Code: 20AC21T

I B.Tech. II Semester Supplementary Examinations June 2024

Differential Equations and Vector Calculus

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

****

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer **all** the following short answer questions (5 X 2 = 10M)   CO   BL

a) Solve $(D^2+5D+6)y=0$ CO1   L3

b) Solve $(x^2D^2+4xD+3)y=0$ CO2   L3

c) Form the partial differential equation by eliminating the arbitrary constants from $z=ax+by$ CO3   L2

d) Find $curl\ \bar{f}$ for $\bar{f}=z\bar{i}+x\,\bar{j}+y\bar{k}$ CO4   L1

e) State Green's theorem.   CO5   L2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks   CO   BL

UNIT-I

2. a) Solve $(D^2+6D+9)y=e^{-2x}$ 6M   CO1   L3

b) Solve $(D^2+1)y=x$ 6M   CO1   L3

OR

3.   Solve $\dfrac{d^2y}{dx^2}+4y=\tan 2x$ by using method of variation of

parameters.   12M   CO1   L3

UNIT-II

4.   Solve

$$(1+x)^2\frac{d^2y}{dx^2}+(1+x)\frac{dy}{dx}+y=2\sin[\log(1+x)]$$

12M   CO2   L3

OR

5.   Solve $(x^2D^2-3xD+4)y=(1+x)^2$ 12M   CO2   L3

UNIT-III

6. Form the partial differential equation by eliminating the arbitrary constants a, b from $(x-a)^2+(y-b)^2=z^2\cot^2\Gamma$ 12M CO3 L2

OR

7. Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$ 12M CO3 L3

UNIT-IV

8. Find the directional derivative of $W=x^2-2y^2+4z^2$ at (1,1,-1) in the direction of $2\bar{i}+\bar{j}-\bar{k}$.   12M CO4 L2

OR

9. Find $curl\,\bar{f}$ where $\bar{f}=grad(x^3+y^3+z^3-3xyz)$ 12M CO4 L2

UNIT-V

10. Evaluate the line integral

$$\int_c [(x^2+xy)dx+(x^2+y^2)dy]$$

where c is the square formed by the lines $x=\pm 1\, and\ y=\pm 1.$ 12M CO5 L2

OR

11. Verify Stoke's theorem for the function $\bar{F}=x^2\bar{i}+xy\,\bar{j}$ integrated round the square in the plane z=0 whose sides are along the lines $x=0,y=0,x=a,y=a.$ 12M CO5 L2

*** End ***

Code: 20A521T

I B.Tech. II Semester Supplementary Examinations June 2024

Data Structures through Python

(Common to CSE, AI&DS, CSE(DS), CSE(AI) and AI&ML)

Max. Marks: 70   Time: 3 Hours

****

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a)	Compare static and dynamic data types in programming languages	CO1	L2
b)	What are actual parameters?	CO2	L1
c)	What are multiple except blocks	CO3	L1
d)	Define a stack	CO4	L1
e)	Define Binary Search Tree.	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2. a)	Compare sequential, selection, and iterative control.	6M	CO1	L2
b)	Define Literals. Write different types of literals with examples	6M	CO1	L1
	OR			
3.	Illustrate, the various ways to iterating over a List	12M	CO1	L3
	UNIT-II			
4.	Discuss various string handling methods in Python	12M	CO2	L2
	OR			
5. a)	Write a Python function that prints all prime numbers from 1 to 100.	6M	CO2	L1
b)	Discuss three fundamental features of object-oriented programming.	6M	CO2	L2
	UNIT-III			
6.	What is inheritance? Illustrate types of inheritance with python code	12M	CO3	L1
	OR			
7. a)	Write a Python Program to Demonstrate multiple exceptions in a single block	6M	CO3	L1
b)	Difference between built-in exceptions and handling exception	6M	CO3	L2
	UNIT-IV			
8.	Explain implementation of Queue ADT using Python List with examples.	12M	CO4	L2
	OR			
9. a)	List out the advantages and disadvantages of using a linked list	6M	CO4	L1
b)	List the applications of stack.	6M	CO4	L1
	UNIT-V			
10.	Describe the priority queues and its operations in Python.	12M	CO5	L2
	OR			
11. a)	Construct a Binary search tree with following key elements: 15, 10, 20, 8, 12, 16, 25	6M	CO5	L6
b)	Differentiate binary tree and binary search tree.	6M	CO5	L2

