

(Section-A) Marks= (18) Time Allowed: 20 Minutes

All questions of this section must be answered on this page and handed over to the Superintendent within given time.

991234



Student Name

Name of Paper: PHYSICS (PH I)

Paper Date: 12 MAY-26

160

Paper Code: 71

Signature of Student

Paper Version

Sign and Seal of Suptd:

SEAL

A

B

C

سوالیات

ایں سے مطابق درست جواب نمبر کا دائرہ پر کریں۔

- Escape velocity for one rocket of mass 2000 kg is 11 km/s on earth's surface. The escape velocity for another rocket of mass 500kg will be a) 11/2 kms⁻¹, b) 11/4 kms⁻¹, c) 11 kms⁻¹ d) 22 kms⁻¹
- The centripetal force acting on a body in uniform circular motion at every point is a) parallel to its tangential velocity, b) perpendicular to its tangential velocity, c) along the axis of rotation, d) anti-parallel to tangential velocity
- When external torque acting on a system is zero, the quantity that must remain constant is: a) moment of inertia, b) linear velocity, c) linear momentum, d) angular momentum
- Moment of inertia of a spherical body of mass M and radius R depend on: a) mass of the sphere only b) radius of sphere only, c) both mass & radius of sphere, d) angular velocity
- Speed of an incompressible fluid is 2ms⁻¹ in a horizontal pipe of radius r. If radius of pipe is reduced to half, speed of fluid in it becomes: a) 4ms⁻¹, b) 8ms⁻¹, c) 16ms⁻¹, d) 32ms⁻¹
- The quantity that has maximum value at mean position in simple harmonic motion is a) kinetic energy b) potential energy, c) acceleration, d) instantaneous displacement
- The speed of transverse waves in an elastic string depends on: a) frequency of waves, b) wavelength of waves, c) tension in the string, d) time period of waves
- In Young double slit experiment, the fringe width will be minimum for the light of a) violet colour, b) red colour, c) green colour, d) yellow colour
- A gas absorbs 700J of heat such that its internal energy is increased by 400J. The work done by the gas is: a) 700J, b) 400J, c) 300J, d) 1100J
- The result of 82.29kg – 62.7kg to the correct number of significant figures in the following is: a) 19.59kg b) 19.5kg, c) 19.6kg, d) 20kg
- The horizontal and vertical components of a force are 12N and 5N respectively. Magnitude of this force is: a) 7N, b) 13N, c) 17N, d) 60N
- The resultant of two vectors of magnitudes 4 units and 3 units is 1 unit. The value of their dot product is: a) 12 units, b) – 12 units, c) 18 units, d) 5 units
- Example of vector product among following is: a) kinetic energy, b) work, c) torque, d) power
- If the slope of velocity-time graph is zero, the body is moving with: a) uniform velocity, b) uniform acceleration, c) variable velocity, d) variable acceleration
- Physical quantity that remains constant during projectile motion is: a) vertical component of velocity, b) horizontal component of velocity, c) vertical acceleration, d) kinetic energy
- If the maximum height of a projectile is 100m, the maximum range attained by projectile will be: a) 100m b) 200m, c) 400m, d) 800m
- A body is displaced on a rough surface by a force F. The work done by the normal force is: a) positive, b) negative, c) zero, d) infinite
- If W₁, W₂ and W₃ are the works done along three different paths of length 1m, 2m and 3m respectively between same end points in a gravitational field, the correct relation will be a) W₁ > W₂ > W₃, b) W₁ = W₂ = W₃, c) W₃ > W₂ > W₁, d) W₁ > W₃ > W₂

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{ If the Candidate is absent, The Superintendent Should fill this Circle } → ○

and pack the sheet with solved OMR sheets in roll number order

Time: 2 Hours 40 Minutes

SECTION-B

Marks: 40

NOTE: Attempt any ten of the following short questions. Each question carries 4 marks.

- Q 1 What are supplementary units? Define radian and prove that $1 \text{ rad} = 57.3^\circ$.
- Q 2 Show that the equation $K.E = \frac{1}{2}mv^2$ is correct using the principle of dimensional homogeneity.
- Q 3 Define vector product and give one example. State the right hand rule to determine the direction of resultant vector obtained from the vector product of two vectors.
- Q 4 Prove that the magnitude of a vector A in terms of its rectangular components is given by $A = \sqrt{A_x^2 + A_y^2}$.
- Q 5 Define work and write down its general formula. Give one example each of positive and negative works.
- Q 6 Does work done in a gravitational field depend on path followed by the body? Prove or disprove mathematically.
- Q 7 Differentiate between streamline (laminar) flow and turbulent flow. List two conditions for turbulent flow to occur.
- Q 8 State the equation of continuity. Write down its mathematical form. Water flows through a pipe that narrows from a larger diameter to a smaller diameter. How do the following change as water passes through narrower part of the pipe. (i) Speed of water (ii) Volume flow rate of water.
- Q 9 A sound wave travels through air with a speed of 330 m/s. If the wavelength of the sound wave is 0.5 m, calculate the: (i) Frequency of wave (ii) Time period of wave.
- Q 10 How beats are used in tuning the musical instruments?
- Q 11 Show that frequency of second harmonic in case of transverse stationary waves in a string of length L fixed between two points is v/L . (v = Speed of waves)
- Q 12 In Michelson interferometer, why is a bright fringe at a point replaced by a dark fringe when the mirror is moved through a distance of $\frac{\lambda}{4}$?
- Q 13 Give answer in four lines why can only transverse waves be polarized but not longitudinal waves.

SECTION-C

Marks: 27

NOTE: Attempt any three of the following questions. Each question carries 9 marks.

- Q 14 i What is isolated system? State and explain the law of conservation of linear momentum with the help of an example.
 ii Two objects of masses 4 kg and 6 kg are moving towards each other along the same line with speeds of 3 m/s & 2 m/s respectively. If they undergo perfectly elastic collision, determine their velocities after collision.
- Q 15 i What is geostationary satellite and why such satellites appear to be stationary as seen from the earth? Determine the radius of the circular orbit for geostationary satellites.
 ii Calculate the moment of inertia of a disc (solid cylinder) of mass 10 kg and radius 30 cm about an axis passing through its centre.
- Q 16 i A mass (m) attached to an elastic spring of spring constant (k) is oscillating with SHM. Derive the formula for the instantaneous K.E of such simple harmonic oscillator.
 ii A spider swings in the breeze from silk thread with a period of 0.6 s. How long is the spider's strand of silk?
- Q 17 i Explain the concept of entropy with the help of a suitable example. Show that all natural process tend to proceed towards a state of greater disorder.
 ii Why is $C_p > C_v$? Where C_p = specific heat capacity at constant pressure and C_v = specific heat capacity at constant volume.