AR 13

TRANSPORTATION ENGINEERING-II
(Civil Engineering)

Time : 3 Hours   Maximum Marks:70

PART-A

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

. 1. a) Why joints are provided in Rigid Pavements?
    b) Draw a typical sketch of tie bar joint in a rigid pavement.
    c) What are the materials used in WBM Roads?
    d) Define Sub Surface drainage System
    e) What are the direct benefits in a Highway project?
    f) What is NPV?
    g) Write the expression for Sleeper density.
    h) Why the railway track is called "Permanent Way" ?
    i) Differentiate Basic Runway length and Actual Runway length.
    j) Define Cross Wind Component.

PART- B

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

UNIT -I

2   a) Write the design procedure of AASHTO method of flexible pavement design.   (6m)
         b) Mention the various steps involved in the design of Bituminous pavements as per
           IRC: 37- 2001.   (6m)

(OR)

3   a) Write the steps in the design of CC pavements based on IRC 58 guidelines   (6m)
         b) Draw the typical layout of various joints provided in CC pavements. Explain
           each with the help of neat sketches.   (6m)

UNIT -II

4   a) What are the materials used in the construction of WBM roads? Write the construction
           procedure of WBM roads.   (6m)
         b) With the help of neat sketches explain the typical failures in Rigid Pavements.   (6m)

(OR)

5   a) Write the design procedure of Surface Drainage System for a highway.   (6m)
         b) Write the construction procedure of Expansion Joint in Rigid Pavement.   (6m)

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UNIT -III

6   a) What are the benefits and Cost of a Highway Project? Explain   (6m)

        b) Differentia Between Benefit – Cost ratio method and NPV method.   (6m)

(OR)

7   a) Explain clearly about IRR method of Economic Analysis of Highway Projects.   (6m)

        b) What are the advantages and Limitations of various method s of Economic Analysis of highway projects?   (6m)

UNIT -IV

8   a) Draw the typical cross section of a railway Track. Indicate all component parts explain the functions of each component.   (6m)

        b) What are the requirements of Ballast and Sleepers in a Railway Track?   (6m)

(OR)

9   a) Draw a neat sketch of Right Hand Turnout. Explain the working principle of it.   (6m)

        b) Explain various creep theories with the help of neat sketches.   (6m)

UNIT –V

10   a) Enumerate various factors affecting selection of site for an airport. Explain each.   (6m)

        b) Draw a typical layout of an Airport with single Runway. Explain the functions of each. (6m)

(OR)

11   a) What is Basic Runway Length? Explain various corrections to be applied on Basic Runway Length.   (6m)

        b) Calculate the actual runway length for the following data: (6m)

            Basic Runway length : 1600 m

            Elevation of the airport above MSL   = 450m

            Airport reference temperature   = 32.5 $^\mathrm{O}$C

            Effective Gradient of the runway   = 0.8%

AR13

CODE: 13CS3009   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, April, 2018

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) Write one function of bus
    b) Find (1001101 - 10101001) using 1's complement
    c) Draw the hierarchy of memory
    d) Write the advantage of RISC over CISC
    e) What is Asynchronous modes of data transfer
    f) Convert $(101.11011)_2$ into Decimal
    g) What is the last Instruction to get back from subroutine program
    h) What is circular shift micro operation
    i) What is BCD full form
    j) What is pipelining?

PART-B

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

UNIT-I

2. a) Explain the components of the Computer system.   6
    b) What is Data Representation? Explain fixed-point representation   6
        with examples.

(OR)

3. a) Draw the flowchart for adding or subtracting two floating –point   4
        binary numbers
    b) Explain basic operational concepts and connections between the   8
        processor and the memory and operating steps? Explain bus
        structure & performance?

UNIT-II

4. a) List and explain the steps involved in the execution of a complete 6
        instruction
    b) List of the arithmetic micro-operations. Draw a 4-bit Binary   6
        Adder, Subtractor, Incrementer, Decrementer with a suitable
        example.

(OR)

5. a) What do you mean by Addressing modes? Explain the following addressing   6
      modes:
      i) Index Addressing mode ii) Immediate Addressing mode
      iii) Relative Addressing mode iv) Direct Addressing mode
   b) Explain how microinstructions execution takes place.   6

UNIT-III

6. a) What is cache memory? Explain the different mapping functions?   6
   b) Compare and contrast between Asynchronous DRAM and   6
      Synchronous DRAM.