*** End ***

Code: 20A324T

I B.Tech. II Semester Supplementary Examinations June 2024

Engineering Drawing

(Common to CSE, AI&DS, CSE(AI), CSE(DS) and AI&ML)

Max. Marks: 70   Time: 3 Hours

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

****

			Marks	CO	BL

UNIT–I

1. a) Divide a straight-line AB of length 50 mm, into 7 equal parts.   7M   CO1   L2

   b) Construct a regular Hexagon by General Method, given the length of its side is 40mm.   7M   CO1   L2

OR

2. The major and minor axes of an ellipse are 120mm and 80mm. Draw an ellipse by Concentric Circles method   14M   CO1   L2

UNIT–II

3. A point is 50mm from both the reference planes. Draw its projections in all possible positions.   14M   CO2   L3

OR

4. A line AB, 50mm long, has its ends A in both the H.P and the V.P. It is inclined at 30^0 to the H.P and at 45^0 to the V.P. Draw the projections.   14M   CO2   L3

UNIT–III

5. A square ABCD of 40mm side has a corner on the HP and 20mm in front of the VP. All the sides of the squares are equally inclined to the HP and parallel to the VP. Draw its projections.   14M   CO3   L3

OR

6. A regular pentagon of 25 mm side has one side on the ground and inclined at 30° to V.P. Its plane is inclined at 45° to the H.P. Draw its projections.   14M   CO3   L3

UNIT–IV

7. Draw the projections of a hexagonal prism of base 25mm side and axis 60mm long, when it is resting on one of its corners of the base on HP. The axis of the solid is inclined at 450 to the HP.   14M   CO4   L3
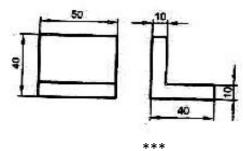
OR

8. A square prism, base 40mm side and height 65mm has its axis inclined at 450 to the HP and has an edge of its base, on the HP and inclined at 30^0 to the VP. Draw its Projections.   14M   CO4   L3

UNIT–V

9. Draw the isometric projection of (i) a cylinder (ii) a cone of base diameter 30mm and axis 45mm long.   14M   CO5   L3

OR

10. Draw the isometric view to the following orthographic views

14M   CO5   L3

***

R-20

Code: 20AC22T

I B.Tech. II Semester Supplementary Examinations June 2024

Applied Physics

(Common to CSE, AI&DS, CSE(AI) and CSE(DS))

Max. Marks: 70   Time: 3 Hours

****

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (5 X 2 = 10M)   CO   BL

		CO	BL
a)	State principle of superposition of light waves	CO1	L1
b)	Write any two applications of dielectric materials.	CO2	L1
c)	Define the total internal reflection	CO3	L1
d)	What is P-type semiconductor	CO4	L1
e)	What is critical temperature of superconductors	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks   CO   BL

UNIT-I

2.	Explain the interference in parallel thin film and derive the conditions for bright and dark bands.	12M	CO1	L3

OR

3.	Derive the conditions for maxima and minima intensities formed by Fraunhofer diffraction due to double slit.	12M	CO1	L3

UNIT-II

4.	a)	Define ionic polarization and derive Ionic polarizability.	8M	CO2	L3
	b)	Write the applications of dielectrics.	4M	CO2	L1

OR

5.	a)	Distinguish soft and hard magnetic materials.	8M	CO2	L4
	b)	Define magnetization and magnetic susceptibility.	4M	CO2	L1

