

NEET PHYSICS SAMPLE PAPER - 11 - 04
NEET-UG - PHYSICS

Time Allowed : 60 mins

Maximum Marks : 200

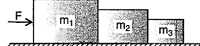
Section A

- 1) Which of the following sets of quantities have same dimensional formulae?
- Frequency, angular frequency and angular momentum
 - Surface tension, stress and spring constant
 - Acceleration, momentum and retardation
 - Work, energy and torque

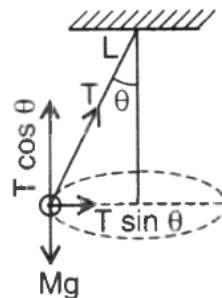
[4]

- a) Only iv b) I and ii
c) II and iii d) III and iv
- 2) A body starting from rest, moves with uniform acceleration. The distance covered by the body in time t is proportional to: [4]
- $T^{3/2}$
 - T^2
 - \sqrt{t}
 - $T^{2/3}$
- 3) If the angles of projection of a projectile with same initial velocity exceed or fall short of 45° by equal amounts α , then the ratio of horizontal ranges is: [4]
- 1:1
 - 1:3
 - 1:4
 - 1:2
- 4) Three blocks of masses $m_1, m_2,$ and m_3 kg are placed in contact with each other on a frictionless table. A force F is applied to the heaviest mass m_1 ; the force experienced by mass m_2 is:

[4]

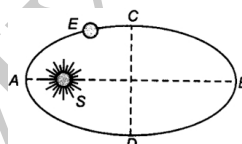
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- $\frac{F(m_2+m_3)}{m_1+m_2+m_3}$
 - $\frac{Fm_1}{m_2+m_3}$
 - F
 - $\frac{F(m_2+m_1)}{m_1+m_2+m_3}$
- 5) A body is rolling on the ground with a velocity of 1 m/s. After travelling a distance of 5 m, the body stops. The coefficient of friction is: [4]
- 0.00102
 - 0.102
 - 1.02
 - 0.0102
- 6) A body of mass m , moving with a uniform velocity of 40 m/sec, collides with another mass m_2 at rest and then the two together begin to move with a uniform velocity of 30 m/sec. The ratio of their masses $(\frac{m_1}{m_2})$ is: [4]
- 0.75
 - 3.0
 - 1.33
 - 4.0
- 7) A ball of mass m_1 makes a head - on elastic collision with a ball of mass m_2 which is initially at rest. The transfer of kinetic energy to the velocity of the second ball is maximum when: [4]
- $M_1 \gg m_2$
 - $M_1 \ll m_2$
 - $M_1 \leq m_2$
 - $M_1 = m_2$

- 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 $(\frac{2}{\pi})$ revolutions per second around a vertical axis through fixed end. The linear velocity of the mass is:



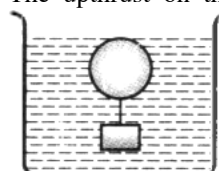
[4]

- $10 \sin\theta \text{ ms}^{-1}$
 - $2 \sin\theta \text{ ms}^{-1}$
 - $40 \sin\theta \text{ ms}^{-1}$
 - $4 \sin\theta \text{ ms}^{-1}$
- 9) A remote - sensing satellite of earth revolves in a circular orbit at a height of $0.25 \times 10^6 \text{ m}$ above the surface of earth. If earth's radius is $6.38 \times 10^6 \text{ m}$ and $g = 9.8 \text{ ms}^{-2}$, then the orbital speed of the satellite is: [4]
- 7.76 km s^{-1}
 - 8.56 km s^{-1}
 - 6.67 km s^{-1}
 - 9.13 km s^{-1}
- 10) The Earth E moves in an elliptical orbit with the Sun S at one of the foci as shown in figure. Its speed of motion will be maximum at the point:



[4]

- B
 - C
 - A
 - D
- 11) The breaking stress of a wire depends upon: [4]
- Radius of the wire
 - Length of the wire
 - Material of the wire
 - Shape of the cross - section
- 12) A metal wire is first stretched beyond its elastic limit and then released. It: [4]
- Will contract to its original length
 - Will contract but the final length will be greater than the original length
 - Will contract to its length at elastic limit
 - Loses its elastic property completely and it will not contract
- 13) A body floats in a liquid contained in a beaker. The whole system shown in figure is falling under gravity. The upthrust on the body due to liquid is:

