

Total No. of Questions – 21  
Total No. of Printed Pages - 3

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No.

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**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. What are ohmic and non-ohmic devices ? Give examples.
2. What is Zener Voltage ( $V_z$ ) and how will a zener diode be connected in circuits generally ?
3. An aluminium conductor is carrying a current of 1A. How many electrons per second are passing across any point in the conductor ? ( $e = 1.6 \times 10^{-19} \text{ c}$ )
4. Draw the circuit symbols for p-n-p and n-p-n transistors.
5. The force between two magnetic poles separated by a distance 'd' in air is 'F'. At what distance between them the force becomes doubled ?
6. Which type of communication is employed in mobile phones ?
7. If a proton and an electron have same de Broglie wavelength, which has more momentum and kinetic energy ?
8. State Fleming's left hand rule.
9. State Gauss's Law in electrostatics.
10. How do you convert a moving coil galvanometer into an ammeter ?

**SECTION – B****6 × 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. Describe the construction and working of an optical fibre. State its uses.
12. Write about the main features in which Fraunhofer and Fresnel approaches of diffraction differ.
13. Derive an expression for the magnetic induction at a point on the axial line of a bar magnet.
14. Define :
  - (a) intensity of Electric field (E)
  - (b) Potential difference between two points (V) and derive the relation between them.
15. Derive the balancing condition of a wheatstone bridge.
16. Explain neutral and inversion temperatures with the help of the graph between the thermo emf and the temperature of hot junction.
17. What is Moseley's Law ? Discuss briefly its importance.
18. What is rectification ? Explain the working of a full wave rectifier.

**SECTION – C****2 × 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's shift ? Derive an expression for the apparent frequency heard by a moving listener when the source of sound is at rest.

Two aeroplanes 'A' and 'B' are moving away from one another with a speed of 720 kmph. The frequency of the whistle emitted by 'A' is 1100 Hz. Calculate the apparent frequency of the whistle as heard by the passenger of the aeroplane 'B'. Velocity of sound in air is  $350 \text{ m/s}^{-1}$ .

20. Obtain an expression for the torque on a loop placed in a uniform magnetic field. Describe the construction and working of a moving coil galvanometer.
21. Explain the principle and working of a nuclear reactor with the help of a labelled diagram.

A nucleus contains no electrons but can eject them. How ?

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