arning:- Please write your Roll No. in the space provided and sign. Roll No----------

(Inter Part – I) **(Session 2019-21 to 2022-24)** **Sig. of Student ----------**

ics (Objective) SGD-11-2-23 **(Group II)** **Paper (I)**

me Allowed:- 20 minutes **PAPER CODE 2474** **Maximum Marks:- 17**

ote:- 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) The shortest distance between two points is called
(A) speed (B) Velocity (C) Acceleration (D) Displacement

2) The efficiency of diesel engine is
(A) 80 % (B) 90 % to 100% (C) 35% to 40% (D) 15%

3) The diameter of milky way galaxy is.
(A) $10^0\ m$ (B) 10^{30} m (C) 10^{10} m (D) 10^{20} m

4) Steradian is the unit of
(A) Plane angle (B) Solid Angle (C) Time (D) Distance

5) The unit vector is expressed as
(A) $\hat{A} = |\vec{A}| \times \vec{A}$ (B) $\hat{A} = \vec{A} / |A|$ (C) $\hat{A} = \vec{A} \times |\vec{A}| \times \hat{A}$ (D) $\hat{A} = A \times \vec{A}$

6) Turning effect of force is called.
(A) Momentum (B) Acceleration (C) Torque (D) Velocity

7) The rate of change of momentum is called.
(A) Force (B) Torque (C) Time (D) Impulse

8) The increase in entropy means
(A) disintegration of energy (B) degradation of energy (C) degradation of mass (D) disintegration of mass

9) Biomass is a potential source of
(A) Energy (B) Non renewable energy (C) Renewable Energy (D) Power

10) One radian is equal to
(A) 5.73° (B) 0.73° (C) 57.3° (D) 2π

11) Moment of inertia of hoop
(A) $I = {}^1/_3\ mr^2$ (B) $I = mr^2$ (C) $I = {}^2/_3\ mr^2$ (D) $I = {}^2/_5\ mr^2$

12) The dolphins have
(A) streamlined bodies (B) Turbulent bodies (C) Unsteady bodies (D) Steady bodies

13) The SI units of spring constant are
(A) m^{-1} (B) Nm^{-1} (C) Nm^{-2} (D) Nm^2

14) The CRO is a device to display the input signal into
(A) Pulses (B) Wave form (C) Data form (D) blank form

15) The distance between the node and adjacent antinode is
(A) ${}^\lambda/_2$ (B) ${}^\lambda/_4$ (C) λ (D) ${}^\lambda/_3$

16) Michel son's interferometer was devised in
(A) 1864 (B) 1687 (C) 1881 (D) 1786

17) The light signals in optical fibres must be regenerated by a device called.
(A) Generators (B) Repeaters (C) Transmitter (D) Transistors

SGD-11-2-23

1123 **Warning:- Please, do not write anything on this question paper except your Roll No.**

Physics (Subjective) Group (II) (Session 2019-21 to 2022-24) Paper (I)

Time Allowed: 2.40 hours Section ---------- I (Inter Part - I) Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:- 8 × 2 = 16

(i) Why do we find it useful to have two units for the amount of substance, the kilogram and the mole?
(ii) Give the drawbacks to use the period of a pendulum as a time standard.
(iii) Show that the equation $v_f = v_i + at$ is dimensionally correct.
(iv) Given that V=(5.2±0.1) volt. Find its percentage uncertainty.
(v) If two perpendicular vectors have same magnitudes, Find the angle between their sum and difference.
(vi) Define **(a)** position vector and **(b)** unit vector.
(vii) Can a vector have a component greater than the vector's magnitude?
(viii) Explain the circumstances in which the velocity ' $\vec{v}$ 'and acceleration ' $\vec{a}$ ' of a car are. (a) antiparallel (b) $\vec{v}$ is zero but $\vec{a}$ *is not zero.*
(ix) Show that the range of projectile is maximum when projectile is thrown at an angle of 45^0 with the horizontal
(x) How impulse is related to linear momentum? (xi) Explain what do you understand by the term viscosity.
(xii) Prove that for angles of projection which exceed or fall short of 45^0 by equal amounts, the ranges are equal.

3. Answer briefly any Eight parts from the followings:- 8 × 2 = 16

(i) A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved.
(ii) What sort of energy is in the following (a) compressed spring (b) water in a high dam.
(iii) Prove that power is dot product of force and velocity.
(iv) State the direction of the following vectors in simple situations; angular momentum and angular velocity.
(v) when mud flies off the tyre of a moving bicycle, in what direction does it fly? Explain.
(vi) Define artificial gravity. Give its significance.
(vii) Of a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop.
(viii) Can we realize an ideal simple pendulum? Explain. **(ix)** Differentiate between free and forced oscillations?
(x) What features do longitudinal, waves have in common with transverse wave?
(xi) Why does sound travel faster in solids than in gases?
(xii) What is doppler's Effect? Explain briefly one of its application?

4. Answer briefly any Six parts from the followings:- 6 × 2 = 12

(i) Can visible light produce interference fringes? Explain.
(ii) How would you manage to get more orders of spectra using a diffracting grating?
(iii) What is the difference between interference and diffraction of light waves?
(iv) One can buy a cheap microscope for use by the children. The image seen in such a microscope has coloured edges. Why is this so?
(v) What is repeater? What it is necessary in optical fibre communication system.
(vi) A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?
(vii) Does entropy of a system increase or decrease due to friction?
(viii) what are isothermal and adiabatic processes? **(ix)** Define triple point of water, also write down its value.

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

5. **(a)** Define Absolute potential energy and derive a relation for it.
(b) The magnitude of dot and cross products of two vectors are $6\sqrt{3}$ and 6 respectively. Find the angle between the vectors.

6. **(a)** What is centripetal force? Work out an expression for centripetal force of an object of mass 'm' moving with constant speed 'v' in a circle of radius 'r'.
(b) A football is thrown upwards with an angle of 30^o with respect to the horizontal to throw a 40 m pass, What must be the initial speed of the ball?

7. **(a)** What is carnot engine. Explain its cycle and derive formula for efficiency.
(b) Water flows through a hose whose internal diameter is 1 cm at a speed of 1 ms^{-1}. What should be the diameter of the nozzle if the water is to emerge at 21 ms^{-1}.

8. **(a)** What is simple pendulum? Show that motion of pendulum is S.H.M. Also find relations for its time period and frequency.
(b) A stationary wave is established in a string which is 120 cm long and fixed at both ends. The string vibrates in four-segments, at a frequency of 120 Hz. Determine its wave length and the fundamental frequency.

9. **(a)** Explain the construction and working of a compound microscope. Drive expression for its magnification.
(b) In a double slit experiment the second order maximum occurs at $\theta = 0.25^o$. The wavelength is 650 nm. Determine the slit separation.

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