



Kulkarni Science Academy

Exam Name :-Cet class 12 th physics thermodynamics ktg laws of motion and gravitation

Date
:-31/08/2025

Time :-30
Minutes

Mark :- 50

PHYSICS

1. The centre of mass of a system of particles does NOT depend on [MHT-CET 2024]

(a) internal forces on the particles
(b) relative distance between the particles

(c) masses of the particles
(d) position of the particles
2. 10 J of work is done when an object is displaced by 2 m in the direction of applied force. The magnitude of the force is ($\cos 0^\circ = 1$) [MHT-CET 2024]

(a) 8 N
(b) 20 N

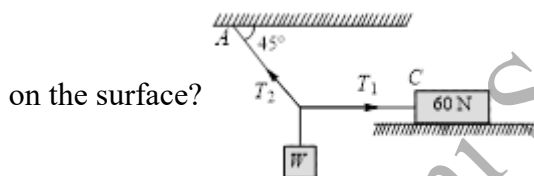
(c) 5 N
(d) 12 N
3. Which one of the following is 'NOT' a contact force? [MHT-CET 2024]

(a) Viscous force
(b) Gravitational force

(c) Force of friction
(d) Normal reaction
4. In case of an elastic collision, [MHT-CET 2024]

(a) the coefficient of restitution is equal to one.
(b) the coefficient of restitution is equal to zero.

(c) the total kinetic energy before collision is less than total kinetic energy after collision.
(d) the total kinetic energy before collision is greater than total kinetic energy after collision.
5. In the figure, a block of weight 60 N is placed on a rough surface. The coefficient of friction between the block and the surface is 0.5. What minimum can be the weight W such that the block does not slip



- (a) 60 N
(b) $\frac{60}{\sqrt{2}}$ N
- (c) 30 N
(d) $\frac{30}{\sqrt{2}}$ N
6. Select the correct statement from the following. [MHT-CET 2023]

(a) Gravitational as well as electrostatic force is always attractive.
(b) Gravitational as well as electrostatic force always act along the line joining the two objects.

(c) Inverse square law ($F \propto \frac{1}{r^2}$) is not obeyed by electrostatic force.
(d) Gravitational force is stronger than electrostatic force.
 7. The mass of the lift is 200 kg . When it ascends with an acceleration of 4 m/s^2 then the tension in the cable supporting the lift will be [Given : Acceleration due to gravity $g = 10 \text{ m/s}^2$] [MHT-CET 2024]

(a) 2000 N
(b) 800 N


(c) 2800 N
(d) 4200 N
 8. The motion of a rocket in upward direction with high speed is based on the principle of conservation of [MHT-CET 2020]

(a) angular momentum
(b) kinetic energy

(c) linear momentum
(d) mass
 9. Two blocks of masses 6 kg and 4 kg are placed in contact with each other on a smooth surface as shown. If a force of 5 N is applied on a heavier block, the force on the lighter block is



[MHT-CET 2024]

- (a) 2 N (b) 5 N
(c) 4 N (d) 1 N
10. A body of mass m is placed on the earth's surface, it is taken from the earth's surface to a height $h=3R$. the change in gravitational potential energy of the body is
(a) $\frac{2}{3}mgR$ (b) $\frac{3}{4}mgR$
(c) $\frac{mgR}{2}$ (d) $\frac{mgR}{4}$
11. A body revolves around sun 27 times faster than earth. The ratio of radius of orbit of body to radius of orbit of earth is [MHT-CET 2023]
(a) $\frac{1}{27}$ (b) $\frac{1}{9}$
(c) $\frac{1}{4}$ (d) $\frac{1}{3}$
12. A body weighs 81 N on the surface of the earth. What is the gravitational force on it due to earth at a height equal to half the radius of the earth from the surface?
(a) 72N (b) 28 N
(c) 36 N (d) 32 N
13. A mass M is broken into two parts of masses m_1 and m_2 . How are m_1 and m_2 related if we want the gravitation attraction between the two parts to be maximum?
(a) $m_1 = m_2$ (b) $m_1 = M$
(c) $m_2 = M$ (d) None of these
14. A planet is moving around the sun in an elliptical orbit at different positions A, B, C, D. The maximum rotational kinetic energy of a planet is at position  [MHT-CET 2022]
(a) A (b) C
(c) B (d) D
15. Two spherical black bodies of radii ' r_1 ' and ' r_2 ' at temperature ' T_1 ' and ' T_2 ' respectively radiate power in the ratio 1:2. Then $r_1:r_2$ is [MHT-CET 2023]
(a) $2\left(\frac{T_1}{T_2}\right)^4$ (b) $2\left(\frac{T_1}{T_2}\right)^2$
(c) $\frac{1}{\sqrt{2}}\left(\frac{T_2}{T_1}\right)^2$ (d) $\frac{1}{2}\left(\frac{T_2}{T_1}\right)^4$
16. A perfect gas at 27°C is heated at constant pressure so as to double its volume. The increase in temperature of the gas will be
(a) 300°C (b) 54°C
(c) 327°C (d) 600°C
17. A quantity of heat ' Q ' is supplied to monoatomic ideal gas which expands at constant pressure. The fraction of heat converted into work is $\left[\gamma = \frac{C_p}{C_v} = \frac{5}{3}\right]$ [MHT-CET 2024]
(a) 2:5 (b) 3:5
(c) 5:3 (d) 3:2
18. A real gas behaves as an ideal gas at [MHT-CET 2024]
(a) high pressure and high temperature (b) low pressure and low temperature
(c) high pressure and low temperature (d) low pressure and high temperature

