Note: You have four choices for each objective type question as A, B, C and D. The choice which
        you think is correct, fill that circle in front of that question number. Use marker or pen to fill the
        circles. Cutting or filling two or more circles will result in zero mark in that question.

1- 1. Which of the following is a pseudo solid?
        (A) CaF_2 (B)   Glass   (C) $NaCl$ (D) $AgNO_3$

    2. When water freezes at $0°C$, its density decreases due to:
        (A)   cubic structure of ice   (B)   change of bond length
        (C)   empty spaces present in the structure of ice   (D)   change of bond angles

    3. The molar volume of CO_2 is maximum at:
        (A)   STP   (B) $127°C$ and 1 atm   (C) $0°C$ and 2 atm   (D) $273°C$ and 2 atm

    4. Pressure remaining constant, at which temperature the volume of the gas will become twice of
       what it is at $0°C$:
        (A) $546°C$ (B) $200°C$ (C) $546k$ (D) $273k$

    5. Solvent extraction is an equilibrium process and it is controlled by:
        (A)   law of mass action   (B)   the amount of solvent used
        (C)   distribution law   (D)   the amount of solute

    6. The volume occupied by 1.4 g of N_2 at S.T.P is :
        (A) $2.24dm^3$ (B) $22.4dm^3$ (C) $1.12dm^3$ (D) $112dm^3$

    7. The mass of one mole of electrons is:
        (A)   1.008 mg   (B)   0.55 mg   (C)   0.184 mg   (D)   1.673 mg

    8. If the rate equation of a reaction $2 A+B \rightarrow$ products is, rate $= k[A]^2[B]$, and A is present in large excess,
       then order of reaction is :
        (A)   1   (B)   2   (C)   3   (D)   4

    9. The cathodic reaction in the electrolysis of dil. H_2SO_4 with Pt electrode is :
        (A)   reduction (B) oxidation (C)   both oxidation and reduction (D)   neither oxidation nor reduction

    10. The molal boiling point constant is the ratio of the elevation in boiling point to :-
        (A)   molarity   (B)   molality   (C)   mole fraction of solvent   (D)   mole fraction of solute

    11. Molarity of pure water is :
        (A)   1   (B)   18   (C)   55.5   (D)   6

    12. An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by
        filtration. What are the main ions in the filtrate?
        (A) Ag^+ and NO_3^- only (B) Ag^+ and Ba^{2+} and NO_3^- (C) Ba^{2+} and NO_3^- only (D) Ba^{2+} and NO_3^- and Cl^-

    13. For a given process the heat changes at constant pressure (q_p) and at constant volume (q_v) are
        related to each other as:
        (A) $q_p = q_v$ (B) $q_p < q_v$ (C) $q_p > q_v$ (D) $q_p = \dfrac{q_v}{2}$

    14. Which of the following species has unpaired electrons in antibonding molecular orbitals?
        (A) O_2^{2+} (B) N_2^{2-} (C) B_2 (D) F_2

    15. Which of the following molecules has zero dipole moment?
        (A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

    16. Splitting of spectral lines when atoms are subjected to strong electric field is called:
        (A)   zeeman effect   (B)   stark effect   (C)   photoelectric effect   (D)   Compton effect

    17. When 6d orbital is complete, the entering electron goes into:
        (A)   7f   (B)   7s   (C)   7p   (D)   7d

Physics (New Scheme)

Paper : I

SUBJECTIVE

Note:- Section I is compulsory. Attempt any 3 questions from Section II.

(Section – I)

2. **Write short answers to any Eight parts.** (8 x 2 = 16)

 i. Give the drawbacks to use the period of simple pendulum as time standards.

 ii. How the digit 5 , if insignificant, will be rounded off?

 iii. Define the terms (i) Unit Vector (ii) Position Vector and write their mathematical expressions.

 iv. Is it possible to add a vector quantity to a scalar quantity? Explain.

 v. How would the two vectors of the same magnitude have to be oriented, if they were to be combined to give the resultant equal to a vector of the same magnitude?

 vi. Calculate the work done in kilo joules in lifting a mass of 10 kg (at a steady velocity) through vertical height of 10 m?

 vii. What sort of energy is in the following ?

   (a) compressed spring (b) a moving car

 viii. A person is standing near a fast moving train. Is there any danger that he will fall towards it?

 ix. In an orbiting space station, would the blood pressure in major arteries in the legs ever be greater than the blood pressure in major arteries in the neck?

 x. What is meant by phase angle? Does it define the angle between maximum displacement and the driving force?

 xi. Differentiate between Resonance and Damping .

 xii. Under what conditions does the addition of two simple harmonic motions produce a resultant, which is also simple harmonic?

3. **Write short answers to any Eight parts.** (8 x 2 = 16)

 i. State Law of Conservation of Momentum. What is its limitation?

 ii. Explain the circumstances in which the velocity $\vec{v}$ and acceleration $\vec{a}$ are parallel and anti parallel.

 iii. If angle of projection of a projectile is 90°. Find its range.

 iv. How can acceleration be found by velocity- time graph?

 v. What is meant by weightlessness?

 vi. Prove that orbital angular momentum depends upon the radius of the orbit.

 vii. What is meant by moment of inertia? Explain its significance.

 viii. Derive relation $S = r\theta$.

 ix. What do you know about radar speed trap?

 x. What are the quantities which affect the frequency of standing waves along a string?

 xi. What are the conditions for points which are in phase and out of phase?

 xii. As we know PV^γ = Constant. What do you know about γ in this relation?

(Turn over)