

Physics -Set 4

1) In the gas equation $[P + a/v^2] (v - b) = RT$ where T, P & V are temperature, pressure and volume. The dimensions of constant 'a' is

- a) $[ML^2T^{-3}]$,
- b) $[ML^5T^{-2}]$,
- c) $[L^3]$,
- d) $[ML^{-1}T^{-2}]$

2) The image formed by a convex mirror of focal length 30 cm is a quarter of the object, what is the distance of object from the mirror?

- a) 90 cm
- b) -90 cm
- c) 30 cm
- d) -30cm

3) A person having a myopic eye uses a concave lens of focal length 10 cm. Find the power of the lens.

- a) 10 D
- b) -10D
- c) 5 D
- d) -5D

4) Which of the following has no units?

- a) Thermal capacity
- b) Magnetic susceptibility
- c) Angular acceleration
- d) Moment of a magnet

5) A bomb of 12kg explodes into two pieces of masses 4kg and 8kg. The velocity of 8kg mass is 6m/s. the kinetic energy of the other mass is

- a) 48J,
- b) 32J,
- c) 24J,
- d) 288J.

6) The product, $\lambda_m T = \text{constant}$ is given by

- a) Stefan's law,
- b) Newton's law,
- c) Wien's law,
- d) Kirchoff's law.

7) The energy of a conductor of capacitance C and having charge Q is given by

- a) $\frac{1}{2} QC$,
- b) $Q^2/2C$,
- c) $\frac{1}{2} CQ^2$,
- d) $2 C^2/Q$,

8) Two particles A and B undergo vibrations in SHM. A passes through the mean position in positive direction while B passes negative direction at $t = 0$. Their displacements are represented mathematically.

- a) $y_A = a \sin(\omega t + \pi)$,
 $y_B = a \sin(\omega t + 2\pi)$

b) $y_A = a \sin \omega t$,
 $y_B = b \sin (\omega t + \pi)$

c) $y_A = a \sin (\omega t - kx)$
 $y_B = b \sin (\omega t + kx)$

9) Light energy emitted by stars is due to

- (a) breaking of nuclei
- (b) joining of nuclei
- (c) burning of nuclei
- (d) reflection of solar light.

10) Two masses $m_1 = 5 \text{ kg}$ and $m_2 = 4.8 \text{ kg}$ tied to a string are hanging over light frictionless pulley. What is the acceleration of the masses when left free to move? ($g = 9.8 \text{ m/s}^2$)

- (a) 0.2 m/s^2
- (b) 9.8 m/s^2
- (c) 5 m/s^2
- (d) 4.8 m/s^2 .



11) The time period of a satellite of earth is 5 hour. If the separation between the earth and the satellite is increased to 4 times the previous value, the new time period will become

- (a) 10hour
- (b) 80hour
- (c) 40hour
- (d) 20hour

12) A particle of mass 0.3 kg is subjected to a force $F = -kx$ with $k = 15 \text{ N/m}$. What will be its initial acceleration if it is released from a point 20 cm away from the origin?

- (a) 5 m/s^2
- (b) 10 m/s^2
- (c) 3 m/s^2
- (d) 15 m/s^2

13) A parallel plate capacitor is made by stacking n equally spaced plates connected alternatively. If the capacitance between any two adjacent plates is ' C ', then the resultant capacitance is :

- (a) $(n - 1)C$
- (b) $(n + 1)C$
- (c) C
- (d) nC

14) A spherical ball of mass 20 kg is stationary at the top of a hill of height 100 m. It rolls down a smooth surface to the ground, then climbs up another hill of height 30 m and finally rolls down to a horizontal base at a height of 20 m above the ground. The velocity attained by the ball is :

- (a) 40 m/s
- (b) 20 m/s
- (c) 10 m/s
- (d) 10^{30} m/s

15) If the temperature of the sun were to increase from T to $2T$ and its radius from R to $2R$, then the ratio of the radiant energy received on earth to what it was previously, will be

- (a) 4
- (b) 16
- (c) 32
- (d) 64

16) An electric current is passed through a circuit containing two wires of the same material, connected in parallel. If the lengths and radii of the wires are in the ratio of $4/3$ and $2/3$, then the ratio of the currents passing through the wire will be :

- (a) 3
- (b) $1/3$
- (c) $8/9$
- (d) 2

17) The work function of a substance is 4.0 eV. The longest wavelength of light that can cause photoelectron emission from this substance is approximately :

- (a) 540 nm
- (b) 400 nm
- (c) 310 nm
- (d) 220 nm

18) The length of a magnet is large compared to its width and breadth. The time period of its oscillation in a vibration magnetometer is 2 s. The magnet is cut along its length into three equal parts and three parts are then placed on each other with their like poles together. The time period of this combination will be :

- (a) 2 s
- (b) $2/3$ s
- (c) $2\sqrt{3}$ s
- (d) $2/\sqrt{3}$ s

19) In an LCR circuit, capacitance is changed from C to $2C$. For the resonant frequency to remain unchanged, the inductance should be changed from L to

- (a) $4L$
- (b) $2L$
- (c) $L/2$
- (d) $L/4$

20) Time taken by a 836 W heater to heat one litre of water from 10°C to 40°C is :

- (a) 50 s
- (b) 100 s
- (c) 150 s
- (d) 200 s