Previous Questions and Answers

Physics (312)

1. Raman effect pertains to the phenomenon of
   a) Dispersion b) diffraction

   c) scattering d) interference **(April 2024)**

   Ans. Scattering
2. A glass prism splits a beam of white light into its constituent colours because in glass different colours of light beam have
   a) Different amplitudes b) different velocities

   C) different energies d) different phases (April 2024)

   Ans. Different velocities

3. On increasing temperature the resistivity of ------
   (April 2022)
   a) A conductor decreases but that of an insulator increases
   b) A conductor increases but that of an insulator decreases
   c) Both conductor and insulating increases
   d) Both conductor and insulator decreases

   Ans. A conductor increases but that of an insulator decreases

4. The physical quantity which is equal to rate of change in momentum of a body is known as **(April 2023)**
   a) Force b) Acceleration
   c) Impulse d) velocity **Ans. Force**
5. In a p n junction diode , the depletion region has higher resistance because it contains **(April 2023)**
   a) No charge carriers
   b) Large number of charge carrier
   c) Only electron as charge carrier
   d) Only hole as charge carrier

   Ans. No charge carriers

6. In Rutherford scattering experiment target nucleus was bombarded with **(Oct 2022)**

a) Alpha particle b) beta particle

c) gamma particle d) protons **Ans. Alpha particle**

7. The condition for obtaining sustained interference is that the sources be --------- **(April 2024)**

Ans. Coherent

8. The angle of incidence for which the reflected light undergoes maximum polarization is called ---------- **(April 2024)**

Ans. Brewster's angle

9. Which of the following has minimum resistance?

a) Voltmeter b) Ammeter

c) Milliammetre d) Galvanometer **(April 2022)**

Ans. Ammeter

10. Area under force-displacement graph is equal to

a) Work done b) momentum

c) Acceleration d) impulse **(Oct 2022)**

Ans. Work done

11. Water flows in a pipe of variable bore. It's velocity of flow at a point where the radius of pipe is 5 mm is 25 m/s. What will be the velocity of flow where the radius is 1 cm?

(April 2022, April 2024)

{ Hint : $A_1V_1 = A_2V_2$ (1/2 mark)

$A_1 = \pi r_1^2 = \pi(0.005)^2$ (1/2 mark)

$A_2 = \pi r_2^2 = \pi(0.01)^2$ (1/2 mark)

$V_2 = A_1 V_1 / A_2 = \pi(0.005)^2 \times 25 / \pi(0.02)^2$

$V_2 = 6.25$ m/s (1/2 mark)**}**

12. Why can two equipotential surfaces not intersect each other? **(April 2024)**

{Hint: because there would be two values of electric potential at the intersection point which is impossible (2 mark) **}**

13. The output of NAND gate is fed to the input of NOT gate. Name and write the truth table of logic gate so formed?

(April 2023)

{Hint : The logic gate mentioned here is AND gate (1 mark)

Truth table of AND gate is given below:

A	B	Output
0	0	0
0	1	0
1	0	0
1	1	1

(1 mark) **}**

14. Write Newton's formula for velocity of sound in gas and explain how it is corrected by Laplace. **(April 2023)**

{Hint : Newton's formula for velocity of sound in gas is $v = \sqrt{P/\rho}$ (1 mark)

The formula for Laplace correction for the speed of sound in a gas is $v = \sqrt{\gamma P/\rho}$, where P is the pressure and ρ is the density of the gas.

(2 mark)**}**

15. A bullet of mass 10 g hits a wooden block of mass 20 kg with a velocity of 500 m/s. The block was initially at rest. The bullet strikes the block and gets embedded into it. Calculate

a) The velocity of block after collision.

b) The lost in energy in the process of collision.

(April 2022, 2024)

{Hint : a) $mv = (M + m)V$ (1/2 mark)

$V = mv/(M + m)$

$V = (0.01 \times 500) / (20 + 0.01)$

$V = 0.25$ m/s (2 mark)

b) kinetic energy lost = kinetic energy of bullet – kinetic energy of block (1 mark)

$= 1/2mv^2 - 1/2(M + m)V^2$

$= 1/2[mv^2 - (M + m)V^2]$

$= 1/2[0.01(500)^2 – 20.01(0.25)^2]$

$= 1249.4$ J (2 mark)**}**