) Briefly explain about overlay techniques. (6M)

### UNIT-III

6.
  - (a) Explain about various costs of highway projects. (6M)
  - (b) Discuss about sources of revenue for highway projects (6M)

(OR)

# AR13

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SET-2

7. It is proposed to widen a stretch of single lane road of length 40 km to two lanes at a total cost of 6.5 lakhs per km and the rate of interest 10% per year. The annual cost of maintenance of the existing single road is Rs. 7000 per km; and that of the improved two lane road is Rs. 9000 per km. the average vehicle operating cost on the existing road is Rs. 1.3 km/veh.km; and that on the improved is to be estimated that to be Rs. 1.15 km/veh.km; if the present traffic is 2000 motor vehicles per day and by the end of 15 years design period. The traffic is estimated to be doubled. Determine whether the investment on the improvement of the road is economically viable during the 15 years period. (12M)

## UNIT-IV

8. (a) Explain briefly about requirements of ideal permanent way (6M)  
(b) What are factors governing selection of gauge? (6M)  
(OR)  
9. (a) Draw the neat sketch of left hand turnout. (7M)  
(b) Write about buckling of rails. (5M)

## UNIT-V

10. (a) Discuss about the factors affecting airport site selection (8M)  
(b) List the facilities of terminal building (4M)  
(OR)  
11. The runway length required for landing at sea level in standard atmospheric conditions is 3000m. Runway length required for take-off at a level site at sea level in atmospheric conditions is 2500m. Aerodrome reference temperature is 25°C and that of standard atmosphere at aerodrome elevation of 150m is 14.025°C. If the effective runway gradient is 0.5%, determine the runway length to be provided. (12M)

2 of 2

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# AR13

CODE: 13CS3009

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

COMPUTER ORGANIZATION AND ARCHITECTURE

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Distinguish between Computer Organization and Architecture.  
b) List the four main functions of a computer.  
c) What is three state buffer?  
d) List addressing modes.  
e) What is cache memory?  
f) Distinguish RAM and ROM.  
g) What are peripheral devices?  
h) What is ASCII?  
i) Define Parallel Processing.  
j) List the applications of Vector Processing.

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Explain error detection codes. 6  
b) Discuss fixed-point representation. 6  
(OR)
3. a) Briefly explain the main structural components of a computer. 6  
b) Convert the hexadecimal number F3A7C2 to binary and octal. 6

### UNIT-II

4. a) Discuss shift microinstructions. 6  
b) Explain register transfer language. 6  
(OR)
5. a) Discuss Arithmetic Logic Shift Unit with neat sketch. 6  
b) Discuss Instruction Cycle 6

### UNIT-III

6. a) Explain the memory hierarchy in digital computer 6  
b) Discuss memory mapping techniques 6  
(OR)
7. a) What are the physical characteristics of magnetic tapes 6  
b) Discuss demand-paging technique. 6

# AR13

CODE: 13CS3009

SET-1

## UNIT-IV

- |    |  |    |
|----|--|----|
| 8. | Discuss in detail input-output interface           | 12 |
|    | (OR)   |    |
| 9. | Discuss Asynchronous Data Transfer and Handshaking | 12 |

## UNIT-V

- |     |  |   |
|-----|--|---|
| 10. | a) Explain in detail about RISC                              | 6 |
|     | b) Discuss instruction pipelining                            | 6 |
|     | (OR)   |   |
| 11. | a) What are the characteristics of multiprocessors?          | 6 |
|     | b) Discuss the interconnection structure of multiprocessors. | 6 |

2 of 2

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**HEAT TRANSFER  
(Mechanical Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) State Newton's law of cooling.
- b) What is Laplace equation for heat flow?
- c) What is the function of insulating materials?
- d) Define efficiency of the fin.
- e) What is Convective heat transfer?
- f) What is meant by thermal resistance?
- g) What is meant by Dimensional analysis?
- h) Define velocity boundary layer thickness.
- i) Sketch temperature and velocity profile in free convection on a vertical wall.
- j) Define momentum thickness.

