

Hall Ticket Number :

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R-23

Code: 23AHS15T

B.Tech. I Semester Supplementary Examinations July 2024

Engineering Physics

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

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 (10X 2 = 20M) | CO | BL |
| a) Define principle of superposition. | CO1 | L1 |
| b) Name the types of optical polarization. | CO1 | L1 |
| c) What is a Bravais lattice? Name the different space lattices in the cubic system. | CO2 | L1 |
| d) Illustrate the plane with Miller indices (1, 0, 0) in cubic crystal. | CO2 | L2 |
| e) Define dielectric polarizability and susceptibility. | CO3 | L1 |
| f) Illustrate the hysteresis loop. | CO3 | L4 |
| g) List the properties of wave function. | CO4 | L1 |
| h) Recall Fermi -Dirac distribution function and define Fermi energy. | CO4 | L1 |
| i) Describe extrinsic semiconductors and name their types. | CO5 | L2 |
| j) Discuss briefly the drift current? | CO5 | L2 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 10 = 50 Marks)

Marks CO BL

UNIT-I

- | | | | |
|---|----|-----|----|
| 2. a) Discuss the theory of Newton's rings with relevant diagram. | 7M | CO1 | L2 |
| b) Newton rings formed by sodium light between flat glass plate and a convex lens are viewed normally. Calculate the order of dark ring which will have double the diameter of that of 40 th ring. | 3M | CO1 | L3 |

OR

- | | | | |
|---|----|-----|----|
| 3. a) Qualitatively discuss resolving power of grating with a neat diagram. | 5M | CO1 | L4 |
| b) Describe polarization by double refraction. | 5M | CO1 | L2 |

UNIT-II

4. Assess the packing factors of FCC and BCC crystals and decide which is closely packed. 10M CO2 L5

OR

5. Discuss Bragg's law and demonstrate X-ray diffractometer. 10M CO2 L3

UNIT-III

6. Evaluate Lorentz internal field in a solid dielectric. 10M CO3 L5

OR

7. a) Discuss para, dia and ferromagnetic materials with examples. 6M CO3 L4
b) Discuss briefly on Ferrites. 4M CO3 L2

UNIT-IV

8. a) Decide whether the energy of a particle trapped in one dimensional infinite potential well is quantized by deriving the expression for its energy. 7M CO4 L5
b) Summarize the physical significance of wavefunction. 3M CO4 L2

OR

9. a) Discuss the merits and demerits of classical free electron theory. 6M CO4 L2
b) List the main postulates of Quantum free electron theory. 4M CO4 L1

UNIT-V

10. Illustrate and analyze the dependance of Fermi energy on carrier concentration and temperature in n type semiconductor. 10M CO5 L4

OR

11. a) Explain Hall effect and deduce the expression for Hall voltage. 7M CO5 L2
b) List any three applications of Hall effect. 3M CO5 L1

*** End ***

Hall Ticket Number :

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R-23

Code: 23A0312T

B.Tech. I Semester Supplementary Examinations July 2024

Engineering Graphics

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer *five* questions by choosing one question from each unit (5 x 14 = 70 Marks)

Marks CO BL

UNIT-I

1. Construct a parabola with the distance of the focus from the directrix as 50mm. Also draw normal and tangent to the curve, at a point 40mm from the directrix. 14M 1 2

OR

2. Construct a scale to be used with a map, the scale of which is 1 cm = 500 m. The maximum length to be read is 5 km. Mark on the scale, a distance of 3.85 km. 14M 1 3

UNIT-II

3. A point A is 20 mm above the HP and 50mm in front of the VP. Another point B is 40mm below the HP and 15 mm behind the VP. The distance between the projectors of the points, measured parallel to xy , is 75mm. Draw the projections of the points. Draw lines joining their FVs and TVs. 14M 2 3

OR

4. The mid point of a straight line AB is 60mm above HP and 50mm in front of VP. The line measures 80mm long and inclined at 30° to HP and 45° to VP. Draw its projections. 14M 2 3

UNIT-III

5. Draw the projections of a circle of 5 cm diameter, having its plane vertical and inclined at 30° to the VP. Its center is 3 cm above the HP and 2 cm in front of the VP 14M 3 3

