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**R-17**

**Code: 7G121**

I B.Tech. II Semester Supplementary Examinations March 2021

**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) Write a C program to access elements of an array using pointer.
- b) Explain the concept of pointers to pointers.

**OR**

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

**UNIT-II**

- 3. a) Explain with an example about nested structures.
- b) Explain any four standard library functions for files in C.

**OR**

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

**UNIT-III**

- 5. a) Write a C program to implement operations of a dynamic queue.(Use pointers)
- b) Write a program to implement stack operations using pointers.

**OR**

- 6. Convert the following infix expressions to postfix expressions.  
i)  $A / B * C - D$     ii)  $(A - B) * (C * D)$     iii)  $A + B + C * D$

**UNIT-IV**

- 7. a) Explain the advantages and disadvantages of linked lists over arrays.
- b) Write the applications of circular linked list.

**OR**

- 8. a) Write a C program for insertion operation in a singly linked list.
- b) Write C functions for deletion operations in doubly linked list.

**UNIT-V**

- 9. a) Define the following terms of a graph.  
    i) Undirected graph    ii) In degree    iii) Digraph
- b) Explain different types of traversals in a tree.

**OR**

- 10. Create a binary search tree by inserting following elements into an empty BST: [6, 4, 5, 3, 10, 8, 11].

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Hall Ticket Number :

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**R-17**

**Code: 7G321**

I B.Tech. II Semester Supplementary Examinations March 2021

**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) Draw a BJT fixed bias circuit and derive the expression for the stability factor 'S'.  
b) How do you provide temperature compensation for the variations of  $V_{BE}$  and stabilization of the operating point?

**OR**

2. a) Explain why common emitter amplifier requires a form of dc stabilization, whereas common base amplifiers are usually unstabilized?  
b) Draw a voltage divider bias circuit and derive an expression for its stability factor.

**UNIT-II**

3. What are the biasing schemes available to achieve the required bias in a JFET? Explain any one of them.

**OR**

4. The following information is included from the data sheet for an N-channel JFET;  $I_{DSS}=20\text{mA}$ ,  $V_P=-8\text{V}$  and  $g_{m0}=5000\mu\text{s}$ . determine the values of drain current and transconductance at  $V_{GS}=-4\text{V}$ .

**UNIT-III**

5. a) Draw the low frequency equivalent circuit of a CE amplifier  
b) What is an emitter follower? Explain.

**OR**

6. Draw the circuit diagram of common base amplifier and derive the expressions for current gain and voltage gain.

**UNIT-IV**

7. A FET amplifier has  $g_m = 2.5\text{mA/V}$  and  $r_d=500\text{k}$  . The load resistance is  $10\text{k}$  .find the value of voltage gain.

**OR**

8. Draw the circuit diagram of common gate amplifier. Derive the expression for its voltage gain and input impedance.

**UNIT-V**

9. a) Discuss the working principle of photodiode.  
b) What is varactor diode? Explain briefly, how it can be used in tuning circuits?

**OR**

10. Discuss the working principle of UJT, construction, characteristics and applications also.

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Hall Ticket Number :

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**R-17**

**Code: 7GC22**

I B.Tech. II Semester Supplementary Examinations March 2021

## **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 the process of a phosphate, carbonate and sodium aluminate conditioning of boiler feed water  
b) Give detailed procedure for the determination of dissolved oxygen in water.

**OR**

2. Describe the principle and procedure involved in the zeolite process used for the treatment of water. Give its advantages over other methods.

### **UNIT-II**

3. a) What is the principle underlying conductometric titration? Discuss the titration curve obtained for a titration between HCl and NaOH.  
b) Explain the construction and working of H<sub>2</sub>-O<sub>2</sub> fuel cell with neat sketch and chemical reactions

**OR**

4. Explain the following  
(a) Nickel electrolessplating  
(b) Copper electroplating

### **UNIT-III**

5. a) What is vulcanization of rubber? Explain why natural rubber needs vulcanization. How is it carried out?  
b) Write a note on the classification of polymers with examples

**OR**

6. Describe the method of preparation, properties & applications of the following  
(i) polyphosphates  
(ii) Buna-S

### **UNIT-IV**

7. a) Explain various steps involved in refining of petroleum  
b) Describe how synthetic petrol is synthesized from Bergius process

**OR**

8. With a neat diagram describe the Orsat's gas analysis method. What are the special precautions to be taken in the measurement?

