

Hall Ticket Number :

R-20

Code: 20AC22T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Applied Physics

(Common to CSE 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 mark**.

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	Blooms Level
a) Distinguish between Fresnel and Fraunhofer diffractions.	1	L1
b) Write any two applications of dielectrics.	2	L1
c) State Stoke's theorem for curl.	3	L1
d) What is indirect band gap semiconductor? Give one example.	4	L1
e) Write any two applications of nanomaterials.	5	L1

PART-B

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

	Marks	CO	Blooms Level
2. a) State the basic conditions required for the phenomenon of interference of light.	4M	CO1	L1
b) Derive an expression for wavelength of light in Newton's rings experiment.	8M	CO1	L3

OR

3. a) Give the differences between interference and diffraction.	4M	CO1	L1
b) Discuss the Fraunhofer diffraction at single slit. Obtain the conditions for principal maximum and minimum.	8M	CO1	L3

UNIT-II

4. a) What are different types of polarization in dielectrics?	4M	CO2	L1
b) Explain ionic polarizability and derive an expression for ionic polarizability.	8M	CO2	L2

OR

5. a) Derive the relation between magnetic susceptibility and permeability.	4M	CO2	L3
b) Explain ferromagnetic hysteresis on the basis of domains.	8M	CO2	L2

UNIT-III

6. a) If $\vec{F} = (3x^2 - 3yz) \mathbf{i} + (3y^2 - 3zx) \mathbf{j} + (3z^2 - 3xy) \mathbf{k}$ then find $\text{curl } \vec{F}$ 3M CO3 L3
- b) State Poynting theorem. Explain how the Poynting vector explains the energy flow. 9M CO3 L2

OR

7. a) Mention few applications of optical fibre. 4M CO3 L1
- b) Define acceptance angle and acceptance cone. Derive an expression for acceptance angle in terms of refractive indices of the core and the cladding. 8M CO3 L3

UNIT-IV

8. a) How does the Fermi level change with temperature in p-type and n-type semiconductors? 4M CO4 L2
- b) Derive an expression for density of electrons in intrinsic semiconductors. 8M CO4 L3

OR

9. a) Distinguish between p-type and n-type semiconductors. 4M CO4 L1
- b) Explain Hall effect and its importance. Derive the relation between Hall coefficient and Hall voltage. 8M CO4 L2

UNIT-V

10. a) Explain A.C Josephson effect. 4M CO5 L2
- b) What is super conductivity? Explain Meissner effect. Describe type- I and type -II superconductors. 8M CO5 L2

OR

11. a) Write some mechanical and optical properties of nanomaterials. 4M CO5 L1
- b) Explain chemical vapor deposition method of synthesis of nanomaterials with diagram. 8M CO5 L2

*** End ***

Hall Ticket Number :										
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R-20

Code: 20A223T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Basic Electrical and Electronics Engineering

(Common to CE, CSE 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 mark**.

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	Blooms Level
a) State Fleming's left hand rule?	1	1
b) Write the applications of DC generators?	2	1
c) Does the transformer draw any current when its secondary is open circuited?	3	1
d) Write the symbol of PNP transistor.	4	2
e) What is the importance of earthing?	5	2

PART-B

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

	Marks	CO	Blooms Level
UNIT-I			
2. a) What is Fleming's right hand rule and how it used to determine the direction of force in DC Generator.	6M	1	3
b) State Kirchhoff's laws and explain with an example?	6M	1	1

OR

3. 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	1	3
b) Discuss Faraday's laws of electromagnetic induction?	8M	1	2

UNIT-II

4. a) Draw and explain the different types of generators?	8M	2	2
b) Explain the principle of operation of DC generator?	4M	2	2

OR

5. a) Derive the Torque equation of DC motor?	6M	2	2
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- b) A DC generator supplies a load of 9kW at 220V. Calculate the induced e.m.f if the armature resistance is 0.8 ohms and the field resistance is 70 ohms? 6M 2 3

UNIT-III

6. a) Derive the EMF equation of transformer? 8M 3 2
 b) Explain the principle of operation of Alternator? 4M 3 2

