R-17

Code: 7G321

I B.Tech. II Semester Supplementary Examinations November 2023

Electronic Devices and Circuits

(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) Name the different types of biasing circuits and give three circuit configurations.   7M
    b) List the three sources of instability of collector current and hence define the three stability factors.   7M

OR

2. a) Explain why common emitter amplifier requires a form of dc stabilization, whereas common base amplifiers are usually unstabilized?   6M
    b) Draw a voltage divider bias circuit and derive an expression for its stability factor.   8M

UNIT–II

3. a) List the advantages and disadvantages of FET over bipolar transistors.   6M
    b) What are the biasing schemes available to achieve the required bias in a JFET? Explain any one of them.   8M

OR

4. a) Explain the principle of MOSFET in depletion mode with neat sketches and output characteristics.   7M
    b) 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.   7M

UNIT–III

5. a) What are the unique features of CC amplifier circuit?   7M
    b) What is the function of emitter by pass capacitor? If removed how it effects the response?   7M

OR

6.   With a neat circuit diagram, explain the working of a transistor amplifier in which phase inversion of the input signal does not take place. Obtain the expressions for such an amplifier.   14M

UNIT–IV

7.   Draw the small signal equivalent circuit of FET amplifier in CS connection and derive the equations for voltage gain, input impedance and output impedance.   14M

OR

8.   Design a source follower circuit with Rg=100M , Rs=10k   and gm=8000µs. and also find the input and output resistance of the circuit.   14M

UNIT–V

9. a) What are the applications of Tunnel diode?   6M
    b) Write a note on LED.   8M

OR

10. a) Discuss the VI characteristics of SCR.   7M
    b) Discuss the two transistor analogy of a SCR.   7M

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Code: 7GC22

I B.Tech. II Semester Supplementary Examinations November 2023

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 are boiler troubles? How are they caused? Give suggestions to minimize the troubles.   7M

    b) What is the principle of EDTA titration? Briefly describe the estimation of hardness of water by EDTA method.   7M

OR

2. a) With the help of neat diagram, describe the reverse osmosis method for the desalination of brackish water.   7M

    b) What is hardness of water? How do you classify and express hardness?   7M

UNIT–II

3. a) Explain the composition, working and applications of Ni-Cd cell   7M

    b) What is the principle underlying conductometric titration? Discuss the titration curve obtained for a titration between HCl and NaOH.   7M

OR

4.   Explain the following
        (a) Nickel electrolessplating   (b) Copper electroplating   14M

UNIT–III

5.   Write a note on
        (a) Degree of polymerization.   (b) Functionality. (c) Tacticity of polymer   14M

OR

6. a) Write a note on processing of raw rubber? Explain the draw backs of raw rubbers.   7M

    b) Explain Chain polymerization and Step growth polymerization with examples.   7M

UNIT–IV

7. a) Explain various steps involved in refining of petroleum   7M

    b) Describe how synthetic petrol is synthesized from Bergius process   7M

OR

8.   What is the main raw material for the metallurgical coke? Describe the Otto Hoffmann's method of manufacture of metallurgical coke. How do you recover the byproducts in this method?   14M

UNIT–V

9. a) Write a note on the classification of refractories with examples.   7M

    b) What is the significance of flash & fire point, cloud & pour point of a good lubricant?   7M

OR

10. a) Explain the hardening and setting of cement using the chemical equations   7M

    b) Write a note on the composition of Portland cement   7M

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R-17

Code: 7GC24

I B.Tech. II Semester Supplementary Examinations November 2023

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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UNIT–I

1. a) Evaluate $\int\limits_{0}^{1}\int\limits_{0}^{1-z}\int\limits_{0}^{1-x-y} x+y+z\,dx\,dy\,dz$ 7M

   b) Trace the curve $r = a(1-\cos\theta)$.   7M

OR

2. a) Change the order of integration in $\int\limits_{0}^{1}\int\limits_{0}^{\sqrt{1-x^2}} y^2\,dy\,dx$ and hence evaluate.   7M

   b) Evaluate the integral by changing the order of integration $\int\limits_{0}^{1}\int\limits_{x^2}^{2-x} xy\,dx\,dy.$ 7M

