# XII –STD - PHYSICS – JUNE- 23

**Time Allowed: 3.00 Hours** **Maximum Marks : 70**

## PART – I

**Note:** i) Answer all the questions **15× 1 =15**

(ii) Choose the most appropriate answer from four given alternatives and write the option code with the corresponding answer

1. The speed of light in an isotropic medium depends on,
   (a) its density (b)its wavelength
   (c) the nature of propagation (d) the motion of the source w.r.to medium
2. A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is
   (a) 1.0 amp – $m^2$ (b) 1.2 amp – $m^2$ (c) 0.5 amp – $m^2$ (d) 0.8 amp – $m^2$
3. . Two wires of A and B with circular cross section made up of the same material with equal lengths. Suppose $R_A = 3\ R_B$, then what is the ratio of radius of wire A to that of B?
   (a) 3 (b) $\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{3}$
4. Which of the following electromagnetic radiation is used for viewing objects through fog
   (a) microwave (b) gamma rays (c) X- rays (d) infrared
5. Emission of electrons by the absorption of heat energy is called.....emission.
   a) photoelectric b) field c) thermionic d) secondary
6. In a series RL circuit, the resistance and inductive reactance are the same. Then the phase difference between the voltage and current in the circuit is
   (a) $\frac{\pi}{4}$ (b) ) $\frac{\pi}{6}$ (c) ) $\frac{\pi}{2}$ (d) zero
7. If the nuclear radius of $^{27}$Al is 3.6 fermi, the approximate nuclear radius of 64Cu is
   (a) 2.4 (b) 1.2 (c) 4.8 (d)3.6
8. The barrier potential of a silicon diode is approximately,
   a. 0.7 V b. 0.3V c. 2.0 V d. 2.2V
9. An electric dipole is placed at an alignment angle of 30° with an electric field of $2 \times 10^5$ N $C^{-1}$. It experiences a torque equal to 8 N m. Th e charge on the dipole if the dipole length is 1 cm is
   (a) 4 mC (b) 8 mC (c) 5 mC (d) 7 mC
10. For light incident from air onto a slab of refractive index 2. Maximum possible angle of refraction is,
    (a) 30° (b) 45° (c) 60° (d) 90°
11. Light transmitted by Nicol prism is,
    (a) partially polarised (b) unpolarised (c) plane polarized (d) elliptically polarised
12. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
    (a) 30° (b) 45° (c) 60° (d) 90°
13. The materials used in Robotics are
    a) Aluminium and silver b) Silver and gold c) Copper and gold d) Steel and aluminum
14. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
    a) 4125Å b) 3750Å c) 6000Å d) 2062.5 Å
15. The principle based on which a solar cell operates is
    a) Diffusion b) Recombination c) photo voltaic action d) carrier flow

## PART - II

**Note:** Answer **any six** questions . Question number **24** is **compulsory.** **6 × 2 = 12**

16. What is photoelectric effect?
17. How will you define Q-factor?
18. State Fleming's left hand rule
19. State Lenz's law.

20. What is the reason for reddish appearance of sky during sunset and sunrise?
21. Define Capacitance
22. Distinguish between intrinsic and extrinsic semiconductors
23. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it.
24. The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the de broglie wavelength of the electron orbiting in the 5th orbit.

## PART – III

**Note :** Answer **any six** questions . Question number **33** is **compulsory.** $6 \times 3 = 18$

25. State and explain the principle of potentiometer
26. Find the ratio of the intensities of light with wavelength 500nm and 400 nm which undergo Rayleigh scattering
27. Explain the various energy losses in a transformer.
28. State and prove Brewster's law
29. Calculate the electric flux through the rectangle of sides 5 cm and 10 cm kept in the region of a uniform electric field 100 $NC^{-1}$. The angle $\theta$ is $60^{\circ}$. If θ becomes zero, what is the electric flux?
30. Explain the alpha decay process with example.
31. Write down Maxwell equations in integral form.
32. List out the advantages and limitations of frequency modulation
33. A coil of a tangent galvanometer of diameter 0.24 m has 100 turns. If the horizontal component of Earth's magnetic field is $25 \times 10^{-6}$ T then, calculate the current which gives a deflection of $60^{\circ}$.

## PART - IV

**Note** : Answer **all** the questions $5 \times 5 = 25$

34. a) What is absorption spectra?. Explain its types.

**(OR)**

b) Obtain the law of radioactivity.

35. a) Obtain the condition for bridge balance in Wheatstone's bridge

**(OR)**

b) Obtain the equation for bandwidth in Young's double slit experiment.

36. a) Explain in detail the principle, construction and working of a Van de Graff generator

**(OR)**

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

37. a) i) State Ampere's circuital law.
ii). Find the magnetic field due to a long straight conductor using Ampere's circuital law

**(OR)**

b) State and prove De Morgan's First and Second theorems

38. a) Explain the working of a single-phase AC generator with necessary diagram

**(OR)**

b) i) List out the characteristics of photons(any two)
ii) Calculate the momentum of an electron with kinetic energy 2eV

**- T. JOHN PETER**