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Code: 7GC24

I B.Tech. II Semester Supplementary Examinations June 2022

**Engineering Mathematics-II**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. Evaluate the double integral  $\iint_R xy \, dx \, dy$  where 'R' is the region bounded by the lines

$$x\text{-axis}, \text{ the line } y = 2x \text{ and } y = \frac{x}{4a}$$

**OR**

2. Evaluate  $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} \, dx \, dy$  by changing to polar coordinates.

**UNIT-II**

3. a) Find the Laplace Transform of  $\frac{\cos at - \cos bt}{t}$

- b) Find the Laplace Transform of  $t^2 e^{-3t}$ .

**OR**

4. a) Find the Laplace Transform of  $\sin 2t \sin 3t$

- b) Find the Laplace Transform of  $\frac{\sin 3t \cos t}{t}$

**UNIT-III**

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

**OR**

6. Solve the differential equation  $y'' + y = t$ ,  $y(0) = 1$ ,  $y'(0) = 2$  Using Laplace Transform

**UNIT-IV**

7. Find the unit vector normal to the surface  $x^3 + y^3 + 3xyz = 3$  at the point  $(1, 2, -1)$

**OR**

8. Find  $\operatorname{div} \bar{F}$  and  $\operatorname{curl} \bar{F}$  where  $\bar{F} = \operatorname{grad}(x^3 + y^3 + z^3 - 3xyz)$

**UNIT-V**

9. Evaluate by Green's theorem  $\int_c [(x^2 - \cos hy) \, dx + (y + \sin x) \, dy]$ , where 'c' is the rectangle with vertices  $(0,0)$ ,  $(f,0)$ ,  $(f,1)$ ,  $(0,1)$ .

**OR**

10. Verify Gauss Divergence theorem for  $\bar{F} = x^3 \bar{i} + y^3 \bar{j} + z^3 \bar{k}$  taken over the cube bounded by  $x=0, x=a; y=0, y=a; z=0, z=a$

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**R-17**

**Code: 7G523**

I B.Tech. II Semester Supplementary Examinations June 2022

**Geometrical Drawing**  
(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. Construct an ellipse, when the distance of the focus from the directrix is equal to 50mm and eccentricity is 2/3. Also draw tangent and normal to the curve at a point 40mm from the directrix.

**OR**

2. a) Divide a given line of 95mm long in to TEN equal parts  
b) Construct a regular Pentagon of given side 45mm.

**UNIT-II**

3. One end P of a line PQ, 55 mm long is 35 mm in front of VP and 25 mm above HP. The line is inclined at 40° to HP and 30° to VP. Draw the projections of PQ.

**OR**

4. The top view of a 75 mm long line AB measure 65 mm while the length of its front view is 50 mm. Its one end A is in H.P and 12 mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P and the V.P

**UNIT-III**

5. A Regular pentagonal plane of 30mm side is parallel to H.P and perpendicular to V.P. The plane is 15 mm above the H.P and an edge of it lies on V.P. Draw the projections of the plane

**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° to the H.P. Its centre is 35mm in front of the V.P.

**UNIT-IV**

7. A square prism, base 40mm side and height 65mm has its axis inclined at 45° to the HP and has an edge of its base, on the HP and inclined at 30° to the VP. Draw its Projections.

**OR**

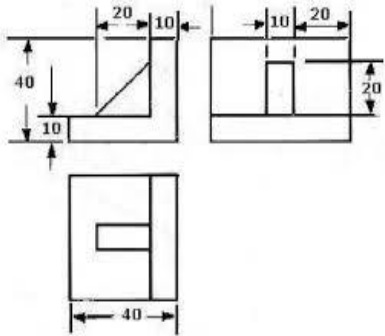
8. A cube of 40mm side is resting with a face on HP such that when one of its vertical faces is inclined at 30° at VP.

**UNIT-V**

9. Draw the isometric projection of a circle of diameter 50mm with its plane horizontal and vertical

**OR**

10. Convert the following orthographic view in to isometric view as shown in Fig.



(All dimensions are in 'mm')

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**R-17**

**Code: 7G121**

I B.Tech. II Semester Supplementary Examinations June 2022

**Data Structures**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

- 1. a) Define pointer? How pointer variables are initialized.
- b) Write a c program to access elements of an array using pointers.

**OR**

- 2. a) Write a short note on void pointer.
- b) Discuss about any two dynamic memory allocation functions.

