

[GROUP C]

[3 × 8 = 24]

9. a. The speed of sound derived from Newton's formula was corrected by Laplace.
- i. What was the correction made by Laplace over Newton's theory? 1
 - ii. Write the Laplace formula of velocity of sound in air. Discuss the effect of pressure and temperature on the speed of sound in air. 2
 - iii. At what temperature the velocity of sound is double than at $27^{\circ}C$? 2
- b. Define intensity of sound and write inverse square law. 2
- c. The intensity level of a sound is 50 dB. What is its intensity? 1
10. a. The deflection of moving coil galvanometer depends on the extent of magnetic field.
- i. Explain, how does this galvanometer work? 2
 - ii. Derive the voltage sensitivity and current sensitivity of moving coil galvanometer. 2
 - iii. A coil of moving coil galvanometer has 50 turns and its resistance is 10 Ω . If it is replaced by a coil having 100 turns and resistance 50 Ω , find the factor by which the voltage sensitivity change. 2
- b. State and explain Ampere's circuital law. 2

OR

- a. Define Peak value and root mean square value of ac and derive the relation between them. 3
- b. Alternating current (ac) waveform is represented in sine function as:
 $I = 5 \sin 314 t$.
- Find:
- i. the maximum value of current. 1
 - ii. frequency and time period. 1
 - iii. current at $t = 4 \text{ mS}$. 1
- c. What do you mean by power factor in ac? Write its significance on the basis of choke coil. 2

11. a. Millikan's oil drop experiment utilizes the electric field in a viscous fluid to analyze the speed of charge oil drop
- i. What type of forces (all possible) apply during the instant of falling of a drop in the vertical path? Mention the direction for each. 2
 - ii. How does this experiment verify the quantization of charge? Explain. 2
 - iii. Calculate the radius of a water drop which would just remain suspended in an electric field of 300 V/cm and charged with one electron. 2
- b. Beams of electron and proton having same initial kinetic energy enter normally into an electric field. Which beam will be more curved? Justify. 2

OR

- a. There are three different types of particles produced in radioactivity.
- i. Name the particles produced during radioactivity. Which particle has maximum penetrating power and why? 2
 - ii. Write the laws of radioactivity and obtain decay equation. 3
- b. How are the atomic number and mass number of radioactive nucleus changed by the emission of gamma particles? 1
- c. The half-life of radium is 1600 years. How long will it take for 7/8 of given sample of radium decay? 2

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