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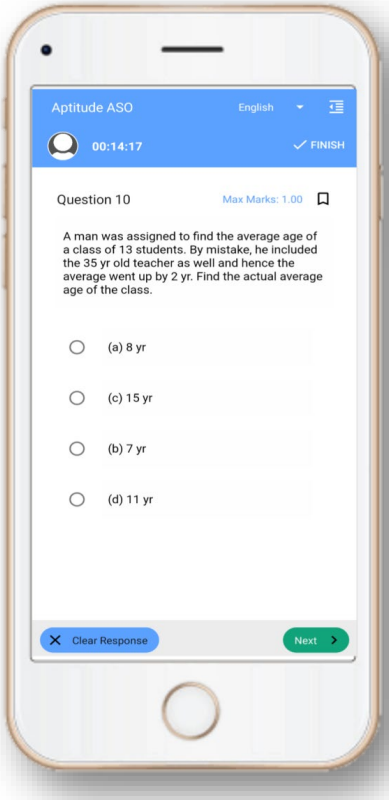

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B - SECTION - III
SCIENCE (PCM)
PHYSICS

160813

41. An object is thrown upward with a velocity v. If air drag is not neglected, what can be inferred about the time of ascent (t_a) and time of descent (t_d) for the motion of the object ?

(A) $t_a > t_d$

(B) $t_d > t_a$

(C) $t_a = t_d$

(D) Retardation plays no role in the kinematics of the body

42. The width of the central maximum for a single slit diffraction is greatest for which color of light :

(A) Violet

(B) Blue

(C) Red

(D) Green

43. In Young's double slit experiment the maximum intensity observed is I_0. When one of the slits is closed, the intensity becomes :

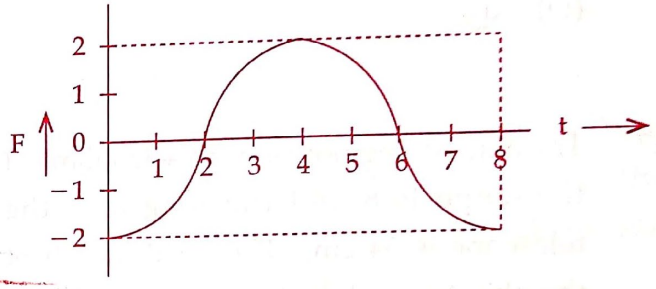
(A) $I_0/4$

(B) $I_0/3$

(C) $I_0/2$

(D) I_0

44. A Force-time (F~t) graph for a linear motion is shown in the figure below. The segments shown are all circular. The linear momentum gained between 0 and 8 seconds is :



(A) -2π N−S

(B) 4π N−S

(C) $+6\pi$ N−S

(D) Zero N−S

45. A dog of mass 'm' stands on one end of a wooden plank of length 'L' and mass 'M'. The plank is floating on water. If the dog walks from one end of the plank to the other end at a constant speed, then the resulting displacement of the plank will be :

(A) $\frac{ML}{m}$

(B) $\frac{mL}{M}$

(C) $\frac{mL}{M+m}$

(D) $\frac{ML}{M-m}$

46. The electric field strength at a distance 'r' from the centre of a charged sphere of radius R is E. If r > R, how much work will be done in bringing a test charge q_0 from infinity to that point ?

(A) q_0RE

(B) $\frac{1}{2}q_0RE$

(C) $\frac{1}{2}q_0rE$

(D) q_0rE

47. The magnifying power of an astronomical telescope is 8 and the length of the telescope is 54 cm. The focal length of the objective will be :

(A) 6 cm

(B) 48 cm

(C) 64 cm

(D) 8 cm

48. The frequency of a tuning fork A is 3% more than the frequency of a standard fork whereas the frequency of another tuning fork B is 3% less than the standard one. The forks A and B produce 6 beats per second. The frequency of standard fork will be :

(A) 100 Hz

(B) 106 Hz

(C) 103 Hz

(D) 112 Hz

49. Two waves are represented by :

$$Y_1 = a \sin\left(\omega t + \frac{\pi}{6}\right)$$

$$Y_2 = a \cos\omega t$$

The resultant amplitude becomes :

