

Total No. of Questions – 21

Regd.

Total No. of Printed Pages – 2

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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 is dispersion ? Which colour gets relatively more dispersed ?
2. How do you convert a moving coil galvanometer into a voltmeter ?
3. The earth's magnetic field at the equator is approximately 0.4 G. Estimate the earth's dipole moment. (Radius of earth  $R = 6.4 \times 10^6$  m)
4. Magnetic lines form continuous closed loops, why ?
5. What is the phase difference between AC emf and current in the following :  
 (a) Pure inductor & (b) Pure capacitor
6. What are the applications of microwaves ?
7. What is the de-Broglie wavelength associated with an electron, accelerated through a potential difference of 100 volts ?
8. What is work function ?
9. How is a battery connected to a junction diode in (i) Forward and (ii) Reverse bias ?
10. Define modulation. Why is it necessary ?



## 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. Explain the formation of mirage.
12. Explain Doppler effect in light. Distinguish between red shift and blue shift.
13. Derive an expression for the intensity of the electric field at a point on the axial line of an electric dipole.
14. Derive an expression for the electric potential due to a point charge.
15. Derive an expression for the magnetic dipole moment of a revolving electron.
16. Obtain an expression for the mutual inductance of two long co-axial solenoids.
17. Explain the different types of spectral series.
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. Explain the formation of stationary waves in an air column enclosed in open pipe. Derive the equations for the frequencies of the harmonics produced.  
A closed organ pipe 70 cm long is sounded if the velocity of sound is  $331 \text{ ms}^{-1}$ . What is the fundamental frequency of vibration of the air column ?
20. State the working principle of potentiometer. Explain with the help of circuit diagram how the potentiometer is used to determine the internal resistance of the given primary cell.  
Two bulbs, whose resistances are in the ratio of 1:2 are connected in parallel to a source of constant voltage. What will be the ratio of power dissipation in these ?
21. Explain the principle and working of a nuclear reactor with the help of a labelled diagram.  
If one microgram of  ${}_{92}\text{U}^{235}$  is completely destroyed in an atom bomb. How much energy will be released ?