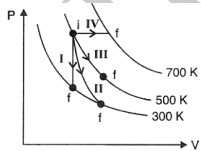


[4]

- Equal to weight of liquid displaced
- Equal to weight of the immersed body

- c) Zero
d) Equal to weight of the body in air
- 14) The terminal velocity v of a small steel ball of radius r falling under gravity through a column of viscous liquid of coefficient of viscosity η depends on the mass of the ball m , acceleration due to gravity g , coefficient of viscosity η and radius r . Which of the following relations is dimensionally correct? [4]
- a) $v \propto \frac{mg}{r\eta}$
b) $v \propto mg\eta r$
c) $v \propto \frac{\eta mg}{r}$
d) $v \propto \frac{mgr}{\eta}$
- 15) For a black body emissivity e is equal to: [4]
a) 1
b) Zero
c) Infinity
d) Less than one
- 16) The ratio of the coefficient of thermal conductivity of two different materials is 5 : 3. If the thermal resistance of the rods of same thickness of these materials is same, then the ratio of the length of these rods will be: [4]
a) 3 : 5
b) 3 : 2
c) 5 : 3
d) 3 : 4
- 17) A given mass of a gas is compressed isothermally until its pressure is doubled. It is then allowed to expand adiabatically until its original volume is restored and its pressure is then found to be 0.75 of its initial pressure. The ratio of the specific heats of the gas is approximate: [4]
a) 1.83
b) 1.20
c) 1.41
d) 1.67
- 18) Thermodynamic processes are indicated in the following diagram. Match the following:

Column I	Column II
P. Process I	1. Adiabatic
Q. Process II	2. Isobaric
R. Process III	3. Isochoric
S. Process IV	4. Isothermal



[4]

- a) P → 4, Q → 2, R → 1, S → 3
b) P → 1, Q → 3, R → 4, S → 2
c) P → 3, Q → 4, R → 2, S → 1
d) P → 3, Q → 1, R → 4, S → 2
- 19) Two perfect gases at absolute temperatures T_1 and T_2 are mixed. There is no loss of energy. The temperature of mixture, if masses of molecules are m_1 and m_2 and the number of molecules in the gases are n_1 and n_2 respectively, is: [4]

- a) $\frac{T_1 + T_2}{2}$
b) $\sqrt{T_1 T_2}$
c) $\frac{n_1 T_2 + n_2 T_1}{n_1 + n_2}$
d) $\frac{n_1 T_1 + n_2 T_2}{n_1 + n_2}$

- 20) A particle executes linear simple harmonic motion with an amplitude of 2 cm. When the particle is at 1 cm from the mean position the magnitude of its velocity is equal to that of its acceleration. Then, its time period (in second) is: [4]
- a) $\frac{2\pi}{\sqrt{3}}$
b) $\frac{1}{2\pi\sqrt{3}}$
c) $\frac{\sqrt{3}}{2\pi}$
d) $2\pi\sqrt{3}$
- 21) A particle moves so that its acceleration a is given by: $a = -bx$, where x is the displacement from the equilibrium position and b is a constant. The period of oscillation is: [4]
- a) $2\pi\sqrt{b}$
b) $\frac{2\pi}{\sqrt{b}}$
c) $2\frac{\sqrt{\pi}}{b}$
d) $\frac{2\pi}{b}$
- 22) The velocity of sound waves in air is 330 m/s. For a particular sound in air, a path difference of 40 cm is equivalent to a phase difference of 1.6π . The frequency of the wave is: [4]
a) 330 Hz
b) 150 Hz
c) 165 Hz
d) 660 Hz
- 23) There are two organ pipes of exactly the same length and material but of different radii. The loss of sound will be: [4]
a) More from a narrower pipe
b) Same for both pipes
c) More from a wider pipe
d) Different for both pipes
- 24) If a ball of mass m elastically collides against a wall with velocity v and returns in the opposite direction with the same velocity, then the change in momentum is equal to: [4]
a) $2mv$
b) $2v$
c) $2m$
d) $4mv$
- 25) A small block slides down from the top of a hemisphere of radius r . It is assumed that there is no friction between the block and the hemisphere. At what height, h will the block lose contact with the surface of the sphere? [4]
a) $\frac{r}{2}$
b) $\frac{r}{4}$
c) $\frac{r}{3}$
d) $\frac{4r}{3}$
- 26) In case of a solid sphere, where is its gravitational potential minimum? [4]
a) At the centre of the sphere
b) At mid - point between the centre and surface of the sphere
c) At infinity
d) At the surface of the sphere