UNIT-III

6.	Derive Maxwell's equations for electromagnetics	12M	CO3	L3

OR

7.	a)	Define total internal reflection and derive the expression for critical angle.	6M	CO3	L3
	b)	Distinguish step index and graded index optical fiber	6M	CO3	L4

UNIT-IV

8.	a)	Write the applications of semiconductors.	6M	CO4	L1
	b)	Explain the N-type semiconductor with energy band diagram	6M	CO4	L2

OR

9.	Classify the solids based on energy bands	12M	CO4	L4

UNIT-V

10.	Distinguish Type-I and Type-II superconductors	12M	CO5	L4

OR

11.	a)	Explain the mechanical and thermal properties of nanomaterials	6M	CO5	L2
	b)	Write the applications of nanomaterials	6M	CO5	L1

*** End ***

R-20

Code: 20A223T

I B.Tech. II Semester Supplementary Examinations June 2024

Basic Electrical and Electronics Engineering

(Common to CE, CSE, CSE(AI), CSE(DS) and AI&DS)

Max. Marks: 70   Time: 3 Hours

****

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
     2. In Part-A, each question carries **Two marks.**
     3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a) State and explain Kirchhoff's Current Law.		CO1	L1
b) What is the expression of back emf?		CO2	L2
c) Define regulation and efficiency of a transformer.		CO3	L1
d) What is a PN Junction diode and how this is to be operated.		CO4	L2
e) What are the essential components of indicating instrument?		CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL

UNIT-I

		Marks	CO	BL
2. a)	A color TV has a current of 1.99 A when connected to a 230V household circuit. What is the resistance in ohms of the TV set?	4M	CO1	L3
b)	Discuss Faraday's laws of electromagnetic induction?	8M	CO1	L2

OR

		Marks	CO	BL
3. a)	Define the following terms with an example: (i) Unilateral elements (ii) Distributed elements (iii) Linear elements (iv) active elements	6M	CO1	L1
b)	A circuit consists of three resistances of 12, 18 and 36ohms respectively by joined in parallel and the combination is connected in series with a resistance of 12ohms. The whole circuit is connected to 60V supply. Calculate current in each branch, total current drawn and power dissipated in each resistor.	6M	CO1	L3

UNIT-II

		Marks	CO	BL
4. a)	What is the operating principle of a DC motor? Explain in detail	6M	CO2	L2
b)	A long shunt compound generator delivers a load current of 30A at 400V and has armature, series field and shunt field resistances of 0.04 ohms, 0.02 ohms and 180 ohms respectively. Calculate the generated voltage and the armature current. Allow 1V per brush for contact drop.	6M	CO2	L3

OR

5. a) Draw and explain the different types of generators?   8M   CO2   L2

   b) Explain the principle of operation of DC generator?   4M   CO2   L2

UNIT-III

6. a) Explain the transformer on no-load with phasor diagram. 6M 3 4   6M   CO3   L4

   b) A single phase core type 50Hz transformer has a square having 25cm side, the maximum flux density in the core 1.2 wb/m2 .Calculate the number of turns per limb on H.V. side and L.V side for a 3400V/240V ratio.   6M   CO3   L3

OR

7. Explain the OC and SC test of transformer with necessary diagrams?   12M   CO3   L2

UNIT-IV

8. Draw and explain the circuit diagram of a common emitter amplifier and draw its characteristics?   12M   CO4   L2

OR

9. a) Explain the operation of diode half-wave rectifier?   6M   CO4   L2

   b) Describe the diffusion process that takes place at the p-n junction, and explain the presence of depletion region?   6M   CO4   L2

UNIT-V

10. Explain How frequency is measured by using CRO.   12M   CO5   L2

OR

11. a) Explain the principle of cathode ray tube?   6M   CO5   L2

    b) Explain about different types of Fuses?   6M   CO5   L2

*** End ***