Total Time: 3:00 Hours

PHYSICS (Part-I)

(Fresh/New Course)

Total Marks: 85

Note: There are three sections in this paper i.e. Section A, B & C.

VERSION : A

Time Allowed: 20 Minutes   **"Section-A"**   Marks: 18

INSTRUCTIONS:
- Attempt this section on the **MCQs Answer Sheet** only.
- Use black ball point or marker for shading only one circle for correct option of a question.
- No mark will be awarded for cutting, erasing, over writing and multiple circles shading.

Q. 1:- Choose the correct option i.e. A,B,C, or D.

1. The SI system is built up from .... kind of units.
   - (A) One
   - (B) Two
   - ● Three
   - (D) Four

2. Dimensions of frequency are ....
   - (A) $[T^2]$
   - (B) $[LT^{-1}]$
   - ● $[T^{-1}]$
   - (D) $[MT^{-1}]$

3. When forces acting upon a body and line of action passes through same point, the forces are said to be ......
   - (A) Couple
   - (B) Resistive forces
   - (C) Drag force
   - ● Concurrent forces

4. For which angle $|\vec{A} \cdot \vec{B}| = |\vec{A} \times \vec{B}|$
   - (A) 30°
   - ● 45°
   - (C) 60°
   - (D) 90°

5. A projectile will have same range for the pair of angles ....
   - ● 50°, 40°
   - (B) 45°, 55°
   - (C) 30°, 90°
   - (D) 90°, 10°

6. Work done in conservative field is independent of ....
   - (A) Mass
   - (B) Time
   - (C) Energy
   - ● Path followed

7. Expression for escape velocity is ....
   - (A) $2gR^2$
   - ● $\sqrt{2gR}$
   - (C) $\frac{gR^2}{2}$
   - (D) $2gR$

8. GPS is a system of .... satellites.
   - ● 24
   - (B) 3
   - (C) 23
   - (D) 4

9. The moment of inertia for sphere is ....
   - (A) MR^2
   - (B) $\frac{1}{2}MR^2$
   - ● $\frac{2}{5}MR^2$
   - (D) $\frac{1}{2}M^2R$

10. Deep water flows .... in comparison to shallow water.
    - ● Fastly
    - (B) Slowly
    - (C) Equally
    - (D) Normally

11. .... shows state of motion of a wave.
    - ● Phase
    - (B) S.H.M
    - (C) Resonance
    - (D) Frequency

12. To make the frequency of oscillator double, we have to ....
    - ● Reduce mass to $\frac{1}{4}$
    - (B) Quadruple the mass
    - (C) Double the mass
    - (D) Half the mass

13. Increase in the speed of sound for each degree rise above 0 °C is ....
    - (A) 0.61cm/sec
    - (B) 0.61 km/sec
    - (C) 0.61 mm/sec
    - ● 0.61 m/sec

14. There is no net transfer of energy by the particles of medium in ....
    - (A) Longitudinal wave
    - (B) Transverse wave
    - (C) Progressive wave
    - ● Stationary waves

15. Coloured fringes in soap bubbles are observed due to ....
    - (A) Diffraction
    - ● Interference
    - (C) Polarization
    - (D) Reflection

16. Triple point of water is ....
    - (A) 273.16 °C
    - (B) 372.16 K
    - (C) 273.16 °F
    - ● 273.16 K

17. Closest orbiting satellite orbits the earth at a height of about ....
    - (A) 300 km
    - ● 400 km
    - (C) 500 km
    - (D) 600 km

18. Measure of disorder of a system is ....
    - (A) Heat
    - ● Entropy
    - (C) Temperature
    - (D) None of these

Total Time: 2:40 Hours

PHYSICS (Part-I)
(Fresh/New Course)

Total Marks: 67

"Section-B"

Marks: 40

Q. 2. Write short answers of any TEN (10) of the following parts. Each part carries equal marks.

(i) How temperature effects speed of sound?

(ii) How resonance help in cooking food?

(iii) Why car has oblong shape?

(iv) A ball just supported by string at rest, breaks if it is set swinging. Why?

(v) When disc and hoop rolls down on an inclined plane, which will reach bottom first and why?

(vi) Explain conservative and non-conservative fields with examples.

(vii) What is the relation of Newton's 2nd law and linear momentum?

(viii) Explain why buses and heavy trucks have large steering wheels?

(ix) Prove that $T = 2\pi\sqrt{\dfrac{l}{g}}$ is dimensionally consistent.

(x) Differentiate between year and light year.

(xi) What is escape velocity? Explain.

(xii) Differentiate between real and apparent weight?

(xiii) How vectors can be added by rectangular components?

"Section-C"

Marks: 27

Note: Answer any THREE (3) questions. Each question carries equal marks.

Q. 3. (a) What is Bernoulli's equation? Explain with three applications.

(b) Eight equal drops of oil are falling through air with a steady velocity of 0.1 m/sec. If the drops recombine to form a single drop what should be the new terminal velocity?

Q. 4. (a) Explain first law of thermodynamics with applications.

(b) A reversible engine works between two temperatures whose difference is 100 °C. If it absorbs 746J of heat from the source and rejects 546J to the sink. Calculate temperature of source and the sink.

Q. 5. (a) Explain Young's double slits experiment.

(b) A spring, whose spring constant is 80.0 N/m^{-1} vertically supports a mass of 1.0 kg is at rest. Find distance by which the mass must be pulled down so that on being released, it may pass the mean position with velocity of one meter per second.

Q. 6. Write note on any TWO (2) of the following:

(a) Fraunhofer Diffraction.

(b) Laplace's Correction.

(c) Continuity Equation.