

**QUATERLY EXAM - MODEL QUESTION****PHYSICS - XII****29.08.2023****Time : 3.00 hrs****TOTAL : 70 marks****PART - I ( 15 X 1 = 15m)****I. Answer all the questions**

1. Relative permittivity water values are  
(a) 40      (b) 80      (c) 1      (d) infinity
2. Current is a quantity  
(a) Scalar    (b) Vector    (c) Tensor    (d) non tensor
3. 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
4. A toaster operating at 240 V has a resistance of  $120 \Omega$ . Its power is  
(a) 400 W    (b) 2 W    (c) 480 W    (d) 240 W
- 5 superconductor example are  
(a) Hg    (b) Ag    (c) Al    (d) Si
6. In Joule's heating law, when  $R$  and  $t$  are constant, if the  $H$  is taken along the  $y$  axis and  $I^2$  along the  $x$  axis, the graph is  
(a) straight line    (b) parabola    (c) circle    (d) ellipse
7. Three wires of equal lengths are bent in the form of loops. One of the loops is circle, another is a semi-circle and the third one is a square. They are placed in a

uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque ?

- (a) Circle (b) Semi-circle (c) Square (d) All of them

8 .Emf another name is

- (a) Resistance (b) current (c) voltage (d) conductivity

9. Electromagnetic induction is not used in

- (a) transformer (b) room heater (c) Ac generator (d) choke coil

10. When the current changes from +2A to -2A in 0.05 s, an emf of 8 V is induced in a coil. The co-efficient of self-induction of the coil is

- (a) 0.2 H (b) 0.4 H (c) 0.8 H (d) 0.1 H

11. A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is

- (a) 1.2 (b) 0.83 (c) 0.12 (d) 0.9

12. Refractive index unit is

- (a) ohm (b) mho (c) ohm meter (d) no unit

13. Which of the following electromagnetic radiations is used for viewing objects through fog

- (a) microwave (b) gamma rays (c) X- rays (d) infrared

14. Fraunhofer lines are an example of \_\_\_\_\_ spectrum.

- (a) line emission (b) line absorption (c) band emission (d) band absorption

15. Stars twinkle due to,

- (a) reflection (b) total internal reflection (c) refraction (d) polarization

**PART - II (6 X 2 = 12m)**

**II. Answer any 6 of the following questions . Question No. 24 is compulsory**

16. Distinguish between polar molecule and non polar molecule
17. Give the uses of Foucault current any Two.
18. State tangent law
19. The repulsive force between two magnetic poles in air is  $9 \times 10^{-3}$  N. If the two poles are equal in strength and are separated by a distance of 10 cm, calculate the pole strength of each pole
20. State the laws of reflection
21. State Flemming's left hand rule.
22. Define displacement current.
23. What are the conditions to achieve total internal reflection?
24. To calculate the KWH for electrical unit

**PART - III (6 X 3 = 18m)****III. Answer any 6 of the following questions . Question No. 33 is compulsory**

25. What are the properties of an equipotential surface .
26. A sample of HCl gas is placed in a uniform electric field of magnitude  $3 \times 10^4$  N C<sup>-1</sup>. The dipole moment of each HCl molecule is  $3.4 \times 10^{-30}$  Cm. Calculate the maximum torque experienced by each HCl molecule.
27. Explain thermoelectric effect.
28. Discuss Earth's magnetic field in detail
29. If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium
30. State and explain Faraday's laws of electromagnetic induction.

31. Explain the potentiometer.

32. Obtain the relation between focal length (f) and radius of curvature (R) of the spherical mirror.

33. The resistance of a wire is 20 ohm. What will be new resistance, if it is stretched uniformly 8 times its original length?

**PART - IV (5 X 5 = 25m)**

**IV. Answer all the questions**

34. (a) Calculate the electric field due to a dipole on its equatorial line.

(OR)

(b) Describe the macroscopic model of current and obtain general form of Ohm's law.

35. (a). Discuss the working of cyclotron in detail

(OR)

(b) prove that the total energy is conserved during LC oscillations

36. (a) Explain the type of emission spectra

(OR)

(b) What is dispersion? Obtain the equation for dispersive power of a medium

37. (a) Explain in detail the construction and working of Van de Graff generator.

(OR)

(b) compute the torque experience by a magnetic needle in a uniform magnetic field

38. (a) Obtain the condition for bridge balance in meter bridge.

(OR)

(b) Explain the construction and working of transformer

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