OR

7. Explain the OC and SC test of transformer with necessary diagrams? 12M 3 2

UNIT-IV

8. a) Draw and explain V-I characteristics of diode? 6M 4 2
 b) Explain the operation of diode half-wave rectifier? 6M 4 2

OR

9. Explain the input and output characteristics of PN junction diode in Common Emitter configuration 12M 4 2

UNIT-V

10. a) Discuss the types of wires and cables? 6M 5 2
 b) Draw and explain the block diagram of CRO? 6M 5 2

OR

11. a) Discuss the operation of MCB? 6M 5 2
 b) Explain the operation of function generator? 6M 5 2

*** End ***

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R-20

Code: 20AC21T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

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 mark**.
 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)

- | | | |
|--|-----|----|
| a) Solve $\frac{d^4x}{dt^4} + 4x = 0$ | CO1 | L3 |
| b) Write the second order Legendre's Linear equation form. | CO2 | L3 |
| c) Form the differential equation by eliminating a and b from $\log(az - 1) = x + ay + b$. | CO3 | L2 |
| d) Find the greatest value of the directional derivative of the function $f = x^2yz^3$ at $(2, 1, -1)$. | CO4 | L2 |
| e) State stokes theorem. | CO5 | L3 |

PART-B

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

	Marks	CO	Blooms Level
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UNIT-I

2. Solve $(D - 2)^2 = 8(e^{2x} + \sin 2x + x^2)$	12M	CO1	L3
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OR

3. Solve the differential equation $(D^2 + 4)y = \sec 2x$ by the method of variation of parameters.	12M	CO1	L3
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UNIT-II

4. A condenser of capacity C discharged through an inductance L and resistance R in series and the charge q at time t satisfies the equation $L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = 0$. Given that L= 0.25 henries, R = 250 ohms, C=2×10 ⁻⁶ farads, and that when t = 0, charge q is 0.002 coulombs and the current dq/dt = 0, obtain the value of q in terms of t.	12M	CO2	L3
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OR

5. Solve $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \cdot \sin(\log x)$ 12M CO2 L1

UNIT-III

6. a) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = yf(x) + xg(y)$. 6M CO3 L2
- b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$. 6M CO3 L3

OR

7. Solve by the method of separation of variables
 $3u_x + 2u_y = 0$ where $u(x,0) = 4e^{-x}$. 12M CO3 L3

UNIT-IV

8. a) Find the directional derivative of $\phi = x^2yz + 4xz^2$
 at $(1, -2, -1)$ in the direction of the vector $2\bar{i} - \bar{j} - 2\bar{k}$. 6M CO4 L2
- b) Show that $\nabla^2(r^n) = n(n+1)r^{n-2}$. 6M CO4 L3

OR

9. a) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and
 $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$. 6M CO4 L2
- b) Find whether the function
 $\bar{F} = (x^2 - y^3)\bar{i} + (y^2 - 3x)\bar{j} + (z^2 - xy)\bar{k}$
 is irrotational and hence find scalar potential function
 corresponding to it. 6M CO4 L2

UNIT-V

10. a) Find the work done in moving a particle in the force field
 $\bar{F} = 3x^2\bar{i} + (2xz - y)\bar{j} + z\bar{k}$ along the straight line from
 $(0,0,0)$ to $(2,1,3)$ 6M CO5 L2
- b) Apply Divergence theorem to evaluate
 $\iiint_s (x+z)dydz + (y+z)dzdx + (x+y)dx dy$
 where s is the surface of the sphere $x^2 + y^2 + z^2 = 4$. 6M CO5 L3

OR

11. Verify Green's theorem in the plane for
 $\int_c (x^2 - xy^3) dx + (y^2 - 2xy) dy$ where c is a square with
 vertices $(0, 0), (2, 0), (2, 2), (0, 2)$. 12M CO5 L5

*** End ***

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R-20

Code: 20A521T

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Data Structures through Python