OR

6. A triangular prism of base 30 mm side and axis 50 mm long, is resting on HP on one of its bases, with a face perpendicular to VP. Draw the projections of the solid. 14M 3 3

UNIT-IV

7. A hexagonal prism of side of base 30 mm and length of axis 75 mm, is resting on a corner of its base on HP, with the longer edge containing that corner, inclined to HP at 30° . It is cut by a section plane parallel to HP and passing through the mid-point of the axis. Draw the front and sectional top views of the solid. 14M 4 4

OR

8. A hexagonal prism of side of base 20 mm and length of axis 50 mm is kept on the ground on its base such that two opposite sides of the base are parallel to the VP. It is cut by an AIP inclined at 45° to the HP and passing through one of the top corners of the prism. Draw the development of the cut prism.

14M 4 4

UNIT-V

9. Draw three views of the block shown pictorially in figure 1 according to first angle projection.

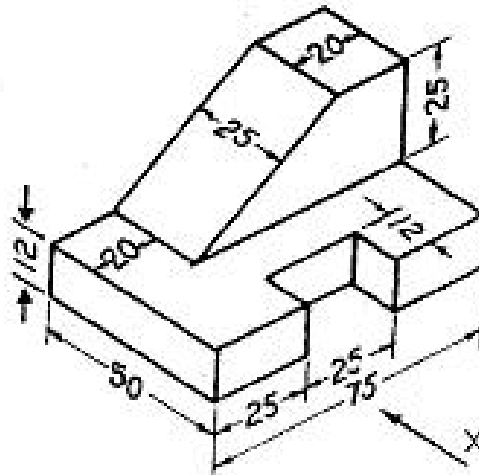


Figure 1

14M 5 4

OR

10. Draw the isometric view of the object shown in figure 2.

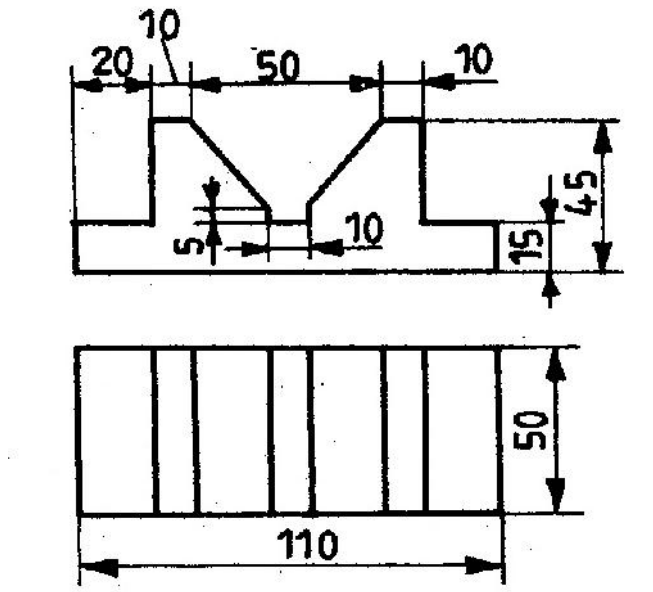


Figure 2

14M 5 4

*** End ***

Hall Ticket Number :

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R-23

Code: 23A0511T

B.Tech. I Semester Supplementary Examinations July 2024

Introduction to Programming

(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)

- | | CO | BL |
|---|----|----|
| 1. Answer all the following short answer questions (10 X 2 = 20M) | | |
| a) List different types of memories in computer systems. | 1 | 1 |
| b) Write the properties of an algorithm. | 1 | 1 |
| c) List the control structures in C. | 2 | 1 |
| d) Compare the difference between entry-controlled and exit-controlled statements | 2 | 1 |
| e) Define array. Write the syntax for the declaration of initialization of the 2D array | 3 | 1 |
| f) Explain various parameter passing methods in C. | 3 | 1 |
| g) Compare the differences between arrays and structures. | 4 | 1 |
| h) List the functions used for dynamic memory allocation in C. | 4 | 1 |
| i) Explain various text file opening modes | 5 | 1 |
| j) Write the purpose of fseek() with example | 5 | 1 |

PART-B

Answer *five* questions by choosing one question from each unit (5 x 10 = 50 Marks)

