NEET PHYSICS SAMPLE PAPER - 01
NEET-UG - PHYSICS

Time Allowed : 60 mins

Maximum Marks : 180

Section A

1) Dimensions of coeffcient of viscosity are: **[4]**
   a) $[ML^{-3}T^{-4}]$
   b) $[MT^2]$
   c) $[ML^{-1}T^{-1}]$
   d) $[ML^{-1}T^{-2}]$

2) SI unit of pressure is: **[4]**
   a) Cm of Hg
   b) Pascal
   c) Atmosphere
   d) Dynes/cm^2

3) **Assertion (A):** The displacement - time graph of a body moving with uniform acceleration is a straight line.
   Reason (R): The displacement is proportional to time. **[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) Both A and R are false.

4) Tom and Dick are running forward with the same speed. They are following a rubber ball to each other at a constant speed v as seen by the thrower. According to Sam who is standing on the ground the speed of ball is: **[4]**
   a) According to time
   b) Less than v
   c) Same as v
   d) Greater than v

5) A ball is thrown upwards. It takes 4 sec to reach back to the ground. Find its initial velocity: **[4]**
   a) 30 ms^{-1}
   b) 10 ms^{-1}
   c) 40 ms^{-1}
   d) 20 ms^{-1}

6) **Assertion (A):** A negative acceleration of a body is associated with a slowing down of a body.
   Reason (R): Acceleration is vector quantity. **[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.

7) The reason why cyclists bank when taking a sharp turn is: **[4]**

   a) To supply the acceleration required to move fast.
   b) Cyclists enjoy turning to one side and so bank.
   c) To decelerate at the turns as turns are dangerous.
   d) To supply the sidewise (centripetal) acceleration required to make the direction change.

8) The trajectory of a projectile in a vertical plane is:
   $y = ax - bx^2$
   Where a and b are constants and x and y are respectively the horizontal and vertical distances of the projectile from the point of projection. The maximum height attained is: **[4]**
   a) $\frac{a^2}{2gb}$
   b) $\frac{a^2}{8a}$
   c) $\frac{a^2}{2a}$
   d) $\frac{a^2}{2b}$

9) **Assertion (A):** The sum of squares of cosines of angle made by a vector with X , Y and Z axes is equal to unity.
   Reason (R): A vector makes 45° from X - axis have equal components along X and Y - axes. **[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.

10) A shell of mass 0.020 kg is fired by a gun of mass 100 kg. If the muzzle speed of the shell is 80 ms^{-1}, what is the recoil speed of the gun? **[4]**
    a) 1.7 cm/s
    b) 1.6 cm/s
    c) 1.9 cm/s
    d) 1.8 cm/s

11) A spring balance and a physical balance are kept in a lift. In these balances equal masses are placed. If now the lift starts moving upwards with constant acceleration, then: **[4]**

    a) The reading of spring balance will remain unchanged and physical balance will remain in equilibrium.
    b) The reading of spring balance will increase and the physical balance will remain in equilibrium.
    c) The reading of spring balance will increase and the equilibrium position of the physical balance will disturb.
    d) The reading of spring balance will decrease and physical balance will remain in equilibrium.

12) **Assertion (A):** A cyclist must adopt a zig - zag path while ascending a steep hill.
    Reason (R): The zig - zag path prevent the cyclist to slip down. **[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.

13) When a spring is stretched by a distance x, it exerts a force given by $F = (-5x - 16x^3)$ N. The work done, when the spring is stretched from 0.1 m to 0.2 m, is **[4]**
    a) 8.7×10^{-2} J
    b) 8.1×10^{-2} J
    c) 12.2×10^{-1} J
    d) 12.2×10^{-2} J

14) A bullet of mass m moving with velocity v strikes a block of mass M at rest and gets embedded into it. The kinetic energy of the composite block will be: **[4]**

    a) $\frac{1}{2}mv^2 \times \frac{m}{(m + M)}$
    b) $\frac{1}{2}Mv^2 \times \frac{m}{(M + m)}$
    c) $\frac{1}{2}mv^2 \times \frac{(M + m)}{M}$
    d) $\frac{1}{2}mv^2 \times \frac{M}{(m + M)}$

15) **Assertion:** A quick collision between two bodies is more violet than slow collision, even when initial and final velocities are identical.
Reason: The rate of change of momentum determines that the force is small or large. **[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.

