

JUPITER ACADEMY

NEET UG SAMPLE PAPER - PHYSICS - 11TH - 05
NEET-UG - PHYSICS

Time Allowed : 60 mins

Maximum Marks : 200

Section A

- 1) The van der Waals' equation of state for some gases can be expressed as:

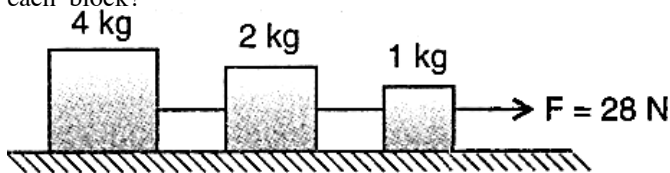
$$\left(P + \frac{a}{V^2}\right) (V - b) = RT$$

Where P is the pressure, V the molar volume, and T is the absolute temperature of the given sample of gas, a, b, and R constants. The dimensions of b are: [4]

- a) $[L^6]$ b) $[L^3]$
c) $[ML^{-1}T^{-2}]$ d) $[ML^5T^{-2}]$
- 2) A person standing on an escalator takes time t_1 to reach the top of a tower when the escalator is moving. He takes time t_2 to reach the top of the tower when the escalator is standing. How long will he take if he walks up a moving escalator? [4]

- a) $T_1 + t_2$
b) $T_2 - t_1$
c) $\frac{t_1 t_2}{t_1 + t_2}$
d) $\frac{t_1 t_2}{t_1 - t_2}$
- 3) A force vector applied on a mass is represented as $\vec{F} = 6\hat{i} - 8\hat{j} + 10\hat{k}$ and the mass accelerates with 1 m/s^2 . What will be the mass of the body? [4]
- a) 10 kg
b) 20 kg
c) $2\sqrt{10} \text{ kg}$
d) $10\sqrt{2} \text{ kg}$

- 4) In the arrangement shown in the figure given below, the strings are light and inextensible. The surface over which blocks are placed is smooth. What is the acceleration of each block?



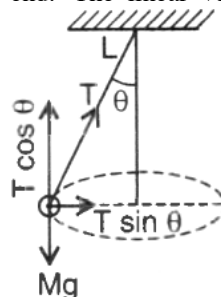
- [4]
a) 8 m/s^2 b) 14 m/s^2
c) 4 m/s^2 d) 2 m/s^2
- 5) If a car is being driven on a circular path, in which of the following circumstances it will not slip: [4]
- a) $\frac{v}{r} = \mu g$
b) $\frac{mv^2}{r} \leq \mu mg$
c) $\frac{mv^2}{r} = 4\mu mg$
d) $\frac{mv^2}{r} \geq \mu mg$
- 6) Two identical balls A and B having velocities of 0.5 m/s and - 0.3 m/s respectively collide elastically in one dimension. The velocities of B and A after the collision respectively will be [4]
- a) 0.5 m/s and - 0.3 m/s
b) 0.3 m/s and 0.5 m/s
c) - 0.5 m/s and 0.3 m/s

d) - 0.3 m/s and 0.5 m/s

- 7) If two masses m_1 and m_2 collide, the ratio of change in their respective velocities is proportional to: [4]

- a) $\frac{m_2}{m_1}$
b) $\frac{m_1}{m_2}$
c) $\sqrt{\frac{m_2}{m_1}}$
d) $\sqrt{\frac{m_1}{m_2}}$

- 8) A string of length 1 m is fixed at one end and carries a mass 100 g at the other end. The string makes $\left(\frac{2}{\pi}\right)$ revolutions per second around a vertical axis through fixed end. The linear velocity of the mass is:



- [4]
a) $10 \sin\theta \text{ ms}^{-1}$ b) $2 \sin\theta \text{ ms}^{-1}$
c) $40 \sin\theta \text{ ms}^{-1}$ d) $4 \sin\theta \text{ ms}^{-1}$
- 9) The acceleration due to gravity on planet A is 9 times the acceleration due to gravity on planet B. A man jumps to a height of 2 m on the surface of A. What is the height of jump by the same person on planet B? [4]
- a) 18 m b) $\left(\frac{2}{9}\right)m$
c) 6 m d) $\left(\frac{2}{3}\right)m$
- 10) In a gravitational field the work is done in transporting mass from one point to another: [4]
- a) Depends on the velocity of transport
b) Depends on the end positions
c) Depends on the distance between them
d) Depends on the actual point of motion
- 11) Choose the wrong statement:
i. The bulk modulus for solids is much larger than for liquids.
ii. Gases are least compressible.
iii. The reciprocal of the bulk modulus is called compressibility.
iv. For a system in equilibrium, the value of bulk modulus is always positive.
- [4]
a) (d) b) (a)
c) (c) d) (b)

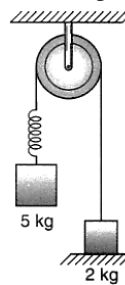
- 12) A load suspended by a massless spring produces an extension of x cm in equilibrium. When it cuts into two unequal parts the same load produces an extension of 7.5 cm when suspended by the larger part of length 60 cm. When it is suspended by the smaller part, the extension is 5.0 cm. Then: [4]