### **UNIT-V**

9. a) What is cement? How do you classify the cement?  
b) How are lubricants classified? Give examples
10. a) Define refractory? Discuss the criteria of good refractory materials  
b) Explain the hardening and setting of cement using the chemical equations

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Code: 7GC24

I B.Tech. II Semester Supplementary Examinations March 2021

**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  $y^2(2a-x) = x^2$ .  
 b) Evaluate the double integral  $\iint_R xy \, dx \, dy$  where 'R' is the region bounded by the lines  $x$ -axis, the line  $y = 2x$  and  $y = \frac{x}{4a}$

**OR**

2. a) Trace the curve  $ay^2 = x^2(a^2 - x^2)$   
 b) Change the order of integration in  $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 \, dy \, dx$  and hence evaluate.

**UNIT-II**

3. a) Find the Laplace Transform of  $t^2 e^{-3t}$ .  
 b) Find the Laplace Transform of  $\frac{\sin 3t \cos t}{t}$

**OR**

4. Find the Laplace Transform of the periodic function defined by the triangular wave

$$f(t) = \begin{cases} \frac{t}{a} & ; 0 \leq t \leq a \\ \frac{2a-t}{a} & ; a \leq t \leq 2a \end{cases} \quad \text{and } f(t+2a) = f(t)$$

**UNIT-III**

5. a) Find the inverse transform of  $\frac{s^2 - 3s + 4}{s^3}$ .  
 b) Find the inverse transform of  $\frac{1}{s(s^2 + a^2)}$ .

**OR**

6. Find the inverse transform of  $\log\left(\frac{s+1}{s-1}\right)$ .

**UNIT-IV**

7. a) Find the unit vector normal to the surface  $x^3 + y^3 + 3xyz = 3$  at the point (1, 2, -1)  
 b) Prove that  $\text{div curl } \vec{F} = 0$

**OR**

8. Find the angle between the surface  $x^2 + y^2 + z^2 = 12$  and  $x^2 + y^2 - z = 12$  at the point (2, 2, 2)

**UNIT-V**

9. Verify stoke's theorem for a vector field  $\vec{F} = (x^2 + y^2)\vec{i} - 2xy\vec{j}$  taken round the rectangle bounded by the lines  $x = \pm a$ ,  $y = 0$ ,  $y = b$ .

**OR**

10. Verify Green's Theorem in the plane for  $\int_c [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$  where 'c' encloses the region bounded by  $y = \sqrt{x}$  and  $y = x^2$

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**Code: 7G523**

I B.Tech. II Semester Supplementary Examinations March 2021

**Geometrical Drawing**  
( 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) Draw an Arc passing through any Three points, which are not in a straight line.
- b) Construct a regular Hexagon of given side 30mm.

**OR**

2. a) Construct an ellipse with major axis 120mm and minor axis 80mm by using Concentric circles method.
- b) Construct an ellipse with major axis 100mm and minor axis 60mm by using Oblong method.

**UNIT-II**

3. A point 30mm above 'xy' line is the plane view of two points P & Q the elevation of P is 45mm above the H.P. While that of the point Q is 35mm below the H.P. Draw the projections of the points and state their positions with reference to the principal planes on the quadrant in which they lie.

**OR**

4. The front view of a 75mm long line measures 55mm. The line is parallel to the H.P and one of its ends is in the V.P and 25mm above the H.P. Draw the projections of the line and determines its inclination with the V.P.

**UNIT-III**

5. A semi-circular lamina of 64mm diameter has its straight edge in VP and inclined at an angle of  $45^{\circ}$  to HP. The surface of the lamina makes an angle of  $30^{\circ}$  with VP. Draw the projections

**OR**

6. Draw the projections of a circle of 50mm diameter, is lying on H.P on a point of its circumference and inclined at  $30^{\circ}$  to the H.P. Its centre is 35mm in front of the V.P.

**UNIT-IV**

7. A hexagonal pyramid, base 25mm side and axis 50mm long, has an edge of its base on the ground. Its axis is inclined at  $30^{\circ}$  to the ground and parallel to the VP. Draw its projections.

**OR**

8. A cylinder of base diameter 40mm and axis 70mm long lies on a point of its base such that its axis is  $30^{\circ}$  inclined to HP and  $45^{\circ}$  to VP. Draw its projections.

**UNIT-V**

9. Draw an isometric projection of
  - i) a square plane of side 40mm
  - ii) an equilateral triangular plane of side 30mm
 Both in the horizontal and the vertical plane

**OR**

10. Draw the isometric view of a hexagonal prism with the side of the base 40mm and length of the axis 70mm, when its axis is vertical.

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