

## Physics Model Question Paper 4: (For Class 11 and 12 and Pre-Medical/Engineering Entrance)

**Question 1 :** A single slit Fraunhofer diffraction pattern is formed with white light. For what wavelength of light the third secondary maximum in the diffraction pattern coincides with the second secondary maximum in the pattern for red light of wavelength  $6500 \text{ \AA}$  ?

- (A)  $9100 \text{ \AA}$
- (B)  $4642.8 \text{ \AA}$
- (C)  $4100 \text{ \AA}$
- (D)  $4400 \text{ \AA}$

**Answer : (B)**

**Question 2 :** A spherical drop of capacitance  $1 \mu\text{F}$  is broken into eight drops of equal radius. Then, the capacitance of each small drop is \_\_\_\_\_.

- (A)  $\frac{1}{8} \mu\text{F}$
- (B)  $8 \mu\text{F}$
- (C)  $\frac{1}{2} \mu\text{F}$
- (D)  $\frac{1}{4} \mu\text{F}$

**Answer : (C)**

**Question 3 :** A vessel of height  $2d$  is half filled with a liquid of refractive index  $\sqrt{2}$  and the other half with a liquid of refractive index  $n$ . (The given liquids are immiscible). Then the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be

- (A)  $\frac{nd}{d + \sqrt{2}n}$
- (B)  $\frac{\sqrt{2}n}{d(n + \sqrt{2})}$

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(C)  $\frac{d(h + \sqrt{2})}{n\sqrt{2}}$

(D)  $\frac{n}{d(h + \sqrt{2})}$

**Answer : (C)**

**Question 4 :** An inductance of  $\frac{200}{\pi}$  mH, a capacitance of  $\frac{10^{-3}}{\pi}$  F and a resistance of 10W are connected in series with an a.c. source 220 V, 50Hz. The phase angle of the circuit is

(A)  $\frac{\pi}{3}$

(B)  $\frac{\pi}{2}$

(C)  $\frac{\pi}{4}$

(D)  $\frac{\pi}{6}$

**Answer : (C)**

**Question 5 :** If two waves of the same frequency and amplitude respectively on superposition produce a resultant disturbance of the same amplitude the waves differ in phase by \_\_\_\_\_.

(A)  $\frac{\pi}{3}$

(B)  $\frac{2\pi}{3}$

(C)  $\pi$

(D) Zero

**Answer : (B)**

**Question 6 :** In an ac circuit an alternating voltage  $e = 200 \sqrt{2} \sin 100t$  volts is connected to capacitor of capacity  $1 \mu\text{F}$ . The r.m.s. value of the current in the circuit is

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- (A) 20 mA
- (B) 10 mA
- (C) 100 mA
- (D) 200 mA

**Answer : (A)**

**Question 7 :** If M is the atomic mass and A is the mass number, packing fraction is given by \_\_\_\_\_.

(A)  $\frac{A}{M - A}$

(B)  $\frac{A - M}{A}$

(C)  $\frac{M}{M - A}$

(D)  $\frac{M - A}{A}$

**Answer : (D)**

**Question 8 :** Out of the following functions representing motion of a particle which represents SHM?

(A)  $y = \sin \omega t - \cos \omega t$

(B)  $y = \sin^3 \omega t$

(C)  $y = 5 \cos \left( \frac{3\pi}{4} - 3\omega t \right)$

(D)  $y = 1 + \omega t + \omega^2 t^2$

- (A) Only (A) and (B)
- (B) Only (A)
- (C) Only (D) does not represent SHM
- (D) Only (A) and (C)

**Answer : (D)**

**Question 9 :** Oxygen is 16 times heavier than hydrogen. Equal volumes of hydrogen and oxygen are mixed. The ratio of speed of sound in the mixture to that in hydrogen is \_\_\_\_\_.

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(A)  $\sqrt{\frac{1}{8}}$

(B)  $\sqrt{\frac{32}{17}}$

(C)  $\sqrt{8}$

(D)  $\sqrt{\frac{2}{17}}$

**Answer : (D)**

**Question 10 :** The acceleration due to gravity becomes  $\left(\frac{g}{2}\right)$  where  $g$  = acceleration due to gravity on the surface of the earth at a height equal to

(A)  $\frac{R}{2}$

(B)  $2R$

(C)  $\frac{R}{4}$

(D)  $4R$

**Answer : (C)**

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