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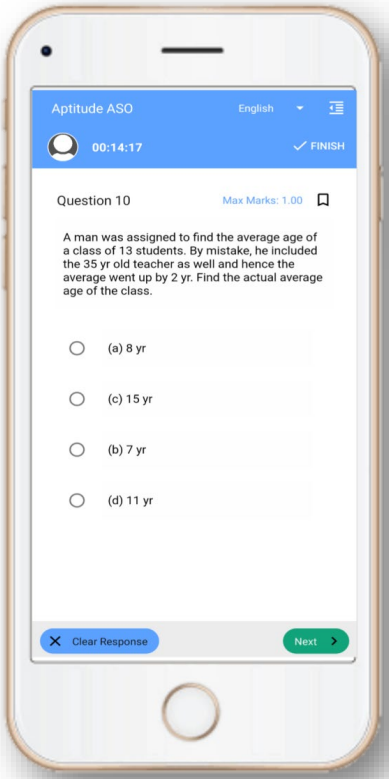

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41. Specific heat at constant pressure and specific heat at constant volume of nitrogen gas respectively in terms of gas constant R are

(A) $\frac{3}{2}R, \frac{5}{2}R$

(B) $\frac{5}{2}R, \frac{7}{2}R$

(C) $\frac{7}{2}R, \frac{5}{2}R$

(D) $\frac{5}{2}R, \frac{3}{2}R$

42. The temperature at which velocity of sound will be double of its room temperature (27°C) value is

(A) 54°C (B) 300°C

(C) 927°C (D) 1200°C

43. Length of a string tied to two rigid supports is 20 cm. Maximum wavelength of a stationary wave produced on it is

(A) 10 cm

(B) 20 cm

(C) 40 cm

(D) 80 cm

44. The velocity of light in water of refractive index $\frac{4}{3}$ in ms^{-1} is

(A) $1{\cdot}33 \times 10^8$

(B) $2{\cdot}25 \times 10^8$

(C) 3×10^8

(D) 4×10^8

45. An object is placed between the focus and pole of a double convex lens. The image is

(A) virtual, erect and magnified

(B) virtual, erect and diminished

(C) real, inverted and magnified

(D) real, erect and diminished

46. If the kinetic energy of a body is doubled then its momentum increases by

(A) 2 times

(B) 4 times

(C) $\sqrt{2}$ times

(D) 8 times

47. If the horizontal range of a projectile is 64 m then the maximum height attained by the projectile is

(A) 16 m

(B) 32 m

(C) 64 m

(D) 128 m

48. Work done when a force $\vec{F} = (2\hat{i} - 3\hat{j} + 5\hat{k})\,N$ acting on a particle takes it from the point $\vec{r_1} = (\hat{i} + 2\hat{j} - 3\hat{k})\,m$ to the point $\vec{r_2} = (3\hat{i} + 5\hat{j} + \hat{k})\,m$ is

(A) 7 J (B) 15 J

(C) 25 J (D) 38 J

49. What is the ratio of potential energy to kinetic energy of a body executing simple harmonic motion when the displacement is equal to one-third of the amplitude ?

(A) 1 : 8

(B) 8 : 1

(C) 1 : 3

(D) 1 : 9

50. If the earth expands to twice of its present radius then duration of the day will be

(A) 6 hours

(B) 12 hours

(C) 24 hours

(D) 96 hours

51. The minimum magnifying power of a telescope is M. If the focal length of its eye-piece is halved its magnifying power will be

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

(B) M

(C) $2M$

(D) $4M$

52. If in a Young's double slit experiment the distance between the two slits is halved and the distance between the slit and the screen is doubled, then fringe width

(A) remains the same

(B) decreases by 4 times

(C) increases by 4 times

(D) increases by 2 times

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53. The flux associated with each wall of a cube having a charge Q at its centre is

(A) $\frac{Q}{\epsilon_0}$ (B) $\frac{Q}{2\epsilon_0}$

(C) $\frac{Q}{4\epsilon_0}$ (D) $\frac{Q}{6\epsilon_0}$

54. The potential on the surface of a thin spherical shell of radius 10 cm is 10 V. The potential at a distance of 5 cm from the centre of the shell is

(A) 0 V (B) 5 V

(C) 10 V (D) 20 V

55. Ten capacitors, each of capacitance 10 μF are first connected in series and then in parallel. The ratio of equivalent capacitance in series to equivalent capacitance in parallel is

(A) $\frac{1}{100}$ (B) 100

(C) $\frac{1}{10}$ (D) 10

56. The relation between escape velocity (v_e) and orbital velocity (v_o) on the surface of the earth is

(A) $v_e = \sqrt{2}\, v_o$

(B) $v_e = 2\, v_o$

(C) $v_o = \sqrt{2}\, v_e$

(D) $v_o = 2\, v_e$

57. If the distance between the sun and the earth is doubled then the duration of the year will be

(A) 2 years

(B) $2\sqrt{2}$ years

(C) 4 years

(D) 8 years

58. Young's modulus of steel is

(A) equal to that of rubber

(B) less than that of rubber

(C) greater than that of rubber

(D) none of the above

59. A solid sphere of radius R is falling in a viscous medium. The terminal velocity attained by the falling body will be proportional to

(A) R^2

(B) R

(C) $\frac{1}{R}$

(D) $\frac{1}{R^2}$

60. A liquid will not wet the surface of a solid if the angle of contact is

(A) 0° (B) 45°

(C) 60° (D) 120°