UNIT–II

3. a) Find the Laplace Transform of $t^2 e^{-3t}$.   7M

   b) Find the Laplace Transform of $t\,e^{-t}\,\mathrm{Sin}\,t$ 7M

OR

4. a) Evaluate $\int\limits_{0}^{\infty} e^{-2t}\,\mathrm{Sin}^3\,t\,dt$ 7M

   b) Find the Laplace Transform of $\int\limits_{0}^{t}\dfrac{\sin t}{t}\,dt.$ 7M

UNIT–III

5. Find the inverse transform of $\log\left(\dfrac{s+1}{s-1}\right).$ 14M

OR

6. a) Find the inverse transform of $\dfrac{1}{s(s^2+a^2)}.$ 7M

   b) Find the inverse transform of $\dfrac{s+2}{s^2-4s+13}.$ 7M

UNIT–IV

7. a) Find the angle between the surface $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point $(2,-1,2)$ 7M

   b) Show that $div\left(grad\ r^n\right)=n(n+1)r^{n-2}$ 7M

OR

8. a) Prove that $div\,curl\,\bar{F}=0$ 7M

   b) Evaluate $curl\ of\ \bar{V}=e^{xyz}\left(\bar{i}+\bar{j}+\bar{k}\right)$ at the point $(1,2,3).$ 7M

UNIT–V

9. 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 $x=0$, $x=a$; $y=0$, $y=a$; $z=0$, $z=a$ 14M

OR

10. Verify stoke's theorem for a vector field $\bar{F}=\left(x^2+y^2\right)\bar{i}-2\,x\,y\,\bar{j}$ taken round the rectangle bounded by the lines $x=\pm a,\ y=0,\ y=b.$ 14M

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I B.Tech. II Semester Supplementary Examinations November 2023
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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UNIT–I

1. a) Construct a regular Hexagon of given side 30mm.   7M

    b) Divide a given line of 75mm long in to TEN equal parts   7M

OR

2. Draw an epicycloid of a circle of 40mm diameter, which rolls outside on another circle of 120mm diameter for one revolution clockwise. Draw a tangent and a normal to it at a point 95mm from the centre of the directing circle.   14M

UNIT–II

3. a) A line AB of 50mm long is parallel to both H.P and V.P. The line is 40mm above H.P and 30mm in front of V.P. Draw the projections of the line.   7M

    b) A line AB, 55mm long has its end A is 15mm above H.P and 20mm in front of the V.P. The line is inclined at 45^0 to the H.P. Draw the projections.   7M

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.   14M

UNIT–III

5. A square plane ABCD of 30mm side is parallel to H.P and 25mm away from it. Draw its projections when two of its sides are (i) Parallel to V.P (ii) inclined at 45^0 to the VP.   14M

OR

6. a) A regular hexagonal lamina of 22mm side rests on one of its sides on HP. It is parallel to and 15mm away from the VP. Draw its projections.   7M

    b) A square plane of side 40mm has its surface parallel to VP and perpendicular to HP. Draw its projections when one of the sides is inclined at 30^0 to HP.   7M

UNIT–IV

7. A cube of 40mm side is resting with a face on HP such that when one of its vertical faces is inclined at 30^0 at VP.   14M

OR

8. Draw the projections of a cone, base 45mm diameter and axis 80mm lying on the HP on one of its generators with the axis parallel to the VP.   14M

UNIT–V

9. Draw the isometric view of a pentagon of 50mm side, plane vertical and horizontal.   14M

OR

10. Draw the isometric projection of a cylinder of base diameter 30mm and axis 70mm long.   14M

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Code: 7G121

I B.Tech. II Semester Supplementary Examinations November 2023
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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UNIT–I

1. a) Write a program to read and display array elements using pointers   7M

    b) What is a pointer? What are the features of pointers? Write a C program to print address of a variable   7M

OR

2. a) Write a C program to swap two numbers using pointers.   6M

    b) Write a program to perform addition of array elements using pointer to array.   8M

UNIT–II

3. a) Explain different modes to open a file   7M

    b) How to copy and compare structure variables? Illustrate with example.   7M

OR

4. a) Define union. List out the differences between unions and structures   7M

    b) Write a C program to copy the contents from one file to another file.   7M

UNIT–III

5. Write a C Program to perform the following operations on a queue
    a) Insert   b) Delete   c) Display   14M

OR

6. Show the stack after each operation of the following sequence that starts with the empty stack: push(a), push(b), pop, push(c), push(d), pop.   14M

UNIT–IV

7. What is a Doubly Linked List.? Explain different operations of a Doubly linked list with suitable examples.   14M

OR

8. Write a C program to implement the following operations on a singly Linked List
    a) Insert at beginning   b) deletion at end   c)Traversing a List   14M

UNIT–V

9. a) Define and describe the terms:
        Tree, Binary Tree, Complete Binary Tree and Degree of a tree.   9M

    b) Draw a complete undirected graph having five nodes.   5M

OR

10. Define Graph and describe various representations of a graph with suitable examples.   14M

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