19. First law of thermodynamics is a special case
 (a) Newton's law (b) Law of conservation of energy
 (c) Charles's law (d) Law of heat exchange
20. For a gas, $\frac{R}{C_v} = 0.4$ where ' R ' is universal gas constant and C_v is the molar specific heat at constant volume. The gas is made up of molecules which are [MHT-CET 2020]
 (a) monoatomic (b) rigid diatomic
 (c) non-rigid diatomic (d) polyatomic
21. For a perfectly black body, coefficient of absorption is [MHT-CET 2021]
 (a) greater than one (non-infinite). (b) zero.
 (c) infinity. (d) unity
22. For a perfectly black body, its absorptive power is [MHT-CET 2024]
 (a) 1 (b) 0.8
 (c) 0.5 (d) 2
23. For an ideal gas, if the ratio of Molar specific heats $\gamma = 1.4$, then the specific heat at constant pressure C_p , specific heat at constant volume C_v and corresponding molecule are respectively [MHT-CET 2020]
 (a) $\frac{9}{2}R, \frac{7}{2}R$, polyatomic (b) $\frac{7}{2}R, \frac{5}{2}R$, non-rigid diatomic
 (c) $\frac{7}{2}R, \frac{5}{2}R$, rigid diatomic (d) $\frac{5}{2}R, \frac{3}{2}R$, monoatomic
24. For an ideal gas, in an isobaric process, the ratio of heat supplied ' Q ' to the work done ' w ' by the system is
 (γ = ratio of specific heat at constant pressure to that at constant volume) [MHT-CET 2024]
 (a) $\frac{\gamma}{\gamma-1}$ (b) $\frac{1}{\gamma-1}$
 (c) $\frac{\gamma-1}{\gamma}$ (d) $\frac{1}{\gamma}$
25. For athermanous substances, coefficient of transmission is [MHT-CET 2020]
 (a) equal to one (b) zero
 (c) less than one but greater than zero (d) greater than one
26. For non-rigid diatomic gas the value of ' γ ' is ($\gamma = C_p/C_v$) [MHT-CET 2024]
 (a) $\frac{9}{3}$ (b) $\frac{7}{5}$
 (c) $\frac{5}{3}$ (d) $\frac{9}{7}$
27. Four moles of hydrogen, two moles of helium and one mole of water vapour form an ideal gas mixture. [C_v for hydrogen = $\frac{5}{2}R$, C_v for helium = $\frac{3}{2}R$, C_v for water vapour = $3R$] What is the molar specific heat at constant pressure of the mixture? [MHT-CET 2024]
 (a) $\frac{23}{3}R$ (b) $\frac{16}{7}R$
 (c) $\frac{11}{3}R$ (d) $\frac{23}{7}R$
28. Generally C_p is
 (a) Greater than C_v (b) Equal to C_v
 (c) Less than C_v (d) Greater than or equal to
29. Ideal gas equation strictly obeys gas laws under all conditions of :
 (a) Pressure only (b) Volume only
 (c) Temperature only (d) Temperature and pressure
30. If γ is the ratio of specific heats and R is the universal gas constant, then the molar specific heat at constant volume C_v is given by

