

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(5 Pages)

Reg. No:

Question Code No: 25001213

Course Code: 25UEPH11

UG Degree - End Semester Examinations, November 2025

First Semester

PHYSICS ALLIED

Allied Physics - I

(For those who joined in June 2025 onwards)

Time: 3 Hours

Maximum: 75 Marks

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer:

1. Lissajous figures are used in CRO to determine
 - (a) Frequency
 - (b) Amplitude
 - (c) Phase
 - (d) Velocity
2. The principle on which ultrasound transducer operates
 - (a) Photoelectric effect
 - (b) Piezoelectric effect
 - (c) Impedance effect
 - (d) Thomson effect

3. Hooke's law applies to _____ type of materials.
- (a) Elastic (b) Plastic
(c) Brittle (d) Ductile
4. The viscosity of liquid
- (a) Increases with increase in temperature
(b) Decreases with decrease in temperature
(c) Decreases with increase in temperature
(d) Remains constant
5. The temperature at which the Joule-Thomson effect changes sign is called
- (a) Joule-Kelvin effect (b) Cooling effect
(c) Heating effect (d) Inversion temperature
6. No entropy change takes place when pure crystalline solids react at absolute zero
- (a) Nernst statement (b) Unattainability statement
(c) Planck statement (d) Clausius statement
7. RMS value of an alternating current
- (a) $0.637I_0$ (b) $0.707I_0$
(c) 0.637 (d) 0.707
8. The material suitable for manufacturing of fuse wire is

- (a) Aluminium (b) Silver
(c) Copper (d) Any metals
9. The universal logic gates are
(a) NAND and NOR (b) NAND and AND
(c) NOR and OR (d) AND and OR
10. The binary equivalent of 15
(a) 1110 (b) 1101
(c) 1010 (d) 1111

PART - B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Identify the uses of ultrasonic waves in medical field.

(OR)

- (b) Compute is the wavelength of ultrasonic wave of frequency 330kHz at 0° C (velocity of sound in air at 0° C = 330ms⁻¹).

12. (a) Using non-uniform bending method, determine Young's modulus of the material.

(OR)

- (b) Using the flow of liquid in a pipe, define streamline motion, turbulent motion and critical velocity.

13. (a) Distinguish between the entropy change in reversible and irreversible processes.

(OR)

(b) Categorize the different ways of stating the third law of thermodynamics.

14. (a) State and explain Biot-savart's law.

(OR)

(b) Justify the use of circuit breakers in houses.

15. (a) Convert binary 110.001 to a decimal number.

(OR)

(b) Using Boolean algebra show that $A + \bar{A} \cdot B = A+B$

PART - C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

16. (a) Make use of sonometer to determine AC frequency of wire.

(OR)

(b) With the help of Piezoelectric method, explain the production of ultrasonic waves.

17. (a) Derive Poiseuille's formula for the rate of flow of a liquid through a capillary tube.

(OR)

(b) Obtain an expression for torsional couple per unit twist.

18. (a) Explain the porous plug experiment and analyze its results.

(OR)

(b) Examine:

- i. The working of heat engine and
- ii. Concept of entropy.

19. (a) Evaluate the Mean and RMS value of alternating voltage.

(OR)

(b) Arrive at an expression for magnetic moment due to a current carrying conductor.

20. (a) State and Verify De Morgan's Theorems.

(OR)

(b) Construct AND, OR and NOT gates using NAND gates.