(Common to CSE, AI&DS 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 mark**.
 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 | Blooms Level |
|---|-----|--------------|
| a) Write a Python program to find the sum of all items in the dictionary. | CO1 | L1 |
| b) How memory management is done in Python? | CO2 | L3 |
| c) What is Encapsulation in Python? Give Example. | CO3 | L3 |
| d) List out the differences between Set and Dictionary? | CO4 | L1 |
| e) List out different Kinds of Tree Traversals for a Binary Search Tree. | CO5 | L5 |

PART-B

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

- | | Marks | CO | Blooms Level |
|---|-------|-----|--------------|
| UNIT-I | | | |
| 2. a) Given the marks of ten students 10, 20, 25, 34, 11, 33, 44, 67, 79, 81. Write a python program to identify the odd and even numbers and place it in separate lists. | 8M | CO1 | L1 |
| b) Write a Python program to find transpose matrix of a given matrix of size n x n. | 4M | CO1 | L4 |
| OR | | | |
| 3. a) Explain about operations on Sets in Python. | 6M | CO1 | L4 |
| b) Explain about operations on Dictionary in Python. | 6M | CO1 | L5 |
| UNIT-II | | | |
| 4. a) Discuss various string handling methods in Python. | 6M | CO2 | L1 |
| b) Write a Python function that prints all prime numbers from 1 to 100. | 6M | CO2 | L5 |
| OR | | | |
| 5. a) Discuss about fundamental features of Object oriented programming. | 6M | CO2 | L6 |
| b) Explain the procedure of calling a class method from another class method in python with an example. | 6M | CO2 | L1 |

UNIT-III

6. Explain Polymorphism in Python with an example. 12M CO3 L2

OR

7. a) Write a Python program to create a user-defined exception that will check whether the person is eligible or not.

Note:- The person eligibility for voting is 21 years. 8M CO3 L2

b) Discuss various built-in exceptions in Python with an example. 4M CO3 L5

UNIT-IV

8. Describe the concept of Queues and its implementation using linked list in Python. 12M CO4 L2

OR

9. Describe the procedure of how to traverse, search and remove a node in a single linked list. 12M CO4 L6

UNIT-V

10. Describe the priority queues and its operations in Python. 12M CO5 L3

OR

11. a) Briefly explain about iterators in Trees. 4M CO5 L6

b) Write a program to calculate the height of a binary tree in python. 8M CO5 L3

*** End ***

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R-20

Code: 20A324T-C

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Engineering Drawing
(Common to CSE and AI&DS)

Max. Marks: 70

Time: 3 Hours

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

	Marks	CO	Blooms Level
UNIT-I			
1. a) Construct an ellipse by concentric circle method whose major axis is 90 mm and minor axis is 55 mm.	7M	C1	L1
b) Construct an ellipse whose major and minor axes are 100 mm and 60mm respectively by oblong method.	7M	C1	L1
OR			
2. A circle of 40 mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point 'P' on the circumference for one revolution of the circle. Draw a tangent and normal at a point on it 35 mm from the line.	14M	C1	L2
UNIT-II			
3. a) A line AB 50 mm long makes an angle 45° to the V.P. The end A is 15 mm in front of V.P and 12 mm above the H.P. Draw the front view and top view of the line AB.	7M	C2	L2
b) A line MN 50 mm long is parallel to V.P and inclined at 30° to H.P. The end M is 20 mm above H.P and 10 mm in front of V.P. Draw the projections of the line.	7M	C2	L2
OR			
4. A line CD 80 mm long is inclined at an angle of 30° to H.P and 45° to V.P. the point C is 20 mm above H.P and 30 mm in front of V.P. Draw the projections of the straight line.	14M	C2	L2
UNIT-III			
5. a) A hexagonal lamina of 40 mm side is resting on one of its corner on H.P. Its plane is inclined at an angle of 30° to H.P and perpendicular to V.P. Draw its projections.	7M	C3	L3
b) Draw the projections of a circular lamina of 50 mm diameter, whose center is 30 mm above the H.P and 20 mm in front of V.P. The circular lamina is inclined at an angle of 30° to V.P and perpendicular to H.P.	7M	C3	L3
OR			
6. Draw the projection of a circular lamina of 80 mm diameter having one end A of the diameter on H.P and the other end B is in the V.P. The surface of the circle is inclined at 30° to H.P and 60° to V.P.	14M	C3	L3

UNIT-IV

7. A pentagonal pyramid side of base 25 mm and axis 50 mm long is resting on an edge of its base on the H.P with its axis inclined at 30° to the HP and parallel to V.P. Draw its projections.