(a) γR

(b) $\frac{(\gamma - 1)R}{\gamma}$

(c) $\frac{R}{\gamma - 1}$

(d) $\frac{\gamma R}{\gamma - 1}$

31. If a gas is compressed isothermally then the r.m.s. velocity of the molecules[MHT-CET 2023]
 (a) remains the same (b) increases
 (c) decreases (d) first decrease and then increases
32. If heat energy ΔQ is supplied to an ideal diatomic gas, the increase in internal energy is ΔU and the amount of work done by the gas is ΔW . The ratio $\Delta W : \Delta U : \Delta Q$ is[MHT-CET 2024]
 (a) 7:5:9 (b) 1:2:5
 (c) 2:5:7 (d) 2:3:5
33. If one mole of an ideal gas ($\gamma = \frac{5}{3}$) is mixed with one mole of a diatomic gas ($\gamma = \frac{7}{5}$). The value of ' γ ' for the mixture is[MHT-CET 2022]
 (a) 3.07 (b) 1.40
 (c) 1.53 (d) 1.50
34. If the amount of heat given to a system is 35J and the amount of work done on the system is 15 J, then the change in internal energy of the system is
 (a) 50J (b) 20 J
 (c) 30 J (d) 50 J
35. If the kinetic energy per unit volume of an ideal gas is ' E ', then the pressure exerted by the gas is[MHT-CET 2019]
 (a) $\frac{3E}{2}$ (b) $\frac{E}{2}$
 (c) $\frac{E}{3}$ (d) $\frac{2E}{3}$
36. If the r.m.s. speed of gas molecules is 400 m/s, then the density of that gas at N.T.P. in kg/m^3 is [Take atmospheric pressure $P = 10^5 \text{ N/m}^2$][MHT-CET 2022]
 (a) $\frac{25}{8}$ (b) $\frac{11}{8}$
 (c) $\frac{5}{8}$ (d) $\frac{15}{8}$
37. If the specific heat of an ideal gas at constant volume is $\frac{3}{2}R$, then the value of γ will be [R = universal gas constant][MHT-CET 2024]
 (a) $\frac{5}{3}$ (b) $\frac{3}{5}$
 (c) $\frac{5}{4}$ (d) $\frac{5}{2}$
38. If the temperature of the black body is 5794 K, then the wavelength for which the emissive power of the black body is maximum is ($b = 2.897 \times 10^{-3} \text{ m K}$)[MHT-CET 2024]
 (a) 11588Å (b) 5000Å
 (c) 2000Å (d) 5794Å
39. In a black body radiation, which one of the following is the WRONG statement?[MHT-CET 2022]
 (a) For longer wavelengths, intensity is less. (b) For all wavelengths, intensity is same.
 (c) All wavelengths are emitted by a black body. (d) For shorter wavelengths, intensity is more.
40. In a monoatomic gas, total degrees of freedom are due to :
 (a) Translational motion (b) Rotational motion
 (c) Vibrational motion (d) Oscillatory motion
41. In a spectral distribution of black body radiation the wave length corresponding to maximum intensity[MHT-CET 2022]
 (a) does not change with increase in temperature. (b) increases with increase in temperature.

- (c) does not change with increase or decrease in temperature. (d) decreases with increase in temperature.
42. A cycle tire bursts suddenly. This represents an [MHT-CET 2024]
 (a) adiabatic process (b) isothermal process
 (c) isobaric process (d) isochoric process
43. A diatomic gas initially at 18°C is compressed adiabatically to one-eighth of its original volume. What will be the temperature after compression?
 (a) 887°C (b) 668 K
 (c) 144°C (d) 10°C
44. The ratio of the vapour densities of two gases at a given temperature is $9:8$. The ratio of the rms velocities of their molecules is
 (a) $3:2\sqrt{2}$ (b) $2\sqrt{2}:3$
 (c) $9:8$ (d) $8:9$
45. The state of a thermodynamic system is represented by [MHT CET 2004]
 (a) pressure only (b) volume only
 (c) pressure, volume and temperature (d) number of moles
46. The thermodynamic process in which no work is done on or by the gas is [MHT-CET 2022]
 (a) isobaric process (b) isothermal process
 (c) isochoric process (d) adiabatic process
47. Two moles of oxygen is mixed with eight moles of helium. The effective specific heat of the mixture at constant volume is
 (a) $1.3 R$ (b) $1.4 R$
 (c) $1.7 R$ (d) $1.9 R$
48. Volume remains same in which thermodynamic process?
 (a) Isochoric (b) Isothermal
 (c) Isobaric (d) Adiabatic
49. What happens in an isobaric process when heat is given to a gas?
 (a) Internal energy of the gas increases (b) The work is done by the gas
 (c) Both (1) and (2) (d) None of the above
50. What is an ideal gas?
 (a) One that consists of molecules (b) A gas satisfying the assumptions of kinetic theory
 (c) A gas having Maxwellian distribution of speed (d) A gas consisting of massless particles