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**Grand
Test**

**HSC Examination
Physics Code - Set - A**

Marks : 70

Time: 3 Hours

SECTION-A

Marks 8

1. A photon is
(A) quantum of light energy (B) quantum of matter
(C) positive ion particle (D) a source of measure of light intensity
2. The transistor provide good power amplification when they are used in
(A) common collector configuration (B) common emitter configuration
(C) common base configuration (D) none of these
3. A particle performs a uniform 2m circular motion in a circle of radius 10 cm. What is its centripetal acceleration if it takes 20 seconds to complete 5 revolutions?
(A) $2.5\pi^2 \text{ cm/s}^2$ (B) $5\pi^2 \text{ cm/s}^2$ (C) $10\pi^2 \text{ cm/s}^2$ (D) $20\pi^2 \text{ cm/s}^2$
4. In Boyle's law relation $PV = k$, the value of k depends on
(A) nature of gas (B) pressure of gas (C) amount of gas (D) density of gas
5. What do you mean by stopping potential?
6. A drop of water of radius 6 mm breaks into number of droplets, each of radius 1 mm. How many droplets will form?
7. State Curie's law.
8. Explain the physical significance of moment of inertia.

SECTION-B

Marks 14

9. Distinguish between Fresnel and Fraunhofer diffraction.
10. What do you mean by photoelectric effect?
11. The magnetic flux associated with a coil changes from zero to $6 \times 10^{-2} \text{ Wb}$ in 2 s. Find the average e.m.f induced in the coil.
12. Write the three differences between AM and FM.
13. Two slits in Young's experiment have widths in the ratio 81 : 1. What is the ratio of the amplitudes of light waves coming from them.
14. Define :
 - i. Donor impurity
 - ii. Acceptor impurity

15. What is Curie temperature? What happens above the curie temperature?

OR

15. State the main properties of diamagnetic substances.

SECTION - C

Marks 33

16. A progressive wave of frequency 50 Hz is travelling with a velocity 350 m/s through a medium. Find

- the phase difference between two particles separated by 7m,
- the change in phase at a given point in time interval 0.005 second.

17. Derive an expression for capacity of a parallel plate capacitor filled with dielectric.

18. Obtain the relation between surface tension and surface energy.

19. A galvanometer carries a maximum current of 15mA when a voltage of 0.75 V is applied to it. Convert this into a voltmeter to read upto 150 volt and into an ammeter to read upto 25 ampere.

20. What is uniform circular motion? State the characteristics of uniform circular motion.

21. State Brewster's law. Show that when light is incident at polarising angle i_p then $\tan i_p = \mu$ where μ is the R.I. of the medium,

22. Distinguish between elastic and plastic body.

Define stress. State its units and dimension.

23. What do you mean by weight and weightlessness of a body?

Explain why an astronaut in an orbiting satellite has a feeling of weightlessness.

24. Describe Kelvin's method to determine the resistance of a galvanometer by using a meter - bridge.

25. A metal cube has each side of length 1 m loses all its energy at the rate of 3000 watt, if the emissivity is 0.4. Find its temperature. [Given : $\sigma = 5.67 \times 10^{-8} \text{ J / m}^2\text{sK}^4$]

26. What will be the duration of the day, if the earth suddenly shrinks to 1/64 of its original volume, mass remaining unchanged?

OR

26. Thin uniform rod of mass 3 kg and length 2 m starts from rest and rotate about an axis passing through its centre and perpendicular to its length with a speed 900 r.p.m for 10 second. Find torque acting on it.

SECTION - D

Marks 15

27. Explain various applications of eddy current with qualitative explanation.

Find the wavelength of a proton accelerated by a potential difference of 50 V.

[Given $m_p = 1.673 \times 10^{-27} \text{ kg}$]

OR

27. Distinguish between step up transformer and step down transformer.

Find the longest wavelength in Paschen series. [Given $R = 1.098 \times 10^7 \text{ m}^{-1}$]

28. State the formula for velocity of a transverse wave on stretched string. Hence find expression for frequency in fundamental mode of vibration.

And the equations of a standing wave is $y = 0.02 \cos\left(\frac{2\pi x}{60}\right) \sin(150 \pi t)$ metre. Determine amplitude of vibrating particle at a distance of 10 metre from the origin.

OR

28. State causes and limitations of end correction.
And the speed of a transverse wave along a uniform metal wire, when it is under a tension of 1000 g wt. is 68 m/s. If the density of metal is 7900 kg./m^3 . Find the area of cross section of the wire.
29. Show that total energy of the particles performing linear S.H.M is constant.
And what will be the percentage change in the time period of a simple pendulum, if its length is increased by 6%?

OR

29. Show that linear S.H.M is the projection of U.C.M on any diameter.
And two simple harmonic motions are given by $x_1 = 20 \sin 8\pi t$ and $x_2 = 10 \sin (8\pi t + \pi / 2)$ (in cgs units).
Find the resultant amplitude and phase of the resultant of two S.H.M's

