Hall Ticket Number :										

R-17

Code: 7G121

I B.Tech. II Semester Regular Examinations May 2018

Data Structures

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define pointer and explain about pointer arithmetic. 7M
   b) List the four dynamic memory allocation functions in C and give their syntax with examples. 7M

OR

2. a) What are the features and uses of pointers? 7M
   b) Write a C program to add two numbers using command line arguments. 7M

UNIT–II

3. a) Differentiate between structure and union. 6M
   b) Give the tracing of quick sort algorithm for the data [1, 2, 3, 4, 5, 6, 7, 8] to be sorted in ascending order. Discuss its time complexity. 8M

OR

4. a) Write a program in C to copy the contents of one file to another. 7M
   b) Write an iterative algorithm for binary search and discuss its time complexity. 7M

UNIT–III

5. a) Convert the following infix expressions to postfix expressions.
   i) A + B * C + D ii) (A + B) * (C + D) iii) A + B + C + D 6M
   b) Write a program in C to implement operations on queue.(Use pointers) 8M

OR

6. a) Write an algorithm to evaluate a postfix expression. 8M
   b) Give the advantages and disadvantages of recursion. 6M

UNIT–IV

7. a) Write a C program for insertion operation in a singly linked list. 7M
   b) Write C functions for insertion and deletion operations in doubly linked list. 7M

OR

8. a) Write a recursive program to reverse the given singly linked list. 8M
   b) Give the applications of circular linked list. 6M

UNIT–V

9. a) Define binary search tree. Write a C function to insert a new node in a binary search tree. 8M
   b) Give the applications of graphs. 6M

OR

10. a) Write a C function to search a given key in a given binary search tree. 8M
    b) Define the following regarding graphs.
    i) Undirected graph ii) In degree iii) Digraph 6M

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Hall Ticket Number :										

R-17

Code: 7G321

I B.Tech. II Semester Regular Examinations May 2018

Electronic Devices and Circuits

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the basic requirements of transistor biasing. Verify these requirements in collector to base bias circuit. 8M

   b) An NPN Silicon transistor with β=50 is used in a common emitter circuit with V_{CC}=10V, R_C=2K. The bias is obtained by connecting a 100K resistance from collector to base. Find i) Q-Point ii) Stability factor, S 6M

OR

2. a) What is thermal runaway in transistors? Obtain the condition for thermal stability in transistors. 8M

   b) Design a self-bias circuit using silicon transistor to achieve a stability factor of 10, with the following specifications: V_{CC}=16V, V_{BE}=0.7V, V_{CEQ}=8V, I_{CQ}=4 mA & β=50. 6M

UNIT–II

3. a) With neat sketches, necessary equations explain the drain & transfer characteristics of MOSFET in enhancement mode. 10M

   b) Establish a relation between the three JFET parameters, μ, r_d and g_m. 4M

OR

4. a) With neat sketches, necessary equations explain the drain & transfer characteristics of MOSFET in depletion mode. 10M

   b) Compare between JFET and MOSFET 4M

UNIT–III

5. a) Explain the working of transistor as an amplifier 7M

   b) Explain DC Load line and the significance of Q-point 7M

OR

6. a) Explain the working of Single Stage Amplifier with neat diagrams and waveforms 7M

   b) Explain AC Load line and the significance of Q-point 7M

UNIT–IV

7. Explain the principle of CS amplifier with the help of circuit diagram. Derive the expressions for A_V , input impedance Z_i and output impedance Z_o. 14M

OR

8. Explain the principle of CD amplifier with the help of circuit diagram. Derive the expressions for A_V , input impedance Z_i and output impedance Z_o. 14M

UNIT–V

9. a) Explain the construction and working of SCR with neat diagram 10M

   b) Explain the working of Photo Diode with neat diagram 4M

OR

10. a) Explain the construction and working of Tunnel Diode with neat diagrams 10M

    b) Explain the working of Photo Transistor with neat diagram 4M

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Hall Ticket Number :										

