1122  Warning:- Please write your Roll No. in the space provided and sign.  Roll No------------
( Inter Part – I )        (Session 2018-20 to 2021-23)         Sig. of Student  ------------
Physics   (Objective)                              ( Group I )  ऽ૬ঐ-૭িঽઽ  Paper (I)
Time Allowed:- 20 minutes        **PAPER CODE 2471**              Maximum Marks:- 17

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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) SI system is built up by how many kinds of units.
   (A) Six                 (B) Five               (C) Four               (D) Three

2) The dimension of power is
   (A) $[MLT^{-1}]$         (B) $[ML^2T^{-3}]$      (C) $[ML^2T^{-1}]$      (D) $[MLT^{-2}]$

3) If $\vec{A} = 2\hat{i} - \hat{j} + 3\hat{k}$ then magnitude of $\vec{A}$ is
   (A) 4                   (B) 14                 (C) $\sqrt{14}$         (D) 6

4) If $A_x = A_y$ the angle between $\vec{A}$ and x-axis is
   (A) $30°$               (B) $45°$              (C) $60°$              (D) $90°$

5) When an object is moving towards earth the value of g is taken as
   (A) Positive            (B) Negative           (C) Zero               (D) Variable

6) A same force is applied on different masses $m_1$ and $m_2$ moving with accelrations $a_1$ and $a_2$ identify the correct relation.
   (A) $\dfrac{m_1}{m_2} = \dfrac{a_1}{a_2}$    (B) $\dfrac{m_2}{m_1} = \dfrac{a_2}{a_1}$    (C) $\dfrac{m_1}{m_2} = \dfrac{a_2}{a_1}$    (D) $m_1 a_2 = m_2 a_1$

7) Power is also defined as dot product of
   (A) $\vec{F} \cdot \vec{m}$    (B) $\vec{F} \cdot \vec{d}$    (C) $\vec{F} \cdot \vec{v}$    (D) $\vec{F} \cdot \vec{t}$

8) Magnitude of centripetal force on a mass m moving with angular speed $\omega$ in a circle of radius r is
   (A) $mr^2\omega$        (B) $\dfrac{mw^2}{r}$   (C) $mr\omega^2$        (D) $mr^2\omega^2$

9) Accelration of a free falling body is
   (A) $+ 9.8$ m/s$^2$     (B) zero               (C) $- 9.8$ m/s$^2$     (D) $19.6$ m/s$^2$

10) The product of crossectional area of pipe and fluid speed along a pipe always
   (A) Zero                (B) Variable           (C) Constant           (D) $9.8$ ms$^{-2}$

11) One complete round trip of vibrating body is called
   (A) Time period    (B) Frequency           (C) Vibration          (D) Amplitude

12) The velocity of sound is maximum in
   (A) Air                 (B) Nitrogen           (C) Metal              (D) Glass

13) Number of nodes between two consective antinodes is
   (A) Zero                (B) 3                  (C) 2                  (D) 1

14) Newton rings are formed due to
   (A) Diffraction         (B) Refraction         (C) Reflection         (D) Interference

15) How many types of optical fibre are in use
   (A) One                 (B) Two                (C) Three              (D) Four

16) For one mole of The gas equation becomes.
   (A) $PV = nRT$          (B) $PV = 3RT$         (C) $PV = mRT$         (D) $PV = RT$

17) Highest efficiency of heat engine whose lower temperature is 17 °C and higher temperature is 200 °C is
   (A) 70 %                (B) 100 %              (C) 38 %               (D) 35 %

**Physics** (Subjective) **Group (I)** (Session 2018-20 to 2021-23) (Inter Part - I) **Paper (I)**

Time Allowed: 2.40 hours   Section ------------------ I       Maximum Marks: 68

**2.    Answer briefly any Eight parts from the followings:-**  SGO-GI-228 ×2 = 16
(i)    Give the drawbacks to use the period of a time standard.
(ii)   Does a dimensional analysis give any information on constant of proportionality that may appear in an algebraic expressions?
(iii)  Give any two conventions for indicating units.   **(iv)** What is scientific notation? Give example.
(v)    Motion with constant velocity is a special case of motion with acceleration. Is this statement true? Discuss.
(vi)   Can the velocity of an object reverse the direction when acceleration is constant ? If so, give an example.
(vii)  How would you elaborate the importance of head-rest of the car seat?
(viii) When a massive body collides with light stationary body then how would you predict the result?
(ix)   Is it possible to convert internal energy into mechanical energy? Explain with an example.
(x)    Why does the pressure of a gas in a car tyre increase when it is driven through some distance?
(xi)   How would you relate work with change in volume. Derive the relation.
(xii)  Energy can be added to a system when no heat transfer takes place. Is this statement true? Support your response with an example.

**3.    Answer briefly any Eight parts from the followings:-**       8 ×2 = 16
(i)    Is it possible to add a vector quantity to a scalar quantity? Explain.
(ii)   Two vectors have unequal magnitudes. Can their sum be zero? Explain.
(iii)  Show by diagram, The vector addition is commutative.
(iv)   A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved?
(v)    A person holds a bag of groceries while standing still, a car is stationary with its engine running. From the stand point of work, how are these situations similar?
(vi)   Differentiate between geyser and aquifer.
(vii)  Why does a diver change his body positions, before and after diving in the pool?
(viii) Prove that 1 radian = 57.3°   **(ix)** Write down applications of communication satellites.
(x)    How would you manage to get more orders of spectra using diffraction grating?
(xi)   Define thin film. Write its two examples.  **(xii)** What aspect of nature of light is proved by phenomena of polarization?

**4.    Answer briefly any Six parts from the followings:-**       6 ×2 = 12
(i)    How the swing is produce in a fast moving cricket ball?  **(ii)** Can we realize an ideal simple pendulum?
(iii)  Explain the term crest, trough, node and antinode.
(iv)   How are beats useful in tunning the musical instruments?
(v)    Why would it be advantageous to use blue light with compound microscope?
(vi)   Does frequency depends on amplitude for harmonic oscillators?
(vii)  What are damped oscillation?  **(viii)** Define electromagnetic waves. Write example.
(ix)   Define Snell's Law.

**Note: Attempt any three questions.**       Section ------------- II       (8 × 3 = 24)

5.  (a)  Define gravitational field prove that work done in the gravitational field is independent of path followed by the body.

    (b)  The line of action of a force $\vec{F}$ passes through a point P of a body whose position vector in meter is $\hat{i} - 2\hat{j} + \hat{k}$. If $\vec{F} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ $(N)$ determine the torque about the point 'A' Whose position vector is $2\hat{i} + \hat{j} + \hat{k}$ (in m)

6.  (a)  Why geostationary orbits are important? Derive relation and find radius of the geostationary orbit.

    (b)  A ball is thrown with a speed of 30 ms$^{-1}$ in the direction 30° above the horizon. Determine the horizontal range.

7.  (a)  State and derive "Bernoulli's Equation" of fluid dynamics.

    (b)  Find the temperature at which the velocity of sound in air is two times its velocity at 10 °C.

8.  (a)  Derive the relations for time period, displacement and velocity in horizontal mass spring system?

    (b)  In a double slit experiment, the second order maximum occurs at $\theta = 0.25°$. The wavelength is 650 nm. Determine the slit separation.

9.  (a)  Define molar specific heat capacity and show that $C_p - C_v = R$

    (b)  A Simple astronomical telescope in normal adjustment has an objective of focal length 100 cm and an eye-piece of focal length 5.0 cm. (i) Where is the final image formed? (ii) Calculate the angular magnification.