COMMON QUARTERLY EXAMINATION - 2022

Reg.No.

Standard - XII

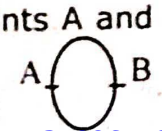
PHYSICS

Time: 3.00 hrs. *Marks: 70*

PART - I

Note : i) Answer all the questions. ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer. **15×1=15**

1. A parallel plate capacitor stores a charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
   a) capacitance b) charge c) voltage d) energy density
2. Two wires of A and B with circular cross section are made up of the same material with equal lengths, $R_A = 3R_B$ then what is the ratio of radius of wire A to that of B?
   a) 3 b) $\sqrt{3}$ c) $1/\sqrt{3}$ d) 1/3
3. A non conducting charged ring carrying a charge of q, mass m, and radius r is rotated about its axis with constant angular speed ω. Find the ratio of its magnetic moment with angular momentum is
   a) q/m b) 2q/m c) q/2m d) q/4m
4. When the current changes from +2A to -2A in 0.05 s an emf of 8V is induced in a coil. The co-efficient of self - induction of the coil is
   a) 0.2H b) 0.4H c) 0.8H d) 0.1H
5. Which of the following is an electromagnetic wave?
   a) α - rays b) β - rays c) γ - rays d) all of them
6. Stars twinkle due to
   a) reflection b) total internal reflection
   c) refraction d) polarization
7. The radius of curvature of curved surface at a thin planoconvex lens is 10cm and the refractive index is 1.5. If the plane surface is silvered, then the focal length will be
   a) 5cm b) 10cm c) 15cm d) 20cm
8. The amount of work done to move 200μc charge between two points of 2cm length in an Equi -potential surface is
   a) 400J b) 4J c) 0J d) 0.004J
9. The colour code sequence of a carbon resistor is yellow, violet, orange, silver. The value of the resistor is
   a) 47 KΩ b) 47 ± 4.7 Ω c) 4.7 KΩ d) 47 ± 4.7 KΩ
10. The ratio of magnetic length and geometrical length is
    a) 0.833 b) 8.33 c) 83.3 d) 833
11. Which of the following loss can be minimized using silicon steel?
    a) Hsteresis loss b) copper loss c) eddy current loss d) flux leakage
12. The dark lines in the solar spectrum is
    a) Fraunhofer linesb) Rayleigh's lines c) Raman lines d) None of these
13. If the focal length is 150cm for a lens, what is the power of the lens?
    a) 0.67D b) 6.7D c) 67D d) 670 D
14. A wire of resistance 12Ω per meter is bent to form a complete circle of radius 10cm the resistance between its two diametrically opposite points A and B as shown in the figure is
    a) 0.6q$\pi\Omega$ b) 3Ω c) 6$\pi\Omega$ d) 6Ω



15. If the velocity and wavelength of light in air is V_a and λ_a, and that in water is V_w and λ_w then the refractive index of water is,
a) V_w/V_a b) V_a/V_w c) λ_w/λ_a d) $V_a\lambda_a/V_w\lambda_w$

PART - II

Note : Answer any six questions. Question No. 24 is compulsory. **6×2=12**

16. Write the applications of capacitors.
17. State Ohm's law.
18. State Peltier effect.
19. State the conditions to achieve total internal reflection.
20. How is a galvanometer converted into a Voltmeter?
21. Define Q - factor.
22. Find the impedance of a series RLC circuit, if the inductive reactance, capacitive reactance, and resistance are 184Ω, 144Ω and 30Ω respectively.
23. What is displacement current?
24. The angle of minimum deviation for an equilateral prism is 37°. Find the refractive index of the material of the prism.

PART - III

Note : Answer any six questions. Question No. 33 is compulsory: **6×3=18**

25. Obtain Gauss's law of electrostatics from coulomb's inverse square law.
26. Write down the properties of electromagnetic wave.
27. State Kirchhoff's current and Voltage rule.
28. Compare the properties of dia, para and ferromagnetic materials.
29. How will you induce an emf by changing the area enclosed by the coil?
30. Obtain the equation for radius of Snell's window.
31. Obtain the expression for energy stored in the parallel plate capacitor.
32. Obtain a relation between current and drift velocity.
33. A coil of a tangent galvanometer of diameter 0.24m has 100 turns. If the horizontal component of Earth's magnetic field is 25×10^{-6} T. |Then calculate the current which gives a deflection of 60°.

PART -IV

Note : Answer all the questions. **5×5=25**

34. Calculate the electric field due to dipole on its equatorial plane. **(OR)**
Explain the principle, construction, and working of a Cyclotran.
35. Obtain the condition for bridge balance in Wheatstone's bridge. **(OR)**
Explain the principle, construction and working of a transformer.
36. Write down Maxwell equations in integral form. **(OR)**
Obtain lens maker's formula, from that derive Lens equation.
37. State Gauss law and obtain an expression for electric field due to an infinitely long charged wire. **(OR)**
Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
38. Describe the Fizeau's method to determine the speed of light. **(OR)**
Derive the expression for band width in young's double slit experiment.
