Waves – MCQ Practice (JSSC CGL Technical & PGT Exam)

Q1. The displacement of a particle in SHM is x = A cos(ωt + φ). The maximum velocity is:

A) Aω

B) A/ω

C) ω/ A

D) A²ω

Answer: A) Aω. Maximum velocity = amplitude × angular frequency.

Q2. In damped oscillation, the amplitude decreases:

A) Linearly

B) Exponentially

C) Reciprocal

D) Constant

Answer: B) Exponentially. A(t) = $A_0 e^{-\beta t}$

Q3. In forced oscillation, maximum amplitude occurs when driving frequency equals:

A) Natural frequency

B) Half natural frequency

C) Double natural frequency

D) Independent

Answer: A) Natural frequency. Condition for resonance.

Q5. The distance between node and antinode in stationary wave is:

A) λ

B) λ/2

C) λ/4

D) λ/8

Answer: C) λ/4. Node to antinode spacing is quarter wavelength.

Q6. The condition for resonance in a series RLC circuit is:

A) XL = XC

B) XL > XC

C) XL < XC

D) XL = R

Answer: A) XL = XC. Resonance occurs when inductive and capacitive reactances cancel.

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Q7. In SHM, the total energy is proportional to:

A) A

B) A^2

C) 1/A

D) $\sqrt{A}$

Answer: B) A^2. Energy ∝ amplitude squared.

Q8. Phase velocity is given by:

A) ω/k

B) k/ω

C) ωk

D) dω/dk

Answer: A) ω/k. Definition of phase velocity.

Q9. Group velocity is:

A) ω/k

B) k/ω

C) dω/dk

D) dk/dω

Answer: C) dω/dk. Group velocity = slope of dispersion curve.

Q10. Two identical waves moving in opposite directions superpose to form:

A) Progressive wave

B) Standing wave

C) Beats

D) Shock wave

Answer: B) Standing wave. Opposite waves → stationary nodes & antinodes.