14M C4 L3

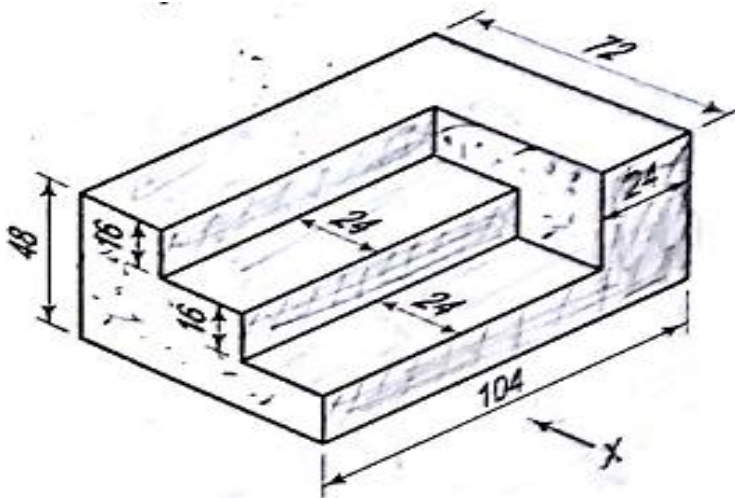
OR

8. Draw the projections of a cylinder of base 30 mm diameter and axis 40 mm long, resting with a point of its base circle on H.P such that the axis is making an angle of 30° with the H.P.

14M C4 L3

UNIT-V

9. Draw the (i) Front view (ii) Top View (iii) Side view of the Following Isometric Drawings

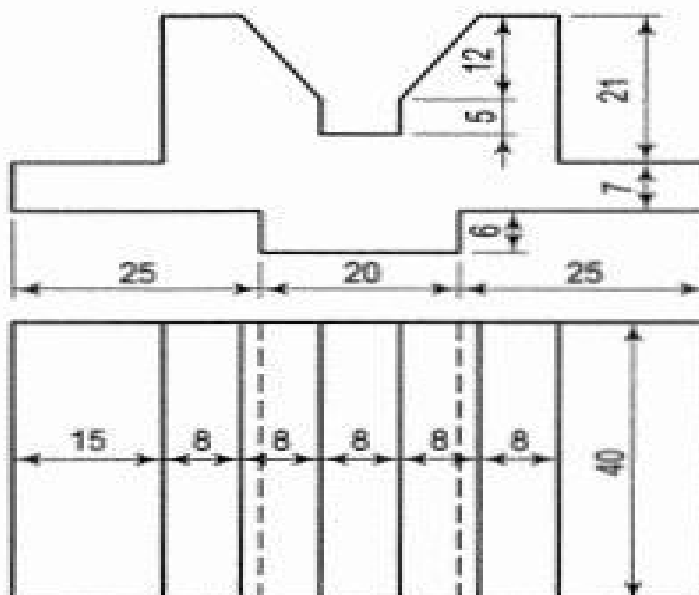


All dimensions are in 'mm'

14M C5 L3

OR

10. Draw the isometric view of an object, whose orthographic projections are shown below.



All dimensions are in 'mm'

14M C5 L3

*** End ***

Hall Ticket Number :																				
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R-20

