

PHYSICS Part-I HSSC-11th-Swat-2026		Paper Code	Roll No. of the Student
Time: 20 Minutes	Marks: 18	☐ 1 ☒ 2 ☐ 3	Serial No. Of the Answer Book _____
Multiple Choice Questions 01 Mark for each			

SECTION-A

Note:

- 1) Attempting all MCQs is compulsory. This paper along with the OMR sheet must be returned to the superintendent after due time.
- 2) Fill the circle (A)(B)(C)(D), which one is correct with blue or black ball point in separate OMR Sheet like ☒
- 3) If more than one circle in the OMR sheet is filled then no credit will be given to such answer.

- I.i. The escape velocity is V_e for a body of mass 1kg on earth's surface. For another body of mass 100kg, the escape velocity on earth's surface will be:

☒ A V_e
☐ B $100V_e$
☐ C $V_e/100$
☐ D $2V_e$
- ii. A high speed car is taking a turn on banked road. The centripetal force is provided to car by the:

☐ A Gravitational force
☒ B Component of normal force
☐ C Engine force
☐ D Tension force
- iii. A net torque of 800Nm acts on a rotating body of moment of inertia 200 kgm^2 . The angular acceleration produced in the body is:

☒ A 4 rads^{-2}
☐ B 8 rads^{-2}
☐ C 10 rads^{-2}
☐ D 12 rads^{-2}
- iv. If the linear speed of a body in uniform circular motion is halved and radius of circle is doubled, the centripetal force F acting on the body becomes:

☐ A $4F$
☐ B $8F$
☒ C $F/8$
☐ D $F/4$
- v. The ratio of the radii of two pipes A and B is 4 : 5. For steady incompressible flow, the ratio of fluid velocities ($V_A : V_B$) in the pipes will be:

☐ A 4 : 5
☐ B 5 : 4
☐ C 16 : 25
☒ D 25 : 16
- vi. The potential energy of a body in simple harmonic motion is maximum when its:

☐ A Kinetic energy is maximum
☐ B Acceleration is zero
☐ C Total energy is zero
☒ D Displacement is maximum
- vii. The speed of a sound wave of frequency 1200 Hz is 300 ms^{-1} in air at a certain temperature. The wavelength of the wave is:

☐ A 10 cm
☒ B 25 cm
☐ C 30 cm
☐ D 50 cm
- viii. In Young double slit experiment, if the separation between the screen and slits is halved, the fringe spacing:

☐ A Is doubled
☒ B Is halved
☐ C Remains constant
☐ D Reduces to half
- ix. Heat cannot spontaneously flow from a body at low temperature to a body at higher temperature. This statement is called:

☐ A First law of thermodynamics
☒ B Second law of thermodynamics
☐ C Zeroth law of thermodynamics
☐ D Third law of thermodynamics
- x. The result of $6.24 \text{ kg}/2.1 \text{ m}^3$ to the correct number of significant figures in the following is:

☐ A 2.971 kg/m^3
☐ B 2.97 kg/m^3
☐ C 3 kg/m^3
☒ D 3.0 kg/m^3
- xi. Two forces of magnitudes 50N and 20N act at a point. The magnitude of their minimum resultant force is:

☐ A 10N
☐ B 20N
☒ C 30N
☐ D 70N
- xii. If a vector A is inclined at an angle of 60° to another vector B, the magnitude of their scalar product is:

☐ A AB
☐ B $-AB$
☐ C 0
☒ D $AB/2$
- xiii. A vector C obtained from the vector product of two vectors A and B is directed:

☐ A Along vector A
☐ B Along vector B
☒ C Perpendicular to plane of A and B
☐ D Parallel to plane of A and B
- xiv. If velocity-time graph of a body is a straight line parallel to time axis, the body is:

☐ A Moving with uniform velocity
☒ B Moving with uniform acceleration
☐ C Moving with variable velocity
☐ D Stationary
- xv. The range of projectile is 50m for an angle θ . Keeping velocity of projection constant, another angle for which it gives the same range is:

☐ A 90°
☒ B $90^\circ - \theta$
☐ C $90^\circ + \theta$
☐ D 45°
- xvi. In one dimensional elastic collision, if a body of mass m_1 moving with velocity V collides with identical body of mass m_2 at rest, the velocity of m_2 (target body) after collision is approximately:

☒ A V
☐ B $2V$
☐ C $-V$
☐ D 0
- xvii. A body thrown vertically upward covers a distance S . The work done by the force of gravity F on the body during the ascent is:

☐ A FS
☒ B $-FS$
☐ C Zero
☐ D $FS/2$
- xviii. Two bodies A and B do the same amount of work in times 40s and 10s respectively. The power of B is:

☐ A One forth that of A
☐ B Half that of A
☐ C Same as that of A
☒ D Four times that of A

PHYSICS Part-I

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Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B"**Marks: 40**

Attempt any Ten Questions out of the following. Each question carries equal marks.

1. Define the term uncertainty. How is a measured value expressed indicating uncertainty? Why do scientific measurements contain some uncertainty?
2. Show that the equation $V = \sqrt{T \times L/M}$ is correct using the principle of dimensional homogeneity.
3. State the two conditions of equilibrium. What type of equilibrium is guaranteed by each condition?
4. What is vector product? Give one example of vector product. Also prove that vector product is anti-commutative.
5. A ball of mass 80g is thrown vertically upward with a velocity of 30ms^{-1} in air. If the ball rises to a height of 20m, calculate the work done against the air resistance.
6. Prove that power can be expressed as a dot product of force and velocity.
7. Define aerofoil. How does aerofoil provide the lift to the aeroplane wings using Bernoulli's equation?
8. The velocity of water in a pipe of diameter 5cm is 2 m/s. calculate the velocity of water in a pipe of diameter 2cm pipe connected to it.
9. Define the following terms in the context of waves.
a) nodes b) antinodes c) amplitude d) wavelength
10. Distinguish between transverse and longitudinal waves by giving two examples of each type.
11. Define Doppler effect. Derive mathematical expression for apparent frequency of sound when a listener moves towards a stationary sounding source.
12. State two parts of Huygen's principle to determine the shape and location of a new wave front from a known wave front.
13. Monochromatic light of wavelength 500nm is incident on a grating having 2500 lines per cm. Calculate the angle for the third order diffraction maximum.

SECTION "C"**Marks: 27**

Note: Attempt any Three Questions of the following. Each question carries equal Marks.

14. (a) Define projectile motion? Derive the mathematical expression for the time of flight of a projectile in terms of initial velocity V_0 and angle θ with the horizontal. 5
(b) Distinguish between the following terms of kinematics.
i) average and instantaneous velocities ii) uniform and variable velocity 4
15. (a) Define moment of inertia. Derive a relation between torque, moment of inertia and angular acceleration for a point mass in rotational motion. 5
(b) A car of mass 500kg travelling with a speed of 80 km/h rounds a curve of radius 120 m. calculate the centripetal force acting on the car. 4
16. (a) Explain the phenomenon of mechanical resonance with an example. Draw a graph between the amplitude of vibration and the driving frequency for the following cases: 5
a) small damping b) heavy damping
(b) Calculate the time period of a simple pendulum of length 6m on earth's surface. 4
17. (a) What is a refrigerator? Briefly describe its working and derive an expression for its coefficient of performance when used for cooling. 5
(b) State the first law of thermodynamics and write its mathematical expression. Explain how is this law particular formulation of the principle of conservation of energy.