Section B

- 27) **Assertion (A):** As the frictional force increases, the safe velocity limit for taking a turn on an unbanked road also increases.
Reason (R): Banking of roads will increase the value of limiting velocity. [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:** Two balls of different masses are thrown vertically upward with the same speed. They will pass through their point of projection in the downward direction at the same speed.
Reason: The maximum height and downward velocity attained at the point of projection are independent of the mass of the ball. [4]
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but the reason is not the correct explanation of assertion.
 c) If the assertion is true but the reason is false.
 d) If both assertion and reason are false.
- 29) **Assertion (A):** Two particles of different mass, projected with same velocity, the maximum height attained by both the particles will be same.
Reason (R): The maximum height of projectile is independent of particle mass.
 is equal to maximum height attained by projectile. [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.
- 30) **Assertion (A):** When a body is placed in a rotatory frame rotating with constant angular speed, it is thrown radially outward.
Reason (R): Centrifugal force acts on the body placed in a rotating frame. [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.
- 31) **Assertion:** Pseudo force is an imaginary force which is recognized only by a non-inertial observer to explain the physical situation according to Newton's laws.
Reason: Pseudo force has no physical origin, that is it is not caused by one of the basic interactions in nature. It does not exist in the action-reaction pair. [4]
 a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false.
 d) If both assertion and reason are false.
- 32) **Assertion:** A body may gain kinetic energy and potential energy simultaneously.
Reason: Principle of conservation of mechanical energy may not be valid every time. [4]
 a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
 b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 c) Assertion is correct statement but reason is wrong statement.
 d) Assertion is wrong statement but reason is correct statement.
- 33) **Assertion (A):** When the force retards the motion of a body the work done is zero.
Reason (R): Work done depends on angle between force and displacement. [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.
- 34) **Assertion (A):** A solid sphere is rolling on a rough horizontal surface. The acceleration of contact point is zero.
Reason (R): A solid sphere can roll on a smooth surface. [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.
- 35) **Assertion (A):** A particle moving on a straight line with a uniform velocity, its angular momentum is constant.
Reason (R): The angular momentum is zero when particle moves with a uniform velocity. [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.
- 36) **Assertion (A):** The escape speed for the moon is 2.3 km s^{-1} which is five times smaller than that for the earth.
Reason (R): The escape speed depends on acceleration due to gravity on the moon and radius of the moon and both of them are smaller than that of earth. [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.
- 37) **Assertion (A):** Ductile metals are used to prepare thin wires.
Reason (R): In the stress-strain curve of ductile metals, the length between the points representing elastic limit and breaking point is very small. [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.
- 38) **Assertion (A):** The surface of water in the capillary tube is concave.
Reasons (R): The pressure difference between two sides of the tube is $\frac{2S}{a} \cos \theta$. [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.

39) **Assertion:** A man would feel iron or wooden balls equally hot at 37.4°C.

Reason: At 37.4°C both iron and wood have same thermal conductivity. [4]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

40) **Assertion:** First law of thermodynamics allows many processes which actually don't happen.

Reason: First law of thermodynamics must not be violated for any process to happen. [4]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

41) **Assertion (A):** The ratio of specific heat of gas at constant pressure and specific heat at constant volume is more for helium gas than for hydrogen gas.

Reason (R): Atomic mass of helium is more than that of hydrogen. [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.

42) **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]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

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]

- 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.

44) **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]

- 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.

45) **Assertion:** The amplitude of an oscillating pendulum decreases gradually with time.

Reason: The frequency of the pendulum decreases with time. [4]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

46) **Assertion:** The time period of a pendulum on a satellite orbiting the earth is infinity.

Reason: The time period of a pendulum is inversely proportional to \sqrt{g} . [4]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) 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]

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

48) **Assertion (A):** Two arms of a tuning fork vibrate in same phase.

Reason (R): Each arm has the same frequency of vibration. [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.

- 49) **Assertion (A):** The waves on strings are always transverse.
Reason (R): The transverse waves move in the form of crests and troughs. [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.
- 50) **Assertion (A):** Sound produced by an open organ pipe

is richer in quality than the sound produced by a closed organ pipe.

Reason (R): All harmonics (even and odd) are produced in an open pipe while only odd harmonics are produced in a closed pipe. [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.

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