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III

Total No. of Questions – 21 Regd. No.

Total No. of Printed Pages – 2

Part – III

PHYSICS, Paper-II

(English Version)

Time : 3 Hours] *[Max. Marks : 60*

SECTION – A **10 × 2 = 20**

Note : (i) Answer all questions.
(ii) Each question carries two marks.
(iii) All are very short answer type questions.

1. Two lenses of power – 1.75 D and +2.25 D respectively, are placed in contact. Calculate the focal length of the combination.
2. What is the importance of Oersted's experiment ?
3. Classify the following materials with regard to magnetism : Manganese, Cobalt, Nickel, Bismuth, Oxygen, Copper
4. Define magnetic inclination or angle of dip.
5. What is transformer ratio ?
6. The charging current for a capacitor is 0.6 A. What is the displacement current across its plates ?
7. What is "Photoelectric effect" ?
8. What is the de Broglie wavelength associated with an electron, accelerated through a potential difference of 100 volts ?
9. In which bias can a zener diode be used as voltage regulator ?
10. Mention the frequency range of speech signals.

SECTION – B

$6 \times 4 = 24$

Note : **(i) Answer any six of the following questions.**
(ii) Each question carries four marks.
(iii) All are short answer type questions.

11. Explain the formation of rainbow.

12. Does the principle of conservation of energy hold for interference and diffraction phenomena ? Explain briefly.

13. State Gauss's law in electrostatics and explain its importance.

14. Derive an expression for the capacitance of a parallel plate capacitor.

15. State and explain Ampere's law.

16. Obtain an expression for the mutual inductance of two long co-axial solenoids.

17. The wavelength of first member of Balmer Series is 6563 Å. Calculate the wavelength of second member of Lyman Series.

18. Write truth tables of Universal logic gates.

SECTION – C

$2 \times 8 = 16$

Note : **(i) Answer any two of the following questions.**
(ii) Each question carries eight marks.
(iii) All are long answer type questions.

19. What is Doppler effect ? Obtain an expression for the apparent frequency of sound heard when the source is in motion with respect to an observer at rest.

20. (a) State Kirchhoff's law for an electrical network. Using these laws deduce the condition for balance in a Wheatstone bridge.

    (b) The four resistors 20 Ω, 40 Ω, $(20 + x)$ Ω, 80 Ω respectively form a Wheatstone bridge. Find the value of "x".

21. (a) Explain the principle and working of a nuclear reactor with the help of a labelled diagram.

    (b) Compare the radii of the nuclei of mass numbers 27 and 64.
