Roll No.

Answer Sheet No._____

Sig. of Candidate._____

Sig. of Invigilator._____

PHYSICS HSSC–I

SECTION – A (Marks 17)

Time allowed: 25 Minutes

NOTE:- Section–A is compulsory and comprises pages 1–2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the **correct** option i.e. A / B / C / D. Each part carries one mark.

(i) In colour printing, the entire range of colours can be obtained by mixing_____

    A.   Seven colours   B.   Six colours

    C.   Five colours   D.   Four colours

(ii) Which of the following pairs has the same dimension?

    A.   Power, Speed
    B.   Force, Momentum
    C.   Work, Torque
    D.   Velocity, Acceleration

(iii) If $A_x = -1$ and $A_y = -1$ then the resultant vector lies with the $x-$axis at _____

    A.   45°   B.   180°

    C.   90°   D.   225°

(iv) Slope of the tangent at a point on velocity – time graph gives _____

    A.   Displacement   B.   Velocity

    C.   Acceleration   D.   Momentum

(v) Kilowatt – hour is the unit of _____

    A.   Power   B.   Work

    C.   Force   D.   Momentum

(vi) On a clear day at noon the intensity of solar energy reaching the earth's surface is about _____

    A. $1.4\,kW\,m^{-2}$ B. $1\,kW\,m^{-2}$

    C. $1.2\,kW\,m^{-2}$ D. $1.6\,kW\,m^{-2}$

(vii) How many satellites form the Global positioning system?

    A.   3   B.   9

    C.   12   D.   24

(viii) $1\,torr = $ _____ N/m^2.

    A.   760   B.   76

    C.   133.3   D.   780

(ix) S.I unit of coefficient of viscosity is _____

A. $\dfrac{N.Sec^{-1}}{m^2}$ B. $N.m^{-2}Sec^{-1}$

C. $\dfrac{N.Sec}{m^2}$ D. None of these

(x) The length of second pendulum will be _____

A. $2\,m$ B. $1.5\,m$

C. $1\,m$ D. $0.5\,m$

(xi) The length of a pipe is $10\,cm$ (where one end is closed and other is open). The maximum wavelength which can be produced is _____

A. $5\,cm$ B. $10\,cm$

C. $20\,cm$ D. $40\,cm$

(xii) For interference of light sources should be _____

A. Monochromatic   B. Coherent

C. Close to each other   D. All of these

(xiii) For normal adjustment, length of Galilean Telescope is _____

A. $f_0 + f_e$ B. $f_0 - f_e$

C. $f_0\,f_e$ D. $\dfrac{f_0}{f_e}$

(xiv) Human metabolism provides an example of _____

A. Mass conservation   B. Energy conservation

C. Momentum conservation   D. All of these

(xv) An adiabatic change is the one in which _____

A. No heat is added to or taken out of a system
B. No change of temperature takes place
C. Boyle's law is applicable
D. Pressure and volume remain constant

(xvi) The normal human ear is most sensitive in the frequency range is _____

A. $200 - 20000\,Hz$ B. $2000 - 4000\,Hz$

C. $1000 - 3000\,Hz$ D. $3000 - 5000\,Hz$

(xvii) When light enters glass from air its speed decreases. It is due to the change in its _____

A. Wavelength   B. Frequency

C. Both A and B   D. Intensity

For Examiner's use only:

Total Marks: 17

Marks Obtained:

—— 1H A-1008 (L) ——

PHYSICS HSSC–I

Time allowed: 2:35 Hours   Total Marks Sections B and C: 68

NOTE:- Sections 'B' and 'C' comprise pages 1–2 and questions therein are to be answered on the separately provided answer book. Answer any fourteen parts from Section 'B' and attempt any two questions from Section 'C'. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

Q. 2 **Attempt any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines.** (14 x 3 = 42)

(i) Under what circumstances would a vector have components that are equal in magnitude?

(ii) Show that the expression $v_f = v_i + at$ is dimensionally correct.

(iii) Explain the circumstances in which the velocity v and acceleration a of a car are:

  a. Parallel
  b. Anti-parallel
  c. Perpendicular to one another

(iv) What is Rotational K.E.? Find the rotational K.E. of sphere.

(v) Explain how the swing is produced in a fast moving cricket ball.

(vi) At what distance from the mean position of simple harmonic oscillator its K.E. will become half of its max-value?

(vii) Would you keep the amplitude of simple pendulum small or large? Why?

(viii) What are the conditions for constructive and destructive interference of sound waves?

(ix) What is thin film? Upon what factors does the interference in thin film depend?

(x) If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens.

(xi) Why the adiabatic curve is more steeper than isothermal curve?

(xii) The frequency of the note emitted by a stretched string is $300\,Hz$. What will be the frequency of this note when the length of wave is reduced by one-third without changing the tension?

(xiii) A block of mass $4\,kg$ is dropped from a height of $0.80\,m$ onto a spring of spring constant $k = 1960\,N/m$. Find the maximum distance through which the spring will be compressed.

(xiv) Water flows through a hose, whose internal diameter is $1cm$, at a speed of $1m/sec$. What should be the diameter of nozzle if the water is to emerge at $21m/sec$?

(xv) How large a force is required to accelerate an electron $\left(m=9.1\times10^{-31}\,kg\right)$ from rest to a speed of $2\times10^{7}\,m/sec$ through a distance of $5cm$?

(xvi) Find the angle of projection of a projectile for which its maximum height and horizontal range are equal.

(xvii) Describe why the sound produced by explosions going on in the sun can not be heard on the earth.

(xviii) Why does the flow of water from a tap decrease when someone opens another tap in the same building?

(xix) A ball of mass 'm' attached to string is whirled in a vertical circle. At what point on the circle the string are likely to break? Why?

SECTION – C (Marks 26)

Note:-   Attempt any TWO questions.   (2 x 13 = 26)

Q. 3   a.   Define and explain the Vector product. Give its four characteristics.   07

b.   The line of action of force $F=\hat{i}-2\hat{j}$ passes through a point whose position vector is $\left(-\hat{j}+\hat{k}\right)$. Find the moment of $\bar{F}$ about the point of which the position vector is $\hat{i}+\hat{k}$.   04

c.   Can a body rotate about its centre of gravity under the action of its weight?   02

Q. 4   a.   What is meant by Geostationary orbit? Derive its orbital radius.   07

b.   Calculate the angular momentum of a star of mass $2\times10^{30}\,kg$ and radius $7\times10^{5}\,km$. If it makes one complete rotation about its axis once in 20 days.   04

c.   What is meant by moment of inertia? Explain its significance.   02

Q. 5   a.   Describe the construction, working and magnifying power of compound microscope.   07

b.   An astronomical telescope having magnifying power of 5 consists of two thin lenses $24cm$ apart. Find the focal length of the lenses.   04

c.   How is the power lost in optical fiber through dispersion? Explain.   02

—— 1H A-1008 (L) ——