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

2. a) Explain briefly the concept of critical thickness of insulation and state any two applications of the same. 4M
- b) A 3 cm OD steam pipe is to be covered with two layers of insulation each having a thickness of 2.5 cm. The average thermal conductivity of one of the insulation is 5 times that of the other. Determine the percentage decrease in heat transfer if better insulating material is next to pipe than it is the outer layer. Assume that the outside and inside temperatures of composite insulation are fixed. 8M

**(OR)**

3. a) Derive the general heat conduction equation in rectangular coordinate system. 6M
- 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  $560^\circ\text{C}$  ( $560^\circ\text{C}$  on the Cu plate side and  $0^\circ\text{C}$  on the fiber plate side). Estimate the heat flux through this composite wall and the interface temperature between asbestos and fiber plate. 6M

**UNIT-II**

4. a) What is meant by lumped capacity? What are the physical assumptions necessary for a lumped capacity unsteady state analysis? 4M
  - b) A slab of Aluminium 5 cm thick initially at  $200^\circ\text{C}$  is suddenly immersed in a liquid at  $70^\circ\text{C}$  for which the convection heat transfer co-efficient is  $525 \text{ W/m}^2\text{K}$ . Determine the temperature at a depth of 12.5 mm from one of the faces 1 minute after the immersion. Also, calculate the energy removed per unit area from the plate during 1- minute of immersion. 8M
- Take  $p = 2700 \text{ bar}$ ,  $c_p = 0.9 \text{ kJ/kgK}$ ,  $k = 215 \text{ W/mK}$ ,  $\alpha = 8.4 \times 10^{-5} \text{ m}^2/\text{s}$ .

**(OR)**

5. a) Derive the heat dissipation equation through pin fin with insulated end. 4M
- b) A temperature rise of  $60^\circ\text{C}$  in a circular shaft of 60 mm diameter is caused by the amount of heat generated due to friction in the bearing mounted on the crankshaft. The thermal conductivity of shaft material is  $60 \text{ W/mK}$  and heat transfer coefficient is  $10 \text{ W/m}^2\text{K}$ . Determine the amount of heat transferred through shaft assume that the shaft is a rod of infinite length. 8M

# AR13

CODE: 13ME3020

SET-2

## UNIT-III

6. a) Explain the principle of dimensional homogeneity. How is it utilized in deriving the dimensionless groups? 4M
- b) Calculate the heat transfer coefficient for water flowing through a 25 mm diameter tube at the rate of 1.5 kg/s, when the mean bulk temperature is 40 °C. For turbulent flow of a liquid take  $Nu_d = 0.0243 Re_d^{0.8} Pr^{0.4}$ , where all properties are evaluated at the mean bulk temperature. 8M

(OR)

7. a) Draw and explain the temperature variation of a fluid along the flow direction for constant wall temperature boundary condition. 4M
- b) Air at 25 °C and at atmospheric pressure flows over a flat plate at 3 m/s. If the plate is 1m wide and the wall is maintained at 75 °C, calculate the following at location  $x = 1\text{m}$  from the leading edge: i. hydrodynamic and thermal boundary layer thickness, ii. Local and average heat transfer coefficient, iii. The total rate of heat transfer, iv. The total drag force due to friction. Properties of air at 50 °C are  $\rho = 1.093 \text{ kg/m}^3$ ,  $c_p = 1.005 \text{ kJ/kgK}$ ,  $\gamma = 17.95 \times 10^{-6} \text{ m}^2/\text{s}$  and  $k = 0.0282 \text{ W/mK}$ . 8M

## UNIT-IV

8. a) How is the velocity field developed in front of a vertical plate which is maintained at a temperature higher than the surrounding fluid? 4M
- b) A 15 cm diameter steel shaft is heated to 350 °C for heat treatment. The shaft is then allowed to cool in air (at 20 °C) while rotating about its own horizontal axis at 4 rpm. Compute the rate of convection heat transfer from the shaft when it has cooled to 100 °C. 8M