(OR)

7. a) What is virtual memory? With a neat block diagram explain the   8
      virtual memory address translation
   b) Explain about associative memory   4

UNIT-IV

8. a) Explain the functions of typical input-output interface   6
   b) Why does DMA have priority over the CPU When both request a   6
      memory Transfer?

(OR)

9. a) Discuss about parallel priority interrupt.   6
   b) What is handshaking? Discuss with neat diagrams   6

UNIT-V

10. a) What is parallel processing? Explain any parallel processing   6
       mechanism
    b) Explain organization of multiprocessor system with neat sketch   6

(OR)

11. a) Explain the interconnection structure for multiprocessor systems   6
    b) What is multiprocessor system? Explain the advantages of multi   6
       processors over Uni processors

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, April, 2018

HEAT TRANSFER
(Mechanical Engineering)

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

PART-A

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

1. a) How does heat transfer differ from thermodynamics?
    b) How many number of boundary conditions are required to solve one dimensional steady state heat conduction equation?
    c) Define the efficiency of a fin.
    d) What is semi-infinite medium? Give example
    e) Define Prandtl number.
    f) What is the significance of Biot number?
    g) Define NTU of a heat exchanger.
    h) Define the term effectiveness of a heat Exchanger.
    i) Define emissivity of a surface.
    j) What is an opaque body?

PART-B

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

UNIT-I

2. a) Derive the general heat conduction equation in Cartesian coordinates and deduce it in one dimensional steady state condition with no internal heat generation.   **8M**
    b) A 100 W bulb has switched on in a 2.5m * 3m* 3m size thermally insulated room having a temperature of 20^0C. Calculate the room temperature at the end of 24 hours   **4M**

(OR)

3. a) A steel pipe line (k = 50W/mK) of I.D 100 mm and O.D 110 mm is to be covered with two layers of insulation each having a thickness of 50 mm. The thermal conductivity of the first insulation material is 0.06 W/mK and the second is 0.12 W/mK. Calculate the loss of heat per metre length of pipe and the interface temperature between the two layers of insulation when the temperature of the inside tube surface is 250^0C and that of the outside surface of the insulation is 50 ^{0}C.   **7M**
    b) Derive the expression critical radius of insulation in case of cylinder.   **5M**

UNIT-II

4. a) A steel rod (5 cm in diameter, 90 cm long, k = 40 W/mK) is attached to a wall. The rod is dissipated heat at the rate of 45 W to the surroundings at 30^0C. The convective heat transfer coefficient is 15 W/m^{2}K. Assuming the heat is lost from the tip also, Calculate the temperature of the wall.   **6M**
    b) Derive the expression for temperature distribution for a long fin.   **6 M**

5. a) An aluminium sphere weighing 5.5 kg and initially at a temperature of 290^0 C is suddenly immersed in a fluid at 15^0C. The convective heat transfer coefficient is 58 W/m^{2}K. Estimate the time required to cool the aluminium to 95 ^{0}C. **6M**

   b) The ground at a particular location is covered with snow pack at -10^0 C for a continuous period of three months, and the average properties at that location are k = 0.4 W/mK and $\alpha = 0.15 \times 10^{-6}$ m^2/sec. Assuming an initial temperature of 15^0C for the ground, determine the minimum burial depth to prevent the water pipes from freezing. **6M**

UNIT-III

6. Water entering at 10^0C is heated to 40^0C in the tube of 0.02 m ID at a mass flow rate of 0.01 kg/sec . The outside of the tube is covered with an insulated electric heating element that produces a uniform heat flux of 15000 W/m^2 over the surface. Neglecting any entrance effect, determine **12M**
   (a) Reynolds Number   (b) The heat transfer Coefficient
   (c) The length of pipe needed for a 30^0C increase in average temperature
   (d) The inner tube surface temperature at the outlet
   (e) The friction factor   (f) The pressure drop in the pipe
   (g) The pumping power required , if the pump is 50 % efficient

(OR)