16) A particle of mass m is circulating on a circle of radius r having angular momentum L, then the centripetal force will be **[4]**

    a) $\frac{L^2}{mr^2}$
    b) $\frac{L^2 m}{r}$
    c) $\frac{L^2}{mr^3}$
    d) $\frac{L^2}{mr}$

17) Two particles of equal masses have velocities $\vec{v_1} = 2\hat{i}\,\text{m/s}$ and $\vec{v_2} = 2\hat{j}\,\text{m/s}$. The first particle has an acceleration $\vec{a_1} = (3\hat{i} + 3\hat{j})\,\text{m/s}^2$, while the acceleration of the other particle is zero. The centre of mass of the two particles moves in a: **[4]**
    a) Ellipse   b) Straight line
    c) Parabola   d) Circle

18) **Assertion:** If torque $\vec{\tau}$ acting on a rigid body is defined as $\vec{\tau} = \vec{A} \times \vec{L}$ where $\vec{A}$ is a constant vector and $\vec{L}$ is the angular momentum of the body then magnitude of the angular momentum of the body remains same.
Reason: In this case $\vec{\tau}$ is perpendicular to $\vec{L}$ and hence torque does not deliver any power to the body. **[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.

19) A central force is always directed: **[4]**

    a) Perpendicular to the position vector of the point of application of the force with respect to the fixed point
    b) At a fixed angle to the position vector of the point of application of the force with respect to the fixed point
    c) At a varying angle to the position vector of the point of application of the force with respect to the fixed point
    d) Along the position vector of the point of application of the force with respect to the fixed point

20) If a body weighing 40 kg is taken inside the earth to a depth to $\frac{1}{4}$ th radius of the earth, the weight of the body at that point is: **[4]**
    a) 40 kg - wt   b) Zero
    c) 10 kg - wt   d) 30 kg - wt

21) Assuming that earth and mars move in circular orbits around the sun, with the martian orbit being 1.52 times the orbital radius of the earth. The length of the martian year in days is: **[4]**
    a) $(1.52)^{2/3} \times 365$ b) $(1.52)^{3/2} \times 365$
    c) $(1.52)^3 \times 365$ d) $(1.52)^2 \times 365$

22) **Assertion:** Earth has an atmosphere but the moon does not.
Reason: Moon is very small in comparison to 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.

23) A mild steel wire of length 1.0 m and cross - sectional area $0.50 \times 10^{-2}\text{cm}^2$ is stretched, well within its elastic limit, horizontally between two pillars. A mass of 100 g is suspended from the mid - point of the wire. Calculate the depression at the midpoint. **[4]**
    a) 0.90×10^{-2} m   b) 1.5×10^{-2} m
    c) 0.40×10^{-2} m   d) 1.074×10^{-2} m

24) Data was collected by studying a metal ball dropped in the shallow lake of uniform density by a student. He plotted a graph and found its nature to be linear. If he plotted depth of lake on X - axis, what physical quantity he might have plotted along Y - axis? **[4]**

    a) Hydraulic strain
    b) Hydraulic stress
    c) Bulk modulus
    d) |Hydraulic stress| or |hydraulic strain|

25) **Assertion:** Bulk modulus of elasticity B represents the incompressibility of the material.
Reason: $B = -\frac{\Delta P}{\frac{\Delta V}{V}}$, where symbols have their usual meaning. **[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.

26) For different capillaries of radius r, the condition of liquid rise (h) above the liquid surface is **[4]**

    a) $\frac{h}{r}$ = constant
    b) H - r = constant
    c) H + r = constant
    d) Rh = constant

27) Liquid rises in capillary tube when angle of contact θ is: **[4]**
    a) $= 0°$ b) $= 90°$
    c) $< 90°$ d) $> 90°$
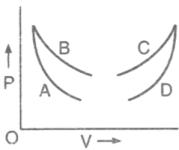
28) The liquid rises in the capillary tube when angle of contact θ is: **[4]**
   a) $= 90°$ b) $< 90°$
    c) $> 90°$ d) $= 0°$

29) **Assertion:** If a liquid in a vessel is stirred and left to itself, the motion disappears after few minutes.
Reason: The moving liquid exerts equal and opposite force. **[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.

