



DO NOT WRITE ANYTHING HERE

- vii. Which feature of graph allows acceleration to be determined?
- A. Area under displacement time graph
  - B. Area under velocity time graph
  - C. Slope of displacement time graph
  - D. Slope of velocity time graph
  - E.
- viii. Which statement is true for projectile when it is at highest point of its path
- A. Horizontal component of acceleration is zero
  - B. Horizontal component of velocity is zero
  - C. Kinetic energy of projectile is zero
  - D. Momentum of projectile is zero
  - E. Potential energy of projectile is zero
- ix. A ball of mass 2 kg travelling at 8 m/s strikes a ball of mass 4 kg travelling at 2 m/s. After collision both balls move at the same velocity 'v'. What is magnitude of velocity 'v'?
- A. 4 m/s
  - B. 5 m/s
  - C. 6 m/s
  - D. 7 m/s
  - E. 8 m/s
- x. To travel at constant speed, 9 car engines provide 24 KW power. The force on the car is 600 N. At what speed does it travel?
- A. 2.5 m/s
  - B. 4 m/s
  - C. 25 m/s
  - D. 6 m/s
  - E. 40 m/s
- xi. The rotational and translational K.E of a hoop are related by
- A.  $K.E_{rot} = K.E_{trans}$
  - B.  $K.E_{rot} = \frac{1}{2} K.E_{trans}$
  - C.  $K.E_{rot} = 2 K.E_{trans}$
  - D.  $K.E_{rot} = \frac{1}{4} K.E_{trans}$
  - E.  $K.E_{rot} = 4 K.E_{trans}$
- xii. An object travels at constant speed around a circle of radius 1.0 m in 1.0 s. What is the magnitude of its acceleration?
- A. 0
  - B.  $1.0 \text{ m/s}^2$
  - C.  $2\pi \text{ m/s}^2$
  - D.  $4\pi^2 \text{ m/s}^2$
  - E.  $2 \text{ m/s}^2$
- xiii. A point mass moves through a circular arc of length 'l' and radius 'r' in time 't'. The angular velocity about centre is given by
- A.  $l/rt$
  - B.  $r/lt$
  - C.  $2\pi/lt$
  - D.  $2\pi r/t$
  - E.  $2\pi/rt$



- xxii. Sound in air exhibits all other properties of waves except  
 A. Reflection B. Diffraction  
 C. Refraction D. Polarization  
 E. Interference
- xxiii. Where, in a stationary wave, do the vibrations of medium occur?  
 A. Only at nodes B. At all points between the nodes  
 C. Only at antinodes D. At all points between antinodes  
 E. At all points
- xxiv. Distance between an object and its real image formed by a convex lens cannot be  
 A. Greater than  $2f$  B. Less than  $2f$   
 C. Greater than  $f$  D. Less than  $4f$   
 E. Equal to  $4f$
- xxv. The least distance of distinct vision is 25 cm. Focal length of a convex lens is 5 cm. It can act as a simple microscope of magnifying power  
 A. 4 B. 5  
 C. 6 D. 7  
 E. 8
- xxvi. If the top half of a convex lens is covered with black paper  
 A. The bottom half of image will disappear  
 B. The top half of image will disappear  
 C. The magnification will be reduced to half  
 D. The intensity will be reduced to half  
 E. No change in the image
- xxvii. Which one of the following phenomenon is used in optical fibers  
 A. Scattering B. Successive reflection  
 C. Refraction D. Total internal reflection  
 E. Polarization
- xxviii. Image formed by compound microscope is:  
 A. Real, inverted and enlarged B. Virtual, inverted and enlarged  
 C. Real, erect and enlarged D. Virtual, erect and enlarged  
 E. Real, erect and diminished
- xxix. The cross product of vector A with itself has magnitude  
 A. A B. Zero  
 C.  $2A$  D.  $3A$   
 E.  $4A$
- xxx. For molar heat capacities  $C_v$  and  $C_p$   
 A.  $C_v = C_p$  B.  $C_v < C_p$   
 C.  $C_v > C_p$  D.  $C_v C_p = 1$   
 E.  $C_v C_p = 0$