R-17

Code: 7GC22

I B.Tech. II Semester Regular Examinations May 2018

Engineering Chemistry

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain in detail how hardness of a water sample is estimated by EDTA method. 8M

   b) A sample of hard water contains the following dissolved salts per liter. Ca(HCO3)2=16.2 mgs, Mg(HCO3)2=14.6mgs, CaCl2=111mgs, CaSO4=1.36mgs, turbidity=10mgs. Calculate the temporary permanent and total hardness of water in ppm. 6M

OR

2. a) How do you determine dissolved oxygen present in a water sample by Winkler's method? 7M

   b) What is desalination? Explain desalination of water by reverse osmosis process. 7M

UNIT–II

3. a) In what way Conductometric titrations are advantageous than volumetric titrations? Explain the curve obtained in the Conductometric titration between strong acid vs strong base. 7M

   b) Define fuel cell? Explain the working of Hydrogen oxygen fuel cell? 7M

OR

4. a) Explain the rusting of iron with the help of electrochemical theory of corrosion? 6M

   b) Explain Sacrificial anode and Impressed current cathodic protection in detail. Write their applications 8M

UNIT–III

5. a) Write the differences between addition and condensation polymerization? 6M

   b) Explain the preparation, properties and uses of Bakelite 8M

OR

6. Explain the preparation, properties and engineering applications of Buna-S, Buna-N and polyurethane rubber. 14M

UNIT–IV

7. What is calorific value of a fuel? How calorific value of a solid fuel is determined using bomb calorimeter? Explain how corrections are made? 14M

OR

8. a) What is knocking? What are its adverse effects? How can it be prevented? 6M

   b) Explain in detail with a neat flow chart the method of preparation of synthetic petrol by Fischer –Tropsch process 8M

UNIT–V

9. a) What are the raw materials used for manufacturing of Portland cement? Describe the method of manufacturing of Portland cement by wet process with the help of a rotary kiln. 8M

   b) Explain the chemical reactions involved in setting and hardening process of cement? 6M

OR

10. a) Explain the important properties of a refractory material? 7M

    b) Present a brief account on the following properties of lubricants

    i) Flash and fire point ii) Mechanical stability iii) cloud and pour point 7M

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Hall Ticket Number :										

R-17

Code: 7GC24

I B.Tech. II Semester Regular Examinations May 2018

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Trace the curve $y^2(2a-x) = x^3$ 7M

   b) Evaluate $\iint r \sin\theta \, dr\, d\theta$ over the cardioid $r = a(1-\cos\theta)$ above the initial line. 7M

OR

2. a) Evaluate the double integral $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2+y^2)\,dx\,dy$ by changing into polar coordinates 7M

   b) Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ *and* $z = 0$ 7M

UNIT–II

3. a) Find the Laplace transform of $e^{4t}\sin 2t \cos t$ 7M

   b) Evaluate $\int_0^\infty t\, e^{-3t}\sin t \, dt$ applying Laplace transform. 7M

OR

4. a) Find the Laplace transform of $\frac{\sin 3t \cos t}{t}$ 7M

   b) Evaluate $L(f(t))$ where $f(t)$ is a periodic function of period 2π given by

$$f(t) = \begin{cases} \sin t & , \ 0 < t < \pi \\ 0 & , \ \pi < t < 2\pi \end{cases}$$

7M

UNIT–III

5. a) Find the inverse Laplace transform of $\frac{s+2}{s^2-2s+5}$ 7M

   b) Applying Laplace transforms, solve the differential equation

$$\frac{d^3y}{dt^3} + 2\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = 0, \quad y(0) = 1, \quad y'(0) = y''(0) = 2$$

7M

OR

6. a) Find the inverse Laplace transform of $\frac{e^{-2s}}{s^2+4s+5}$ 7M

   b) Applying Laplace transforms, solve the differential equation

$$\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t}\sin t, \quad x(0) = 0, \quad x'(0) = 1$$

7M

UNIT–IV

7. a) Find the directional derivative of the function $f = x^2 - y^2 + 2z^2$ at the point $P = (1, 2, 3)$ in the direction of PQ where $Q = (5, 0, 4)$ 7M

   b) Show that $F = (e^x \cos y + yz)i + (xz - e^x \sin y)j + (xy + z)k$ is conservative over its natural domain and find potential function for it. 7M

