

Code: 7GC24

I B.Tech. II Semester Supplementary Examinations April 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)

Marks

UNIT-I

1. a) Trace the curve $y^2(2a-x) = x^2$. 7M
- 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 $y = \frac{x}{4a}$. 7M

OR

2. a) Trace the curve $r = a(1 - \cos \theta)$. 7M
- b) Evaluate the integral by changing the order of integration $\int_0^1 \int_{x^2}^{2-x} xy \, dx \, dy$. 7M

UNIT-II

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

OR

4. a) Evaluate $\int_0^\infty e^{-2t} \sin^3 t \, dt$ 7M
- b) Find the Laplace Transform of $\cosh^2 2t$ 7M

UNIT-III

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

OR

6. Solve $\frac{d^2x}{dt^2} + 9x = \cos 2t$, if $x(0) = 1$, $x(\pi/2) = -1$. 14M

UNIT-IV

7. a) Show that $\operatorname{div}(\operatorname{grad} r^n) = n(n+1)r^{n-2}$ 7M
- b) Find the unit vector normal to the surface $x^3 + y^3 + 3xyz = 3$ at the point $(1, 2, -1)$ 7M

OR

8. Find $\operatorname{div} \vec{F}$ and $\operatorname{curl} \vec{F}$ where $\vec{F} = \operatorname{grad}(x^3 + y^3 + z^3 - 3xyz)$ 14M

UNIT-V

9. Verify divergence theorem for $\vec{F} = 4xz\vec{i} - y^2\vec{j} + yz\vec{k}$ taken over the cube bounded by $x=0, x=1; y=0, y=1; z=0, z=1$ 14M

OR

10. Evaluate by Green's theorem $\int_c [(x^2 - \cos hy)dx + (y + \sin x)dy]$, where 'c' is the rectangle with vertices $(0,0), (f,0), (f,1), (0,1)$. 14M

Hall Ticket Number :																				
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R-17

Code: 7GC23

I B.Tech. II Semester Supplementary Examinations April 2023

Engineering Physics
(Common to CE, ME & CSE)

Max. Marks: 70

Time: 3 Hours

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

Marks

UNIT-I

- 1. a) Recite the ruby laser for production of laser 8M
- b) Describe construction of optical fiber 6M

OR

- 2. a) Discuss the working of He-Ne laser 8M
- b) Summarize the applications of LASER 6M

UNIT-II

- 3. a) Illustrate the powder method to describe the structure of crystal 6M
- b) What is Unit cell & describe the Seven Crystal Systems. 8M

OR

- 4. Show that FCC is closely packed than SC and BCC structures 14M

UNIT-III

- 5. a) Find energy of an electron in second state moving in a box of width 1nm 7M
- b) Describe Fermi-Dirac distribution function 7M

OR

- 6. Derive Eigen energies of a particle in one dimensional potential box 14M

UNIT-IV

- 7. a) Explain Hall effect and write its applications 8M
- b) What is photo diode explain it 6M

OR

- 8. a) Explain the diamagnetic nature of superconductors by Meissner's effect 8M
- b) Mention the applications of superconductors 6M

UNIT-V

- 9. a) Define magnetic materials write any two examples 4M
- b) Write the properties of dia, para and ferro magnetic materials 10M

OR

- 10. a) Explain Hysterisis loop of ferromagnet 6M
- b) Derive magnetic moment of magnetic material through origin 8M

Code: 7G221

I B.Tech. II Semester Supplementary Examinations April 2023

Basic Electrical and Electronics Engineering
(Computer Science and Engineering)