(OR)

9. a) Derive an expression for LMTD of a parallel heat exchanger. 6M
- b) A 4kg/s product steam from a distillation column is to be cooled by a 3 kg/s water steam in a counter flow heat exchanger. The hot and cold stream inlet temperatures are 400 K and 300 K respectively, and the area of heat exchanger is 30 m<sup>2</sup>. If the overall heat transfer coefficient is estimated to be 820 W/m<sup>2</sup>K, determine the product steam outlet temperature, if its specific heat is 2500 J/kgK and the coolant outlet temperature. 6M

## UNIT-V

10. a) What is a black body? Give some examples of surfaces which do not appear black but have high values of absorptivity. 4M
- b) Two very large parallel planes with emissivities 0.3 and 0.8 exchange radiative energy. Determine the percentage reduction in radiative energy transfer when a polished aluminium radiation shield ( $\epsilon = 0.04$ ) is placed between them 8M

(OR)

11. a) What is shape factor? What is the value of shape factor with respect to itself if the surface is concave, convex or flat? 6M
- b) An enclosure measures 1.5m × 1.7m with a height of 2m. The walls and ceiling are maintained at 250 °C and the floor at 130 °C. The walls and ceiling have an emissivity of 0.82 and the floor 0.7. Determine net radiation to the floor. 6M

# AR13

CODE:13EC3021

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

VLSI DESIGN

(Electronics & Communication Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
  - a) Explain about enhancement mode transistor
  - b) Explain about masking and etching steps?
  - c) Define latch up? how to avoid latch up in transistor?
  - d) Explain the impact of interconnections on speed of the circuit?
  - e) What are the area scaling parameters with respect to  $\lambda$  based rules?
  - f) Define vias ?
  - g) Name few alternate forms of pull up circuits ?
  - h) Mention various synthesis tools?
  - i) Mention various simulation tools?
  - j) What is the impact of testing fails on VLSI design?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2.
  - a) Tabulate the comparison between CMOS and Bipolar technologies. 4M
  - b) Explain the process steps for BiCMOS fabrication in an n-well process 8M  
(OR)
3.
  - a) Tabulate the comparison between CMOS, Bipolar and BiCMOS technologies. 6M
  - b) What is the need of twin well process in CMOS? 6M

### UNIT-II

4.
  - a) Explain and derive the expressions for MOS transistor parameters  $g_m$ ,  $g_{ds}$  and  $\omega_0$ . 6M
  - b) Explain the Latch-up effect in CMOS circuits with suitable diagrams 6M  
(OR)
5.
  - a) Find the pull up to pull down ratio for an n-MOS inverter driven through one or more pass transistors 8M
  - b) Explain about pass transistor logic? 4M

### UNIT-III

6.
  - a) What are the various scalable design rules for  $\lambda$  -based technology? 6M
  - b) What is Vias? How to construct it in layout? 6M  
(OR)
7.
  - a) Draw the stick diagram of 4 input NAND gate 6M
  - b) Draw the stick diagram of  $Y=(AB+CD)'$  6M

## UNIT-IV

- |    |   |  |    |
|----|---|--|----|
| 8. | a | Explain about WIRES and VIAS                                     | 6M |
|    | b | Explain DCVS logic and compare with other logics available?      | 6M |
|    |   | (OR)   |    |
| 9. | a | Explain about fan-in and fan-outs ?                              | 6M |
|    | b | Draw the structure of BRAUN multiplier and explain its operation | 6M |

## UNIT-V

- |     |   |   |    |
|-----|---|---|----|
| 10. | a | Explain about design capture tools?                   | 6M |
|     | b | Explain about design verification tools?              | 6M |
|     |   | (OR)  |    |
| 11. | a | Briefly Explain about chip level testing              | 6M |
|     | b | Briefly Explain about system level testing techniques | 6M |



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**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B.Tech II Semester Supplementary Examinations, July-2017**

**COMPUTER GRAPHICS  
(Computer Science and Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) What is cartography?  
b) Define Pixel and Frame Buffer  
c) Define persistence in terms of CRT Phosphorous  
d) What is Anti-Aliasing and how to eliminate it?  
e) What is the slope at a point which belongs to both regions in ellipse?  
f) Define Clipping  
g) Define Polygon Mesh.  
h) Write the equation for representing a spline.  
i) What do you mean by wireframe model?  
j) Define raster animation.