Marks CO BL

UNIT-I

- | | | | |
|---|----|---|---|
| 2. a) Explain in detail about computer hardware and software. | 5M | 1 | 1 |
| b) Write the pseudo-code for the conversion of temperature from Fahrenheit to Celsius | 5M | 1 | 1 |

OR

- | | | | |
|--|----|---|---|
| 3. a) Explain in detail about data types in C | 5M | 1 | 2 |
| b) Write algorithm and draw flowchart for finding the greatest number among three numbers. | 5M | 1 | 2 |

UNIT-II

- | | | | |
|--|----|---|---|
| 4. a) Write a C program to print first n lines of Floyd's Triangle.
1
2 3
4 5 6
7 8 9 10 | 5M | 2 | 2 |
| b) Demonstrate the name of the day for the given week number using switch-case execution. | 5M | 2 | 2 |

OR

5. a) Write a program in C to find the prime numbers within a range of numbers. 5M 2 2
 b) Explain about different loop control statements in C 5M 2 2

UNIT-III

6. a) Explain the following functions string handling functions.
 i. strcmp() ii. strrev() 5M 3 2
 b) Write C program to find the largest and smallest number among a list of integers. 5M 3 2

OR

7. a) Find an element in the given list along with position. 5M 3 2
 b) Write C program to find the transpose of a matrix. 5M 3 2

Example

Given matrix

```
1 2 3
4 5 6
```

Transpose of the matrix:

```
1 4
2 5
3 6
```

UNIT-IV

8. a) Differentiate structures and unions. 5M 4 2
 b) Explain the meaning and purpose of the following:
 i. struct keyword ii. typedef keyword iii. sizeof operator 5M 4 2

OR

9. a) Write a C program to read and print the book details using structures. 5M 4 2
 b) Define a pointer. How to initialize and declare pointer variable? Write a C program to find the sum of array element values using a pointer. 5M 4 2

UNIT-V

10. a) Demonstrate the user defined function (single function) to perform all arithmetic operations. 5M 5 2
 b) Demonstrate the following functions through a sample program that reads a file "test.txt".
 i. ftell() ii. fseek() iii. rewind() 5M 5 2

OR

11. a) Write the syntax of the following file I/O functions and Explain every option in each function with suitable example
 i. fopen() ii. fclose() iii. fread() iv. fwrite() 6M 5 2
 b) Explain about recursive function with an example. 4M 5 2

*** End ***

Code: 23AHS11T

B.Tech. I Semester Supplementary Examinations July 2024

Linear Algebra and 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 (10 X 2 = 20M) CO BL
- a) Define Echelon form of a matrix. What is the rank of a matrix which is in Echelon form? CO1 L1
- b) How do you find the inverse of a matrix by Gauss-Jordan method? CO1 L1
- c) Show that the Eigen values of a triangular matrix are the just diagonal elements. CO2 L2
- d) Write the real symmetric matrix corresponding to the quadratic form $2(xy - yz + zx)$. CO2 L1
- e) State Lagrange's mean value theorem. CO3 L1
- f) State Taylor's theorem with Lagrange's form of remainder. CO3 L1
- g) If $f(x, y) = x^2 y \sin(xy) - xy^2 \cos(xy)$ find $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$. CO4 L2
- h) Write the properties of Jacobian. CO4 L1
- i) Evaluate $\int_1^2 \int_1^3 xy^2 dx dy$. CO5 L2
- Evaluate $\int_0^a \int_0^x \int_0^y (x + y + z) dz dy dx$.
- j) CO5 L2

PART-B

Answer five questions by choosing one question from each unit (5 x 10 = 50 Marks)

Marks CO BL

UNIT-I

2. a) Solve the following system of equations by Gauss elimination method

$$x_1 - x_2 + x_3 + x_4 = 2, \quad x_1 + x_2 - x_3 + x_4 = -4,$$

$$x_1 + x_2 + x_3 - x_4 = 4, \quad x_1 + x_2 + x_3 + x_4 = 0.$$

6M CO1 L3

- b) Solve the equations

$$x + 2y + 3z = 0, \quad 3x + 4y + 4z = 0, \quad 7x + 10y + 12z = 0$$

4M CO1 L3

OR

3. Solve the following equations using Gauss Seidal iteration method correct up to four decimal places.

$$10x + 2y + z = 9, \quad x + 10y - z = -22, \quad -2x + 3y + 10z = 22.$$

10M CO1 L3

UNIT-II

4. Find the characteristic equation of the matrix

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \text{ and hence compute } A^{-1}.$$

Also find the matrix represented by

$$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I.$$

10M CO2 L3

OR

5. Reduce the following quadratic form

$$3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$$

into canonical form or sum of squares through orthogonal reduction and hence find the nature.