OR

8. a) Establish the relation $\nabla^2[f(r)] = \frac{d^2 f}{dr^2} + \frac{2}{r}\frac{df}{dr}$ *where* $r = |\bar{r}|$ 7M

   b) Evaluate $\int_S \bar{F} \cdot \bar{n}\, dS$ where $\bar{F} = 18z\,\bar{i} - 12\,\bar{j} + 3y\,\bar{k}$ and S is the part of the surface of the plane $2x + 3y + 6z = 12$ located in the first octant. 7M

UNIT–V

9. a) Applying divergence theorem evaluate $\iint_S x\,dydz + y\,dzdx + z\,dxdy$ where S is the surface of the sphere $x^2 + y^2 + z^2 = a^2$ 7M

   b) Evaluate by Greens theorem $\oint_C (y - \sin x)dx + \cos x\, dy$ where C is the triangle enclosed by the lines $y = 0$, $x = \frac{®}{2}$ *and* $® \; y = 2x$ 7M

OR

10. Verify stokes theorem for the vector field $\bar{F} = (2x - y)\,\bar{i} - yz^2\,\bar{j} - y^2 z\,\bar{k}$ over the upper half of the surface $x^2 + y^2 + z^2 = 1$ bounded by its projection on the xy – plane. 14M

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Hall Ticket Number :										

R-17

Code: 7G523-A

I B.Tech. II Semester Regular Examinations May 2018

Geometrical Drawing

(Common to EEE & ECE(Shift-II))

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Construct a heptagon of side 35mm. 7M

   b) Inscribe a hexagon in a circle of 90mm diameter with two of its sides vertical. 7M

OR

2. Trace the path of a point on the circumference of a circle of diameter 60mm when the circle rolls without slipping on a straight line for one complete revolution. Name the curve. Draw a tangent to the curve at a point on it 35mm from the straight line. 14M

UNIT–II

3. A straight-line AB, 75mm long, has one end 20mm above H.P & 25mm in front of V.P. The other end is 60mm from both V.P and H.P. Draw its projections and determine its true inclinations with the V.P and the H.P. 14M

OR

4. A line AB is inclined at 40^o to the H.P. A is 25mm above the H.P and 30mm in front of the V.P. The top view of the line is 70mm long and is inclined at 30^o to XY. Draw the projections and determine its true inclinations with V.P. 14M

UNIT–III

5. A circle of 70mm diameter is so placed that its front view is an ellipse with 35mm long minor axis, and the major axis is inclined at 45^o to XY. Draw the projections of the circle and determine its inclination with the V.P. 14M

OR

6. Draw the projections of a square lamina of 60mm side when a side of the square lamina is in the V.P but inclined at 30^o to the H.P and the lamina itself is inclined at 45^o to the V.P. 14M

UNIT–IV

7. A hexagonal prism is resting on one of the corners of its base on the HP. The longer edge containing that corner is inclined at 45^0 to the base. The axis of the prism makes an angle of 30^0 to the V.P. Draw the projections of the solid. 14M

OR

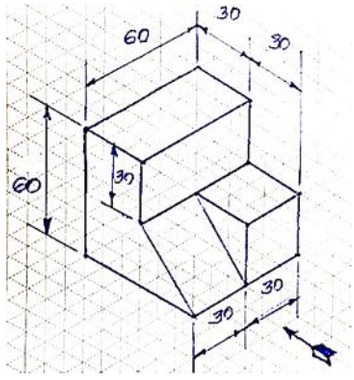
8. A hexagonal pyramid base 30mm side and axis 65mm long, has one of its slant edges in the H.P but inclined at 45^o to the V.P. Draw its projections when the apex is nearer to the V.P. 14M

UNIT–V

9. A square pyramid 40mm base side and 70mm long axis rests with its base on the H.P. Draw its isometric view. 14M

OR

10. Draw the projections (front view looking in the direction of the arrow, top view and the left side view) of the solid shown in the figure.



14M

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