Code: 20A324T-B

I B.Tech. II Semester Regular & Supplementary Examinations September 2022

Engineering Drawing

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

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

	Marks	CO	Blooms Level
UNIT-I			
1. Construct an ellipse when the distance between the focus and the directrix is 30 mm and eccentricity is 3/4. Draw a tangent and a normal on any point on the ellipse.	14M	C1	L1
OR			
2. Draw an epicycloid of rolling circle 40 mm diameter, which rolls outside another circle (base circle) of 150 mm diameter for one revolution. Draw a tangent and normal at any point on the curve.	14M	C1	L2
UNIT-II			
3. a) A line EF 40 mm long is in V.P. and inclined to H.P. The top view measures 30 mm. The end E is 10 mm above H.P. Draw the projections of the line. Determine its inclination with H.P.	7M	C2	L2
b) A line GH 45 mm long is in H.P. and inclined to V.P. The end G is 15 mm in front of V.P. The length of the front view is 35 mm. Draw the projections of the line. Determine its inclination with V.P.	7M	C2	L2
OR			
4. A line LM 70 mm long has its end L 10 mm above H.P and 15 mm in front of V.P. Its top view and front view measures 60 mm and 40 mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P.	14M	C2	L2
UNIT-III			
5. a) A regular pentagonal plane of 25 mm side, has one side on the H,P. Its plane is inclined at an angle of 30° to the H.P. and perpendicular to the V.P. Draw the projections of the pentagon.	7M	C3	L3
b) An equilateral triangle of 30 mm side has a corner in V.P and 20 mm above the H.P. Draw the projections when the plane is parallel to the H.P and one of its side is inclined at 45° to the V.P.	7M	C3	L3

OR

6. A semicircular plate of 80 mm diameter has its straight edge in the VP & inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.

14M C3 L3

UNIT-IV

7. A hexagonal pyramid of side of base 30 mm and axis 60 mm long is resting on edge of its base on the H.P with its axis inclined at 30° to H.P and parallel to V.P. Draw its projections.

14M C4 L3

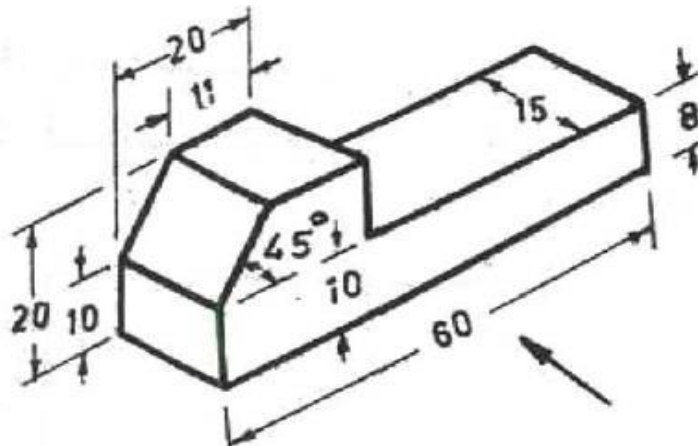
OR

8. A pentagonal Prism side of base 25 mm and axis 60 mm long lies with one of its rectangular faces on the H.P such that the axis is inclined at 45° to the V.P. Draw is projections.

14M C4 L3

UNIT-V

9. Draw the (i) Front view (ii) Top View (iii) Side view of the Following Isometric Drawing.

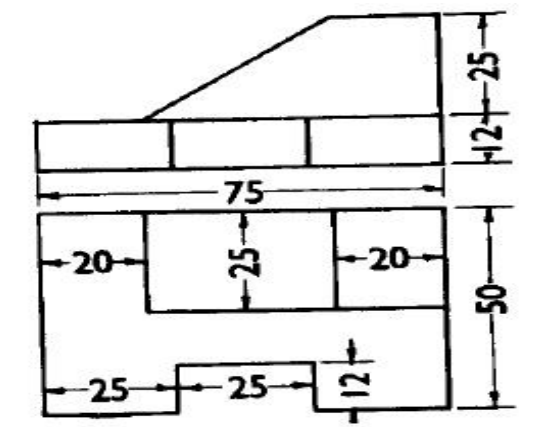


All dimensions are in 'mm'

14M C5 L3

OR

10. Draw the isometric view of an object, whose orthographic projections are shown below



All dimensions are in 'mm'

14M C5 L3

*** End ***