10M CO2 L3

UNIT-I

6. a) Verify Rolle's theorem for $f(x) = \frac{\sin x}{e^x}$ in $(0, f)$

5M CO3 L3

- b) Verify the result of Cauchy's mean value theorem for the functions \log_e^x and $\frac{1}{x}$ in $[1, e]$.

5M CO3 L3

OR

7. Verify Maclaurin's theorem for $f(x) = (1-x)^{\frac{5}{2}}$ with Lagrange's form of remainder up to three terms when $x=1$.

10M CO3 L3

UNIT-I

8. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$ show that

$$\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z} \right)^2 u = \frac{-9}{(x+y+z)^2}$$

10M CO4 L2

OR

9. Examine the following functions for maxima and minima

$$f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2.$$

10M CO4 L2

UNIT-I

10. a) Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} \sqrt{a^2-x^2-y^2} dx dy$.

5M CO5 L3

- b) By changing into polar coordinates, evaluate

$$\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$$

5M CO5 L4

OR

11. Evaluate

$$\int_1^e \int_1^{\log y} \int_1^{e^x} \log z dz dx dy.$$

10M CO5 L3

*** End ***

Hall Ticket Number :

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R-23

Code: 23A0211T

B.Tech. I Semester Supplementary Examinations July 2024

Basic Electrical & Electronics Engineering

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

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-1** and **Part-2**)
2. Use separate Answer booklets for **Part-1** and **Part-2**
3. Part-1 & Part-2 of question paper consists of Part-A & Part-B
4. In Part-A, each question carries **One marks**.
5. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-1

PART-A

(Compulsory question)

1. Answer **all** the following short answer questions (5 X 1 = 5M)
- | | | |
|---|----|----|
| | CO | BL |
| a) State how does inductor and capacitor behaves when excited with DC excitation. | 1 | L2 |
| b) Draw the power triangle and write the expression for power factor from the triangle. | 1 | L2 |
| c) What is the principle difference between DC Motor and generator? | 2 | L2 |
| d) Which type of electricity billing is done for residential and commercial loads? | 3 | L2 |
| e) What is the purpose of electrical earthing? | 3 | L2 |

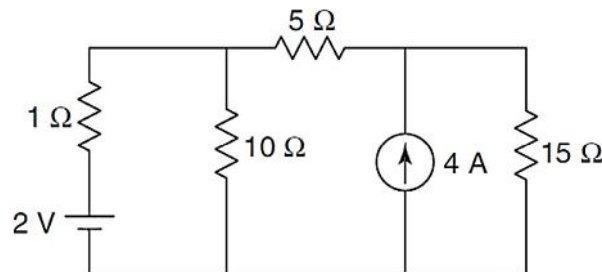
PART-B

Answer **five** questions by choosing one question from each unit (3 x 10 = 30 Marks)

Marks CO BL

UNIT-I

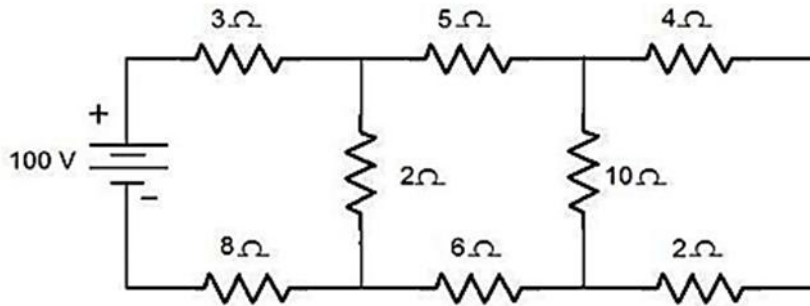
2. a) Find the current through the 10 Ohm resistor in the circuit shown in figure using Superposition theorem.