30) If m mass of a substance undergoes a phase change, then amount of heat required will be **[4]**
   a) $\Delta Q = mc_p \Delta T$
   b) $\Delta Q = mL$
   c) $\Delta = m_s \Delta T$
   d) $\Delta Q = mC_v \Delta T$

31) One gm of ice is mixed with one gm of steam. After thermal equilibrium is reached, the temperature of the mixture is: **[4]**
   a) $0°C$
   b) $100°C$
   c) $55°C$
   d) $75°C$

32) An aluminium measuring rod, which is correct at $5°C$ measures the length of a line as 80 cm at $45°C$. If the thermal coefficient of linear expansion of aluminium is $\frac{2.50 \times 10^{-5}}{°C}$, the correct length of the line is: **[4]**
   a) 79.62 cm
   b) 79.92 cm
   c) 81.12 cm
   d) 80.08 cm

33) **Assertion (A):** It is easier to spray water in which some soap is dissolved.
   Reason (R): Soap is easier to spread. **[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) A gas is expanded isothermally from volume V_1 to V_2 at a constant temperature T, the work done by the gas in this expansion is **[4]**

   a) $\mu RT \log \frac{V_1}{V_2}$
   b) $\mu RT \times \frac{V_1}{V_2}$
   c) $\mu RT \times \frac{V_2}{V_1}$
   d) $\mu RT \log \frac{V_2}{V_1}$

35) Four curves A, B, C, and D are drawn in figure for a given amount of gas. The curves which represent adiabatic and isothermal changes are:

   [4]
   a) B and A respectively
   b) D and C respectively
   c) C and D respectively
   d) A and B respectively

36) **Assertion (A):** A room can be cooled by opening the door of a refrigerator in a closed room.
   Reason (R): Heat flow from lower temperature (refrigerator) to higher temperature (room). **[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) Both A and R are false.

37) One mole of an ideal monatomic gas is at an initial temperature of 300 K. The gas undergoes an isovolumetric process, acquiring 500 J of energy by heat. It then undergoes an isobaric process, losing this same amount of energy by heat. Determine the work done on the gas. **[4]**
   a) 231 J
   b) 123 J
   c) 200 J
   d) 333 J

38) 6 g of hydrogen is mixed with 33.6 litres of helium at S.T.P. The adiabatic constant of the resultant mixture is **[4]**
   a) 1.35
   b) 1.45
   c) 1.65
   d) 1.25

39) **Assertion:** State variables (P, V and T) of any gas at low densities obey the equation PV = nRT.
   Reason: Real gases are good approximation of an ideal gas at low density. **[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) Two bodies M and N of equal masses are suspended from two separate massless springs of spring constants k_1 and k_2 respectively. If the two bodies oscillate vertically such that their maximum velocities are equal, the ratio of the amplitude of vibrations of M to that of N is **[4]**

   a) $\frac{k_2}{k_1}$
   b) $\left(\frac{k_2}{k_1}\right)^{1/2}$
   c) $\left(\frac{k_1}{k_2}\right)^{1/2}$
   d) $K_1 k_2$

41) When two displacements represented by $y_1 = a \sin(\omega t)$ and $y_2 = b \cos(\omega t)$ are superimposed the motion is: **[4]**

   a) Simple harmonic with amplitude $\frac{a}{b}$
   b) Simple harmonic with amplitude $\sqrt{a^2 + b^2}$
   c) Not a simple harmonic
   d) Simple harmonic with amplitude $\frac{(a + b)}{2}$

42) **Assertion:** In simple harmonic motion, kinetic energy and potential energy become equal when the displacement is $\frac{1}{\sqrt{2}}$ times the amplitude.
   Reason: In simple harmonic motion, kinetic energy is zero when potential energy is maximum. **[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) What is the minimum length of a tube, open at both ends, that resonates with a tuning fork of frequency 350 Hz? [velocity of sound in air = 350 m/s]**[4]**
   a) 100 cm
   b) 50 cm
   c) 25 cm
   d) 75 cm

44) One of the modes of resonance in a tube containing water at one end has been shown. The tube in the present case is in:
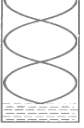
[4]

a) Seventh harmonic   b) Fourth harmonic

c) Third harmonic   d) First harmonic

45) **Assertion (A):** In nth normal mode of a stretched string, there are n antinodes and (n + 1) nodes.

Reason (R): The ends of string are nodes, so the number of node is one more than the number of antinodes. [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.