7. a) Show by dimensional analysis that for forced convection heat transfer, Nusselt number is a function of Reynolds number and Prandtl number. **8M**

   b) What is Dittus-Boelter equation? Where and when does it apply? **4M**

UNIT-IV

8. a) How is the velocity field developed in front of vertical plate which is maintained at a temperature (a) higher and (b) lower, than the surrounding fluid. **4M**

   b) Water is boiled at a rate of 30 kg/hr in a copper pan, 30 cm in diameter, at atmospheric pressure. Determine the critical heat flux. **8M**

(OR)

9. a) Derive the expression for NTU in case of a parallel flow heat exchanger **6M**

   b) Hot oil with a capacity rate of 2500 W/K flows through a double pipe heat exchanger. It enters at 360^0C and leaves at 300^0C. Cold fluid enters at 30^0C and leaves at 200^0C. If the overall heat transfer coefficient is 800 W/m^{2}K, determine the heat exchanger area required for (a) Parallel flow and (b) Counter flow **6M**

UNIT-V

10. a) Define (a) Planck's law (b) Wien's law (c) Stefan Boltzmann law **6M**

    b) Show that the hemispherical black cavity with a black flat cover over it emits 50% of radiation to the surface itself and is absorbed. **6M**

(OR)

11. a) Derive the expression for heat exchange between the two non black bodies of Infinite parallel plates **6M**

    b) Consider radiative heat transfer between two large parallel planes of surface emissivity 0.8. How may thin radiation shields of emissivity 0.05 be placed between the surfaces to reduce the radiation heat transfer by a factor of 75? **6M**

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CODE: 13EC3021   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, April, 2018

VLSI DESIGN
(Electronics & Communication Engineering)

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

PART-A

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

1. a) State Moore's law?
   b) Draw the circuit symbol for depletion mode NMOS transistor?
   c) What is Figure of merit?
   d) Define threshold voltage?
   e) What are lambda based design rules?
   f) What is meant by stick diagram?
   g) Define sheet resistance?
   h) What is carry skip adder?
   i) What is the need for CMOS testing?
   j) What are the pass characteristics of CMOS transmission gate?

PART-B

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

UNIT-I

2. a) With neat diagram explain the fabrication of CMOS using P-well?   6M
   b) What are the steps involved in IC fabrication?   6M

(OR)

3. a) Write brief notes on twin tub process and silicon on insulator process?   6M
   b) Explain latch up condition in CMOS?   6M

UNIT-II

4. a) Derive the expression for drain current of nmos transistor in cutoff, linear and saturation regions?   6M
   b) With schematic diagram explain the operation of nmos inverter?   6M

(OR)

5. a) Derive the expression for pullup to pulldown ratio for an nmos inverter driven by another nmos inverter?   6M

    b) Draw the circuit diagram of Bicmos inverter and explain the operation?   6M

UNIT-III

6. a) Design nand and nor gates using CMOS and draw stick diagram?   6M

    b) Draw layout diagram for NMOS inverter?   6M

(OR)

7. a) Write the scaling factors for the following device parameters. (i) Gate capacitance (ii) Q_{ON} (iii) Gate delay T_d (iv) Current density J (v) Power dissipation per gate p_g 6M

    b) What are the limitations of scaling?   6M

UNIT-IV

8. a) Implement nand and nor gates using dynamic CMOS technology?   6M

    b) Implement carry select adder and write the advantages of it?   6M

(OR)

9. a) Explain different ways of driving large capacitive loads?   6M

    b) Explain the following. (i) sheet resistance (ii) Delay unit   6M

UNIT-V

10. a) Explain the basic architecture of BIST?   6M

    b) Explain about design verification tools?   6M

(OR)

11. a) Explain Ad-hoc testing and chip level test techniques?   6M

    b) Explain system level test techniques?   6M

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AR13

CODE: 13CS3018   SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, April, 2018

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 the persistence property of Phosphor?
    b) Define the terms LCD and LED.
    c) What is the use of homogeneous coordinates?
    d) Give the matrix for a point P(x,y) reflected about y-axis
    e) Write the transformation matrix to scale an object to twice it's original size.
    f) What is meant by parametric continuity?
    g) Give the matrix for 3-D object Scaling followed -by Rotation.
    h) Explain about Reflection and Shear transformations
    i) What is the purpose of Key frame?
    j) Define and Morphing.