- | | | | |
|--|----|---|----|
| | 5M | 1 | L3 |
| b) A voltage $v(t) = 177 \sin(314t + 10^\circ)$ is applied to a circuit. It causes a steady-state current to flow, which is described by $i(t) = 14.14 \sin(314t - 20^\circ)$. Determine the power factor and average power delivered to the circuit. | 5M | 1 | L3 |

OR

3. a) Find the current through each branch by network reduction technique.



5M 1 L3

- b) A voltage $v(t) = 150\sin 10^3t$ is applied to a series RLC circuit where $R=40\ \Omega$, $L=0.13\text{H}$ and $C=10\mu\text{F}$. Calculate
- Power supplied by the source
 - Reactive power supplied by the source
 - Reactive power of the capacitor
 - Reactive power of the inductor
 - Power factor.

5M 1 L3

UNIT-II

4. a) With neat sketch, Explain the construction and working of DC generator.
- b) Describe the constructional details of PMMC type instrument with the help of a neat diagram.

5M 2 L2

5M 2 L2

OR

5. a) Explain how a rotating magnetic field is produced in a three-phase induction motor.
- b) How can the sensitivity of a Wheatstone bridge be enhanced for precise measurements?

5M 2 L2

5M 2 L2

UNIT-III

6. a) Draw the layout of thermal power plant and explain the function of each component.
- b) Definition of "Tariff" and list out the objectives of tariff.

5M 3 L2

5M 3 L2

OR

7. a) Draw the layout of Wind power plant and explain the function of each component.
- b) Explain in detail about the two-part tariff and mention for which type of loads it is implemented?

5M 3 L2

5M 3 L2

Basic Electrical & Electronics Engineering

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

PART-2**PART-A****(Compulsory question)**

- | | | | |
|---|----------------|----|----|
| 1. Answer all the following short answer questions | (5 X 1 = 5M) | CO | BL |
| a) Write the differences between CB, CE, and CC Amplifier Configurations. | | 1 | 1 |
| b) Draw the Diode Equivalent Circuit. Mention the applications of PN-junction diode | | 1 | 1 |
| c) Explain the Block diagram description of a dc power supply | | 2 | 2 |
| d) Compare combinational and sequential circuits | | 3 | 2 |
| e) Explain the realization of SR flip-flop, JK flip-flop using D flip-flop | | 3 | 3 |

PART-B**Answer five questions by choosing one question from each unit (3 x 10 = 30 Marks)**

Marks CO BL

UNIT-I

- | | | | |
|---|----|---|---|
| 2. a) Derive the expression for Diffusion capacitance of a diode. | 5M | 1 | 1 |
| b) Zener diode can be used as a voltage regulator. Justify it. | 5M | 1 | 1 |

OR

- | | | | |
|--|----|---|---|
| 3. a) Derive Voltage gain and current gain expression for CB configuration using transistor hybrid model | 5M | 1 | 1 |
| b) Explain about the Current components in a p-n diode. | 5M | 1 | 1 |

UNIT-II

- | | | | |
|--|----|---|---|
| 4. a) Draw and explain the Block diagram of an electronic instrumentation system | 5M | 2 | 2 |
| b) Compare half wave, full wave and bridge rectifier circuits. | 5M | 2 | 2 |

OR

- | | | | |
|--|----|---|---|
| 5. a) Draw and Explain the working of simple Zener voltage regulator | 5M | 2 | 2 |
| b) Explain in detail the Block diagram of Public Address system, | 5M | 2 | 3 |

UNIT-III

- | | | | |
|---|----|---|---|
| 6. a) Deduce the design procedure for sequential logic circuits and give the classification of sequential logic circuits. | 5M | 3 | 2 |
| b) Design and construct MOD-5 synchronous counter using JK flip flops | 5M | 3 | 2 |

OR

7. a) Simplify the following Boolean expressions using the Boolean theorems.

(i) $(A+B+C)(B'+C) + (A+D)(A'+C)$

(ii) $(A+B)(A+B')(A'+B)$

5M 3 3

b) Obtain the characteristic equations of JK, SR, D and T flip-flops. Also explain excitation tables of all these flip-flops.

5M 3 3

*** End ***