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Discuss any six application areas of Interactive computer graphics. **(6M)**  
b) Explain about the components of CRT with a neat diagram. **(6M)**
- (OR)**
3. a) Differentiate between LED and LCD Displays. **(6M)**  
b) Write Short notes on Raster scan systems. **(6M)**

### **UNIT-II**

4. a) Demonstrate the Bresenham line Algorithm with end points (1, 1) and (8, 5) **(6M)**  
b) Demonstrate how the Midpoint circle generating algorithm works for drawing a circle with radius 4 units and centre (2, 3) **(6M)**
- (OR)**
5. a) Explain the simple DDA for generating lines. **(6M)**  
b) Explain Flood fill algorithm with a neat diagram. **(6M)**

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**SET-1**

## UNIT-III

6. a) Explain 2D rotation of an object about an arbitrary axis. (6M)  
b) Explain 2 D translation with homogeneous coordinate system. (6M)  
(OR)  
7. a) Explain Sutherland-Hodgeman polygon clipping algorithm in detail. (6M)  
b) Use the Cohen Sutherland algorithm to clip line P1 (70,20) and p2(100,10) against a window lower left hand corner (50,10) and upper right hand corner (80,40). (6M)

## UNIT-IV

8. a) Describe Interpolation and Approximation splines. (6M)  
b) Define Bezier Curves. Explain with an example. (6M)  
(OR)  
9. a) Explain about 3-D basic transformations with examples (6M)  
b) Differentiate between Parallel projection and Perspective Projection. (6M)

## UNIT-V

10. a) What are the various visible face detection methods or hidden surface elimination method (6M)  
b) State the steps involved in Painter's algorithm in detail. (6M)  
(OR)  
11. a) Explain the various steps in computer generated animation. (6M)  
b) What are the animation languages and motion specifications? Explain (6M)

Time: 3 Hours

Max Marks: 70

**PART-A**

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define Actors  
b) What is meant by unified process?  
c) Define Object  
d) What is meant by relationship?  
e) List the interaction diagrams  
f) Explain activity  
g) Explain nested classes  
h) What is meant by aggregation?  
i) What is meant by MVC in MVC architecture?  
j) Define deployment diagram

**PART-B**

Answer one question from each unit

[5x12=60M]

**UNIT-I**

2. a) Discuss about UML Building Blocks 7  
b) How is use-case generalized? Explain 5

(OR)

3. a) Discuss about common mechanisms of UML 7  
b) Explain <<include>> and <<extend>> mechanisms with examples 5

**UNIT-II**

4. a) What are structural diagrams? Explain 7  
b) Explain how to model single inheritance 5

(OR)

5. a) Explain how to model the non-software things of a system 5  
b) How to model the primitive types of a system. Explain. 7

**UNIT-III**

6. a) What is an activity? Discuss about the activity semantics and activity partitions 6  
b) Explain the general modelling techniques for interaction diagrams 6

(OR)

7. Design activity diagram with a suitable example. 12

**UNIT-IV**

8. a) Explain the dependency relationship in object oriented modelling 6  
b) Explain the generalization relationship in object oriented modelling 6

(OR)

9. a) Write about composition semantics 6  
b) What is an aggregation? Discuss about aggregation semantics. 6

**UNIT-V**

10. a) Explain briefly about the nodes and artifacts of deployment. 6  
b) Draw and explain the deployment diagram for a system where various clients communicate with a server machine. 6

(OR)

11. a) Briefly explain the Architectural implementation with a neat diagram. 7  
b) Explain the MVC architecture 5