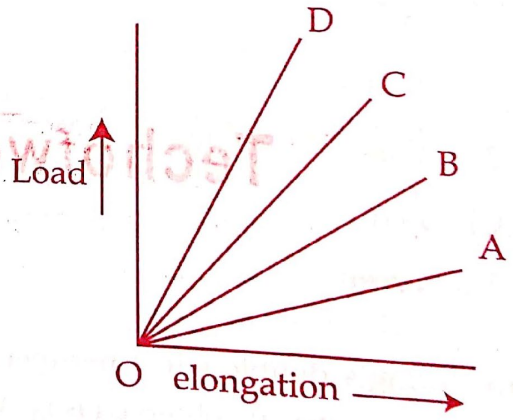
(A) a

(B) $\sqrt{2}$ a

(C) $\sqrt{3}$ a

(D) 2 a

50. The load versus elongation graph for four wires of same material is shown below. The thinnest wire is represented by the line.



(A) OD

(B) OC

(C) OB

(D) OA

51. A man's near point is 0.5 m and far point is 3 m. Power of the spectacle lenses required for the person to see near and distant objects respectively are :

(A) -2 D and $+3$ D

(B) $+2$ D and -3 D

(C) $+2$ D and -0.33 D

(D) -2 D and $+0.33$ D

52. The ratio of radii of two planets P_1 and P_2 moving around the sun is 4. The mass of the planet P_1 is 32 times heavier than that of P_2. The ratio of escape velocities of P_1 to P_2 is :

(A) 8

(B) $2\sqrt{2}$

(C) $\sqrt{2}$

(D) $\frac{1}{\sqrt{2}}$

53. A body floats in a liquid, with half of its volume in air, contained in a beaker. If the whole system falls freely under gravity then the upthrust on the body due to the liquid is :

(A) equal to the weight of liquid displaced

(B) equal to the weight of the body in air

(C) equal to the weight of the immersed portion of the body

(D) zero

54. If Young's double slit experiment is performed inside water instead of air then :

(A) fringe width would remain unchanged

(B) fringe width would increase

(C) fringe width would decrease

(D) no fringes would be seen

55. The potential energy of a system of three identical charges 1 μC each placed at the vertices of an equilateral triangle of side 10 cm is :

(A) 0.27 J

(B) 2.7 J

(C) 3.7 J

(D) 0.37 J

56. A charge of 1 coulomb moves in a circle at 10 revolutions per second. The radius of the circle is 2×10^{-6} m. Magnetic field at the centre of the circle is :

(A) $\frac{\pi}{10}$ N $-$ A^{-1} m^{-1}

(B) $\frac{\pi}{5}$ N $-$ A^{-1} m^{-1}

(C) π N $-$ A^{-1} m^{-1}

(D) $\frac{\pi}{100}$ N $-$ A^{-1} m^{-1}

57. A (100 W, 200 V) electric bulb is connected to a 160 Volts supply. The power consumption would be :

(A) 64 W

(B) 80 W

(C) 100 W

(D) 125 W

58. Two identical parallel plate capacitors of same dimensions joined in series are connected to a D.C. source. When one of the plates of one capacitor is brought closer to the other plate. Which of the following observations will be correct ?

(i) The voltage on the capacitor whose plates come closer is greater than the voltage on the capacitor whose plates are not moved.

(ii) The voltage on the capacitor whose plates come closer is smaller than the voltage on the capacitor whose plates are not moved.

(iii) The voltage on the two capacitors remain equal.

(iv) The applied voltage is divided among the two inversely as the capacitance.

(A) (i) and (iv)

(B) (ii) and (iv)

(C) (iii) and (iv)

(D) (ii), (iii) and (iv)

59. A series combination of an inductor having self inductance L and a resistor with resistance R are connected to a battery of emf E with negligible internal resistance. The final value of current depends on :

(A) L and R

(B) E and L

(C) E and R

(D) L, R and E

60. The average value of current in an AC circuit is 2 amp. An AC ammeter connected to the circuit will show :

(A) $\sqrt{2}\ \pi$ amp

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

(C) $2\sqrt{2}\ \pi$ amp

(D) $\frac{\pi}{2\sqrt{2}}$ amp