PART-B

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

2. a) Draw the architecture of of simple raster graphics system   (6M)
    b) What are the differences between Raster Scan and Random Scan   (6M)
       devices?

(OR)

3. a) Write short notes on Colour CRT (a) beam penetration (b) Shadow   (6M)
       Mask.
    b) What are advantages of DVST over CRT? Also list some   (6M)
       disadvantages of DVST

UNIT-II

4. a) Write an Algorithm to generate a line using Bresenham.   (6M)
    b) Apply Bresenham Algorithm to find all the pixel positions between the (6M)
       given two end points A (30, 15) and B(40,25) of a line.

(OR)

5. a) Write the procedure to generate an ellipse using Mid-point method.   (6M)
    b) Magnify the triangle with vertices A(0,0),B(1,1),C(5,2) to twice it's   (6M)
        size keeping (5,2) fixed.

UNIT-III

6. a) With a neat diagram clearly explain about 2-D Viewing pipeline   (6M)
        Architecture.
    b) Derive window to viewport transformation.   (6M)

(OR)

7. a) Define outcode. Find the outcodes of various regions in 2D plane.   (6M)
    b) Write the Cohen Sutherland outcode algorithm for line clipping.   (6M)

UNIT-IV

8. a) Classify projections with neat diagram.   (6M)
    b) Discuss about 3-D translation rotation and scaling with examples.   (6M)

(OR)

9. a) Write about the characteristic properties of cubic Bezier curves.   (6M)
    b) With an example discuss about polygon surfaces in 3D Object   (6M)
        Representation.

UNIT-V

10. a) What is meant by Z-buffer? Explain about Painters Algorithm   (6M)
    b) State the steps of Warnock's algorithm with an example   (6M)

(OR)

11. a) Describe any six the applications of computer animation in detail.   (6M)
    b) Mention about any three animation languages.   (6M)

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, April, 2018

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) Mention the importance of requirements?
   b) Define includes and extends?
   c) What are the design artifacts of any system?
   d) What is meant by link?
   e) What uses the services of the system under design to fulfill the goals?
   f) Give two reasons for why Unified Process architecture needs to be verified.
   g) Draw the UML Object Notation?
   h) Why should we avoid adding many associations?
   i) What is meant by Low Coupling?
   j) Draw a diagram depicting a relationship between a class and an object?

PART-B

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

UNIT-I

2.
   a) Evaluate use case modelling for finding actors and use cases.   6M
   b) Draw the diagram for requirement work flow, software engineering and explain all the packages?   6M

(OR)

3.
   a) List out the components of Object-Oriented Analysis and Design.   6M
   b) Briefly explain the different phases of Unified process.   6M

UNIT-II

4.
   a) Write short notes on "Finding Analysis Classes".   6M
   b) How to refine association relationship in UML?   6M

(OR)

5.
   a) Explain objects and classes in detail   6M
   b) Polymorphism allows instances of different classes to respond to the same message in different ways. Justify?   6M

UNIT-III

6. a) Illustrate with an example, the relationship between sequence diagram and use cases. 6M

   b) Explain Fork and Join control nodes in an activity diagram with suitable example? 6M

(OR)

7. a) Analyze the purpose of different nodes of activity diagram. 6M

   b) Mention the examples for Modelling Language of Sub systems interactions and how to find relations ships for the application 6M

UNIT-IV

8. a) Examine the Design classes with examples. 6M

   b) Explain the procedure to refine analysis relationships 6M

(OR)

9. a) Give the relationship between aggregation and composition and explain. 6M

   b) Demonstrate the Timing diagram for siren object of the security system under the following timing constraints At t=25 the intruder can sound for no more than 15 minutes because of local regulations on alarms The siren transitions to the state Resting It must stay in this state for 30 minutes.
   At t=75 There is a fire event The siren transitions from the state Sounding Intruder Alarm to the state Sounding FireAlarm. 6M

UNIT-V

10. a) Explain about implementation model (Mapping Designs to Code). 6M

    b) Discuss State Machines diagrams in clear 6M

(OR)

11. a) Write about MVC architecture. 6M

    b) Draw deployment diagram for ATM application. 6M

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