**UNIT-II**

- 3. a) Differentiate structures and unions.
- b) Explain any one sorting technique with example program.

**OR**

- 4. a) List and explain any four functions related to file handling in c.
- b) Differentiate linear search and binary search.

**UNIT-III**

- 5. What is Queue? Explain the operations of a Queue with an example program.

**OR**

- 6. a) Convert the following infix expression to post fix expressions
  - i)  $A + B * C + D$       ii)  $(A + B) * (C + D)$
- b) What is stack? Write the applications of stack.

**UNIT-IV**

- 7. Discuss the operations of a single linked list with proper diagrams.

**OR**

- 8. How to represent doubly linked list? Write the algorithm to insert and delete operations in double linked list.

**UNIT-V**

- 9. What is Binary Search Tree? Construct the BST for the nodes 15, 6, 3, 7, 45, 50

**OR**

- 10. What is Di-graph? Explain different representation of graphs.

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Hall Ticket Number :

**R-17**

**Code: 7G321**

I B.Tech. II Semester Supplementary Examinations June 2022

**Electronic Devices and Circuits**

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. Draw the circuit diagram of a collector to base bias circuit of CE amplifier and derive expression for 'S'.

**OR**

2. Determine the quiescent currents and the collector to emitter voltage for a germanium transistor with  $\beta = 50$  in self biasing arrangement. Draw the circuit with a given component value  $V_{CC} = 20V$ ,  $R_C = 2k$ ,  $R_E = 100$ ,  $R_1 = 100k$  and  $R_2 = 5k$ .

**UNIT-II**

3. Derive the expression for transconductance of JFET and explain its importance in design of circuits.

**OR**

4. In a self-bias N-channel JFET, the operating point is to be set at  $I_D = 1.5mA$  and  $V_{DS} = 10V$ . The JFET parameters are  $I_{DSS} = 5mA$  and  $V_P = -2V$ . Find the values of  $R_S$  and  $R_D$  given that  $V_{DD} = 20V$ .

**UNIT-III**

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

**OR**

6. Design a common emitter amplifier to obtain a voltage gain of 100 and the input impedance of the circuit is assumed to be  $2.5k$  and the circuit is assumed to have emitter bypass capacitor. Assume necessary data wherever is required.

**UNIT-IV**

7. A certain FET has a transconductance of  $2500\mu S$ . with an external drain resistance of  $2k$ , find the value of ideal 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 light emitting diode with minimum and maximum voltage drops of  $1.8V$  and  $3V$  respectively is connected alternately with  $24V$  supply (with  $820$  ohm resistor) and a  $5V$  supply (with  $120$  ohm resistor). Indicate which supply voltage will keep the brightness of the diode as constant.

**OR**

10. a) What are the applications of Tunnel diode?  
b) Write a note on LED.

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**R-17**

**Code: 7GC22**

I B.Tech. II Semester Supplementary Examinations June 2022

**Engineering Chemistry**

(Common to EEE & ECE )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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**UNIT-I**

1. a) What is break point chlorination? State its significance.
- b) Write brief account on Priming and foaming.

**OR**

2. a) With the help of neat diagram, describe the reverse osmosis method for the desalination of brackish water.
- b) What is hardness of water? How do you classify and express hardness?

**UNIT-II**

3. Give reasons for the following  
(i) Corrosion of water-filled tank occurs below the waterline  
(ii) A Copper equipment should not possess a small Steel bolt

**OR**

4. On dilution Equivalent Conductance of an electrolyte increases whereas Specific Conductance decreases. Explain.

**UNIT-III**

5. a) Describe the method of preparation, properties of Bakelite
- b) Write a brief notes on Vulcanization and compounding of rubber

**OR**

6. Describe the synthesis and conducting mechanism of polyacetylene

**UNIT-IV**

7. a) What are the characteristics of a good fuel?
- b) Write short note on octane number and cetane number.

**OR**

8. The percentage composition of a sample of coal by weight was found to be: C = 76%, H=5.2%, O = 12.8%, N = 2.7%, S = 1.2%, the remaining being ash. Calculate the minimum weight of air necessary for complete combustion of 1 kg of coal and percentage composition by weight of dry products, if 50% excess air supplied.

**UNIT-V**

9. What is meant by Lubrication Process? Describe thick-film Lubrication and thin-film Lubrication.

**OR**

10. a) How are lubricants classified? Give examples
- b) Describe the analysis of cement

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