Max. Marks: 70

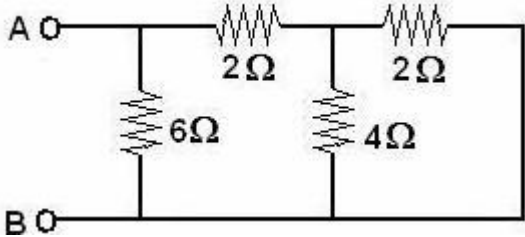
Time: 3 Hours

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

Marks CO BL

UNIT-I

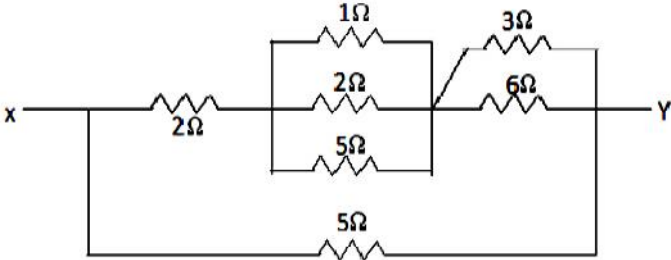
1. Determine the equivalent resistance between A and B of the network shown below.



14M CO1 L3

OR

2. a) Find the equivalent Resistance across the terminals X-Y for the circuit shown below?



8M CO1 L3

6M CO1 L3

b) Two resistances 2 and 4 are connected in series across a supply voltage of 25 Volts. Calculate voltage across each resistor

UNIT-II

3. A 4-pole, lap wound, DC generator has a useful flux of 0.07 wb per pole. Calculate the generated emf, when it is rotated at a speed of 900 rpm with the help of prime mover. Armature consists of 440 numbers of conductors. Also calculate the generated emf. If lap wound armature is replaced by wave wound armature.

14M CO2 L3

OR

4. a) Classify and explain the different types of self-excited DC generators?
b) Derive the torque expression of a DC motor

8M CO2 L2

6M CO2 L3

UNIT-III

5. Draw the constructional diagram of an Alternator and discuss the principle of operation.

14M CO3 L3

OR

6. a) Explain the working principle of Transformer?
b) List out different types of losses present in transformer

8M CO3 L2

6M CO3 L1

UNIT-IV

7. Describe about operation of NPN transistor in terms of CE configuration with necessary diagram.

14M CO4 L1

OR

8. a) Define PNP and NPN transistors along with symbols?
b) Draw the full wave rectifier and discuss the operation of circuit.

7M CO4 L1

7M CO4 L3

UNIT-V

9. a) Explain about dielectric heating with relevant diagrams.
b) List out the applications of induction heating.

8M CO5 L2

6M CO5 L1

OR

10. a) Explain about induction heating with relevant diagrams.
b) List out the applications of Dielectric heating.

8M CO5 L2

6M CO5 L1

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R-17

Code: 7G121

I B.Tech. II Semester Supplementary Examinations April 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)

Marks

UNIT-I

1. a) What is a pointer? What are the features of pointers? Write a C program to print address of a variable 7M
b) Write a C program to swap two numbers using pointers. 7M

OR

2. a) Using pointers write a C program which finds the maximum among the list of elements. 7M
b) Explain in detail about Dynamic Memory allocation with examples 7M

UNIT-II

3. a) Define union. List out the differences between unions and structures 7M
b) Explain different modes to open a file 7M

OR

4. a) Describe the uses and limitations of getc and putc. 7M
b) Write a program for sorting given numbers using selection sort technique 7M

UNIT-III

5. Write a 'C' program for implementation of various operations on queue. 14M

OR

6. What is a stack? How it can be represented in "C" using arrays? 14M

UNIT-IV

7. Represent a doubly linked list using an array. Write routines to insert and delete elements for this representation. 14M

OR

8. List the operations that can be performed on single linked list. In how many ways a node can be deleted from single linked list? Explain. 14M

UNIT-V

9. a) Define and describe the terms: Tree, Binary Tree, Complete Binary Tree and Degree of a tree. 8M
b) Define the following terms of graphs. i) Undirected graph ii) In degree iii) Digraph 6M

OR

10. a) Explain the operations on Binary Tree. 7M
b) Define graph. Explain About the basic Terminology of graphs. 7M

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.