

D-14-A

Roll No.

Total No. of Questions : 26]

[Total No. of Printed Pages : 7

12thARJKLK23

9614-A

PHYSICS

Time : 3 Hours]

[Maximum Marks : 70

SECTION-A

(VERY-VERY SHORT ANSWER TYPE QUESTIONS) 1 each

1. Of metals and alloys which have greater temperature coefficient of Resistance ?
2. Which has smaller wavelength microwaves or infra-red waves ?
3. Name the spectral series of hydrogen atom having least wavelength.
4. How will photocurrent change on decreasing wavelength of incident light ?
5. Define Doping of a Semiconductor.

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Turn Over

SECTION-B

(VERY SHORT ANSWER TYPE QUESTIONS) 2 each

6. Define mutual induction and coefficient of mutual inductance.

Or

A $5\ \mu\text{F}$ capacitor is connected to a 50 Hz a.c. supply. Calculate its capacitive reactance.

7. Give some important uses of U-V rays.
8. Define dispersive power of prism. Write its formula.
9. What are Isotopes ? Give some examples.
10. Define Frequency Modulation.

SECTION-C

(SHORT ANSWER TYPE QUESTIONS) 3 each

11. Find an expression for the energy stored in a capacitor.

Or

Explain superposition principle of forces.

12. Discuss variation of resistance with temperature and hence define temperature coefficient of resistance.
13. A battery of emf 10 V and internal resistance $3\ \Omega$ is connected to a resistor. If the current in circuit is 0.5 A; what is resistance of resistor? What is the terminal voltage of battery when circuit is closed ?
14. Two moving coil galvanometers M_1 and M_2 having the following particulars :

$$R_1 = 10\ \Omega, N_1 = 30, A_1 = 3.6 \times 10^{-3}\ \text{m}^2, B_1 = 0.25\ \text{T}$$

$$R_2 = 14\ \Omega, N_2 = 42, A_2 = 1.8 \times 10^{-3}\ \text{m}^2, B_2 = 0.50\ \text{T}$$

(The spring constants are same for two meters).

Determine ratio of :

(i) Current Sensitivity

(ii) Voltage Sensitivity of M_2 and M_1

15. What are Eddy Currents ? Give some important applications of eddy currents.
16. What is meant by resonance in A.C. circuits ? Derive expression for resonant frequency in series L.C.R. circuit.
17. A ray of light suffers minimum deviation, while passing through a prism of refractive index 1.5 and refracting angle of 60° . Calculate angle of minimum deviation and angle of incidence.
18. Using Einstein's Photoelectric Equation explain laws of photoelectric effect.
19. State radioactive decay law and hence obtain equation $N = N_0 e^{-\lambda t}$.
20. Draw circuit diagram of full wave rectifier. Explain its working and draw its input and output waveforms. <https://www.jkboseonline.com>
21. What is AND gate ? Write its symbol Boolean expression and truth-table.
22. Explain sky wave propagation and space wave propagation.

SECTION-D**(VALUE BASED QUESTION)**

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23. Sushma decided to give a camera as gift to her younger brother on his birthday. She visited a shop for purchasing camera. The shopkeeper showed her some cameras and advocated a beautiful camera having power of lens equal to that of another high priced camera. She asked shopkeeper as to why this beautiful camera was low priced. The shopkeeper told her an equivalent lens has been used in camera. He said that he judged her to be a student and thought to suggest low budget camera to be good option. Sushma being science student happily purchased the camera. Now answer the following questions :

- (a) What is an equivalent lens ?
- (b) What is the relation of power of equivalent lens ?
- (c) What do you think about the moral values of shopkeeper ?

SECTION-E

(LONG ANSWER TYPE QUESTIONS)

5 each

24. Define electric potential energy. Derive an expression for electric potential energy of a system of two point charges.

Or

Explain the principle on which Vandegraff generator works ? Draw labelled diagram and describe its construction and working.

25. What is Cyclotron ? Discuss its construction, working and theory.
What are its limitations ?

Or

State Ampere Circuital Law. Derive an expression for the magnetic field due to a straight current carrying solenoid.

26. What is an Astronomical Telescope ? Draw course of rays through it and hence derive expression for magnifying power in it when final image is formed at least distance of distinct vision.

Or

Derive an expression for fringe-width in Young's double slit experiment.

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