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Q. No.1: Total Marks:

17

Marks Obtained:



Federal Board HSSC-I Examination  
Physics Model Question Paper

Time allowed: 2.30 hours

Total Marks: 68

Note: Sections 'B' 'C' and 'D' comprise pages 1-2 and questions therein are to be answered on the separately provided Answer Book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

**SECTION – B (Marks 21)**

(Chapters 1 to 6)

- Q.2 Attempt any SEVEN parts. All parts carry equal marks. (7 × 3 = 21)
- How can we find the total uncertainty in 'g' where the time period is  $T = 2\pi \sqrt{l/g}$ ?
  - Find the value of  $(\mathbf{A} \times \mathbf{B})^2 + (\mathbf{A} \cdot \mathbf{B})^2$ .
  - Prove that the magnitude of cross product of  $\mathbf{A}$  and  $\mathbf{B}$  is the area of parallelogram having consecutive sides  $\mathbf{A}$  and  $\mathbf{B}$ .
  - Draw displacement-time graph for cases when (a) velocity is constant, (b) velocity is uniformly increasing (c) velocity is variable.
  - A bullet of mass  $m$  is fired with velocity  $v$  from a gun of  $M$ , on which factors the recoil of gun shall depend?
  - Prove that for angles of projection, which exceed or fall short of  $45^\circ$  by equal amounts, the ranges are equals.
  - Define absolute potential energy. Which mass is closer to earth, one having potential energy -100 J or one with potential energy -10 J?
  - Which bullet shall be used to knock down a bear, rubber or lead?
  - Define the orbital velocity of a satellite. Also obtain its expression.
  - Differentiate between laminar and turbulent flow. Also define AN ideal fluid.

**SECTION – C (Marks 21)**

(Chapters 7 to 11)

- Q.3 Attempt any SEVEN parts. All parts carry equal marks. (7 × 3 = 21)
- Can we realize an ideal simple pendulum?
  - What is meant by phase angle, does it define the angle between maximum displacement and the driving force?
  - Define the terms interference, beats and stationary waves.
  - Is it possible for two identical waves, travelling in the same direction along a string, to give rise to stationary waves?
  - For which purposes the Michelson's interferometer is used?
  - What is meant by optical rotation? Explain briefly .
  - An thin oil film spread over a wet foot path shows colours? Explain how?
  - Why would it be advantageous to use blue light with a compound microscope?
  - Prove that flow of heat  $Q$  from a hot to cold body increases entropy of the system.
  - Would an Air Conditioner, placed on a table in a room, cool it?

## SECTION – D (Marks 26)

**Note:** Attempt any **TWO** questions. All questions carry equal marks. (2 × 13 = 26)

- Q.4
- Describe base units, supplementary units and derived units with the help of examples. (6)
  - How would the vectors of same magnitude have to be oriented, if they were to be combined to give the resultant equal to a vector of the same magnitude? (4)
  - Can a body rotate about its centre of gravity under the action of its weight? (3)
- Q.5
- Define projectile motion. Find a relation for
    - Maximum height attained by it and
    - its time of flight.(6)
  - A 1000kg automobile at the top of an incline plane 10 meter high and 100 m long is released and rolls down the hill. What is the speed at the bottom of the incline if the average retarding force on it due to friction is 480 N. (4)
  - Differentiate between Newton's and Einstein's views on gravitation. (3)
- Q.6
- What was Newton's formula for speed of sound? Calculate the velocity of sound using it. How was it corrected by Laplace? (6)
  - A monochromatic light of wavelength 588nm is allowed to fall on half-silvered glass plate  $G_1$  in the Michelson's interferometer. If  $M_1$  is moved through 0.233mm, how many fringes will be observed to shift? (4)
  - Draw ray-diagram for working of a compound microscope. Also calculate expression for its magnification? (3)
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