

# Higher Secondary Examination 2012

## Physics

Max Marks 60

Time 2.15 hrs

HSE 1

1. a). The dimensions of impulse are same as that of  
(a)Force (b)Pressure (c)Velocity (d)Strain (e)Momentum

(1/2)

- b) The force acting on a body is denoted by  $F=at+bt^2$  where  $t$  is time. The dimensions of  $a$  and  $b$  are respectively

(a)  $MLT^{-2}$  &  $MLT$  (b)  $ML^2T$  &  $MLT^2$  (c)  $ML^2T^{-3}$  &  $ML$  (d)  $MLT^{-3}$  &  $ML$

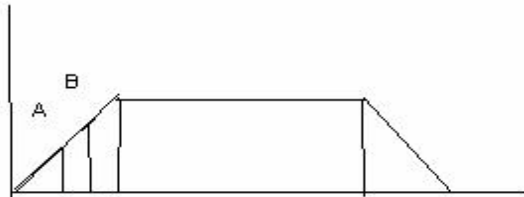
$1\frac{1}{2}$

- c) The time period of oscillation of a simple pendulum is recorded in an experiment as 2.71S, 2.56S, 2.64S, 2.46S & 2.69S respectively.

- Find 1) Mean Period  
2) Absolute Error  
3) Percentage error

$\frac{1}{2}+1 \frac{1}{2}+3=5$

2. The graph shows the velocity –Time Graph of a moving body in 1-D motion.



- a) What do you mean by 1-D motion.  
b) Obtain a general relation between initial velocity and final velocity in the region AB of the above graph.

- c) Draw the corresponding a-t graph of the above motion.

1+1+1=3

3. a) Pick out the two scalar quantities in the following lists.

Force, angular momentum, work, current, linear momentum, electric field, velocity, magnetic moment

- b) The position of the particle is given by  $r= 3ti-2t^2j+4k$  where  $t$  is in second

i) Find  $v$  &  $a$  of the particle

ii) Give the magnitude & direction of velocity of the particle at  $t=2$  s

1+3+1=5

4. Four person sitting in the back seat of a car at rest, is pushing on the front seat. a) Does the car move. Why.  
 b) State the law which help you to answer the above question.  
 c) Give the significance of the law.  
 d) Long jumpers take a long run before a jump. Why. 1+1 1/2+1 1/2+1=5

5. A Circular track of radius 400m is kept with outer side of track raised to make 5° with horizontal (Coeff. Of friction=0.2)

- a) Name such track  
 b) What is the optimum speed to avoid wear and tear of the tyre.  
 c) What is the maximum permissible speed to avoid skidding 1/2+1 1/2+1=3

6. a) Match the following.

Process	Collision	Physical quantity conserved
Collision of two balls	Elastic	KE ,TE & momentum
		Ke & Momentum
Collision of two molecules	Inelastic	TE & Momentum

- b) Obtain expression for velocities of two bodies after elastic collision  
 c) A Body moving towards a finite body at rest collides with it. It is possible that
1. Both the bodies move after collision.
  2. Both come to rest
  3. the stationary remains so and the moving body changes its velocity
  4. None of these.

$$2+3+1=6$$

7. There is a story in Greek mythology, a stone thrown upward by the Hero Hercules never comes back.

- a) What happens to the stone  
 b) Derive an expression for such a situation  
 c) A space craft consumes more fuel in going from the earth to the Moon than it takes for a returnship. Comment. 1+2+1=4

8. Match the following

Displacement	Torque	Iw
Force	Moment of inertia	@
Linear momentum	Angle	I α

mass	Angular momentum	I
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9. When a longitudinal tension is given to a steel wire, it is elongated.

a) Name the law that gives the relation between applied force and elongation of steel wire.

b) State the law

c) Find out the load to be suspended at the end of a Brass wire at length 18m to stretch it through 1 mm.

The diameter of the wire is 0.2m.  $Y=90 \text{ GPa}$ .  $1+2+1=4$

10. "Surface Energy is numerically equal to surface tension"

a) Define surface tension

b) Establish the relation between the surface energy and Surface tension

c) Small drops of a liquid are spherical while largedrops are elliptical .Explain

d) Water drop placed on a lotus leaf is spherical while the same drop spread on a plastic plate. Justify.

$1+2+2+1=6$

11. Heat from sun reaches earth through vacuum.

a) Name the mode of heat transfer in this case.

b) Which mode of heat transfer is used in metals to transfer heat.

c) In cold countries, aquatic animals are protected if ice is formed on the surface of river. Explain.

$\frac{1}{2}+1/2+1= 2$

12. Vertical oscillation of loaded spring in water die out rapidly. a) Name the type of Oscillation here.

b) How can you maintain the oscillation of loaded spring in water.

c) A Girl swings in sitting position on a swing. How will the period of the swing be effected if she stands up.

$\frac{1}{2} +1/2+2=3$

13. A Girl tries to find the frequency of a tuning fork using Sonometer apparatus. a) What is the nature of wave produced in a sonometer.

b) Explain why the paper rider thrown away at a particular resonating length.

c) Explin how the girl finds the unknown frequency.

$1+2+2=5$

14. When a gas is contained in a close vessel , it exerts pressure on the walls of the vessel.

a) It can be explained on the basis of i) Einstein's theory of relativity ii) Newton's laws of motion iii) Kinetic theory of gases iv) Bernoulli's theorem.

b) Arrive at an expression for the pressure exerted by a gas on the walls of the vessel c) How the pressure of a gas relates with the mass of its molecules.

$1+3+1=5$