- a) $X = 12.5$ cm
 b) $X = 3.0$ cm
 c) The length of the original spring is 80 cm
 d) The length of the original spring is 90 cm
- 13) Soap bubbles can be formed floating in the air by blowing soap solution in air, with the help of a glass tube, but not water bubbles. It is because:
- The excess pressure inside the water bubble being more due to large surface tension
 - The excess pressure inside the water bubble being less due to large surface tension
 - The excess pressure inside the water bubble being more due to large viscosity
 - The excess pressure inside the water bubble being less due to less viscosity
- [4]
- a) Only iv
 b) Only iii
 c) Only i
 d) Only ii
- 14) Water rises in a capillary tube to a certain height such that the upward force due to surface tension is balanced by 75×10^{-4} N force due to the weight of the liquid. If the surface tension of water is 6×10^{-2} N/m, the inner circumference of the capillary tube must be: [4]
- a) 0.50×10^{-2} m
 b) 1.25×10^{-2} m
 c) 6.5×10^{-2} m
 d) 12.5×10^{-2} m
- 15) Coefficient of cubical expansion of water is - ve between 0° C and: [4]
- a) 15.5° C
 b) 100° C
 c) 10° C
 d) 4° C
- 16) If a thermometer reads freezing point of water as 20° C and boiling point as 150° C, how much thermometer read when the actual temperature is 60° C? [4]
- a) 110° C
 b) 98° C
 c) 60° C
 d) 40° C
- 17) A thermally insulated rigid container contains an ideal gas. It is heated through a resistance of 100Ω by passing a current of 1 A for five minutes, then change in internal energy of the gas is: [4]
- a) 30 kJ
 b) 0 kJ
 c) 20 kJ
 d) 10 kJ
- 18) If γ denotes the ratio of the two specific heats of a gas, the ratio of the slopes of adiabatic and isothermal curves at their point of intersection is: [4]
- a) $\gamma + 1$
 b) $\frac{1}{\gamma}$
 c) γ
 d) $\gamma - 1$
- 19) The average kinetic energy of a gas molecules at 27° C is 6.21×10^{-21} J. Its average kinetic energy at 227° C will be [4]
- a) 5.22×10^{-21} J
 b) 10.35×10^{-21} J
 c) 11.35×10^{-21} J
 d) 52.2×10^{-21} J
- 20) If the displacement of a particle in simple harmonic motion is given by it and its acceleration as y . What will be the curve of y versus x ? [4]
- a) Sinusoidal
 b) Ellipse
 c) Circle
 d) Straight line
- 21) If n_1 , n_2 and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by: [4]

- a) $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$
 b) $\frac{1}{\sqrt{n_1}} + \frac{1}{\sqrt{n_2}} + \frac{1}{\sqrt{n_3}}$
 c) $N = n_1 + n_2 + n_3$

$$d) \frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$$

- 22) The distance between two points differing in phase by 60° on a wave having a wave velocity 360 m/s and frequency 500 Hz is: [4]
- a) 0.36 metre
 b) 0.72 metre
 c) 0.12 metre
 d) 0.18 metre
- 23) Which of the following statements is correct? [4]
- a) Sound waves in air are longitudinal while light waves transverse.
 b) Both sound and light waves in air are transverse.
 c) Sound waves in air are transverse while light longitudinal.
 d) Both sound and light waves in air are longitudinal.
- 24) The system shown in the figure is released from rest. Pulley and spring are massless and the friction is absent everywhere. The speed of 5 kg block, when 2 kg block leaves the contact with the ground is: (take force constant of the spring $K = 40$ N/m and $g = 10$ m/s²)



- [4]
- a) $\sqrt{2}$ m/s
 b) $2\sqrt{2}$ m/s
 c) $4\sqrt{2}$ m/s
 d) 2 m/s
- 25) A ball of weight W is thrown upwards with a velocity u . If air exerts an average resisting force F , the speed with which the ball returns back to the thrower is: [4]
- a) $u\sqrt{\frac{W}{W+F}}$
 b) $u\sqrt{\frac{W+F}{W-F}}$
 c) $u\sqrt{\frac{W-F}{W+F}}$
 d) $u\sqrt{\frac{W}{W-F}}$
- 26) A spherical planet far out in space has a mass M_0 and diameter D_0 . A particle of mass m falling near the surface of this planet will experience an acceleration which is equal to: [4]
- a) $4m\frac{M_0}{D_0^2}$
 b) $\frac{4M_0G}{D_0^2}$
 c) $\frac{M_0}{D_0^2}$
 d) $M\frac{M_0}{D_0^2}$

Section B

- 27) **Assertion (A):** Vector may change if frame of reference is rotated.
Reason (R): A scalar quantity is independent of the orientation of frame of reference. [4]
- a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.

- 28) **Assertion (A):** Displacement of a body is the signed sum of the area under the velocity - time graph.
Reason (R): Displacement is a vector quantity. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 29) **Assertion (A):** If a physical quantity is a vector, it must have direction.
Reason (R): Current has a direction therefore it is a vector quantity. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 30) **Assertion (A):** In circular motion the centripetal and centrifugal force acting in opposite direction balance each other.
Reason (R): Centripetal and centrifugal forces don't act at the same time. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 31) **Assertion (A):** In Karate, a brick is broken with a bare hand.
Reason (R): In this process the impulse is sharp. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 32) **Assertion (A):** No particle may have a speed as large as speed of light.
Reason (R): Infinite energy of any substance or system is not possible. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 33) **Assertion (A):** When a body moves along a circular path, no work is done by the centripetal force.
Reason (R): The centripetal force is used in moving the body along the circular path and hence no work is done. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 34) **Assertion (A):** The handle of the watch - maker's screw - driver is much thicker than the handle of a carpenter's screwdriver.
Reason (R): Watchmaker requires small torque than the carpenter. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 35) **Assertion (A):** Position of centre of mass is independent of the reference frame.
Reason (R): Centre of mass is same for all bodies. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 36) **Assertion (A):** There is a popular statement regarding Cavendish: **Cavendish weighed the earth.**
Reason (R): The measurement of G by Cavendish's experiment, combined with the knowledge of g and R_E enables one to estimate M_E from equation. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 37) **Assertion:** Young's modulus for a perfectly plastic body is zero.
Reason: For a perfectly plastic body, restoring force is zero. [4]
- Assertion and reason both are correct statements and reason is correct explanation for assertion.
 - Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 - Assertion is correct statement but reason is wrong statement.
 - Assertion is wrong statement but reason is correct statement.
- 38) **Assertion (A):** In steady flow, the velocity of each passing fluid particle remains constant in time.
Reason (R): Each particle follows a smooth path and the paths of the particle do not cross each other. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
- 39) **Assertion (A):** Rubber contract on heating.
Reason (R): In rubber as temperature increases, the amplitude of transverse vibrations increases more than the amplitude of longitudinal vibrations. [4]
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.

d) A is false but R is true.

- 40) **Assertion (A):** Animals curl into a ball, when they feel very cold.

Reason (R): Animals by curling their body reduces the surface area. [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- 41) **Assertion (A):** Specific heat of a body is always greater than its thermal capacity.

Reason (R): Thermal capacity is the heat required for raising temperature of unit mass of the body through unit degree. [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- Both A and R are false.

- 42) **Assertion (A):** Mean free path of gas molecules varies inversely as density of the gas.

Reason (R): Mean free path of gas molecules is defined as the average distance travelled by a molecule between two successive collisions. [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- 43) **Assertion (A):** The root mean square speeds of the molecules of different ideal gases at the same temperature are the same.

Reason (R): Root mean square value of speed depends on the temperature. [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- 44) **Assertion:** The root mean square velocity of molecules of a gas having Maxwellian distribution of velocities is higher than their most probable velocity, at any temperature.

Reason: A very small number of molecules of gas possess very large velocities [4]

- Assertion and reason both are correct statements and reason is correct explanation for assertion.
- Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

- 45) **Assertion:** If a pendulum is suspended in a lift and lift is falling freely, then its time period becomes infinite.

Reason: Free falling body has acceleration equal to acceleration due to gravity. [4]

- Assertion and reason both are correct statements and reason is correct explanation for assertion.
- Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

- 46) **Assertion:** The bob of a simple pendulum is a ball full of water, if a fine hole is made in the bottom of the ball, the time period first increases and then decreases.

Reason: As water flows out of the bob, the weight of bob decreases. [4]

- Assertion and reason both are correct statements and reason is correct explanation for assertion.
- Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

- 47) **Assertion:** When a pendulum is made to oscillate on the surface of the Moon, its time period increases.

Reason: Moon is much smaller as compared to earth. [4]

- Assertion and reason both are correct statements and reason is correct explanation for assertion.
- Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

- 48) **Assertion (A):** A vibrating tuning fork sounds louder, when its stem is pressed against a desk top.

Reason (R): When a sound wave is incident on the surface of a desk, it is totally reflected. [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- 49) **Assertion (A):** If three sources of sound of equal intensities, with frequency 100, 101 and 102 Hz are sounded simultaneously, the beat frequency heard is 2.

Reason (R): In beats at a given position, intensity varies periodically with time with periodicity $T = \frac{1}{n_1 - n_2}$ while in interference at a given time, intensity varies periodically with position with periodicity λ . [4]

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- 50) **Assertion (A):** Resonance is a special case of forced vibration in which the nature and frequency of vibration of the body is the same as the impressed frequency and the amplitude of forced vibration is maximum.

Reason (R): The amplitude of forced vibrations of a body increases with an increase in the frequency of the externally impressed periodic force [4]

a) Both A and R are true and R is the correct expla-

nation of A.

- b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.