

**MBS INTERNATIONAL SCHOOL  
SECTOR-11, DWARKA  
PRACTICE-PAPER  
SESSION- 2019-20  
PHYSICS  
CLASS-XI**

**Time: 1 <sup>1</sup>/<sub>2</sub> Hours**

**Maximum Marks : 35**

**General Instructions:**

- (a) All questions are compulsory.
- (b) There are 37 questions in total. Questions 1 to 20 carry one mark each, questions 21 to 27 carry two marks each, questions 28 to 34 carry three marks each, and questions 35 to 37 carry five marks each.
- (c) There is no overall choice. However, an internal choice has been provided in two questions of two marks, two questions of three marks and all three questions of five marks each. You have to attempt only one of the given choices in such questions.
- (d) Use of calculator is not permitted.
- (e) You may use the following physical constants wherever necessary.  
 $e = 1.6 \times 10^{-19} \text{ C}$   
 $c = 3 \times 10^8 \text{ m/s}$   
 $h = 6.6 \times 10^{-34} \text{ JS}$

**SECTION-A**

- 1** A fermi is: **1**
  - A.  $10^9 \text{ s}$
  - B.  $10^{-9} \text{ s}$
  - C.  $10^{-15} \text{ s}$
  - D.  $10^{-10} \text{ s}$
  
- 2** The position  $y$  of a particle moving along the  $y$  axis depends on the time  $t$  according to the equation  $y = at - bt^2$ . The dimensions of the quantities  $a$  and  $b$  are respectively: **1**
  - A.  $L^2/T, L^3/T^2$
  - B.  $L/T^2, L^2/T$
  - C.  $L/T, L/T^2$
  - D.  $L^3/T, T^2/L$
  
- 3** A car travels east at constant velocity. The net force on the car is: **1**
  - A. east
  - B. west
  - C. up
  - D. zero

## SECTION-B

- 4 If the errors involved in the measurements of a side and mass of a cube are 8% and 10% respectively, what is the maximum permissible error in the density of the material? 2
- 5 Derive Newton' s law of cooling 2
- OR
- Why do passengers fall in forward direction when a bus suddenly stops moving from the rest position?
- 6 Derive fourth equation of motion using calculus. 2
- 7 Define transverse wave with relation. 2
- 8 Define unit vector. Determine a unit vector perpendicular to both  $A = 4i + 2j + 3k$  and  $B = 2i + 3j + 2k$ . 2

## SECTION C

- 9 Derive the relation of terminal velocity. 3
- 10 What is the acceleration of the block and the trolley system, if the coefficient of kinetic friction between the trolley and the surface is 0.04? What is the tension in the string? Neglect the mass of string. ( take  $g = 10 \text{ m/s}^2$  ) 3
- OR
- Define Perfectly Black Body and Kirchhoff' s law with relation.
- 11 Define the term work. Name and define SI unit of work. Give the sign of the work done by the force in the following case with explanation. (i) Work done by gravitational force in lifting a bucket out of a well by means of a rope tied to the bucket. 3  
(ii) Work done by an applied force on a body moving on a rough horizontal plane with uniform velocity.
- 12 On a certain day, rain was falling vertically with a speed of 35m/s. A wind started blowing after some time with a speed of 12m/s in east to west direction. In which direction should a boy waiting at a bus stop hold his umbrella? 3

## SECTION-D

- 13 Derive the relation of Work done by an isothermal and adiabatic system 5
- OR
- Derive Newton' s formula for velocity of sound and Laplace correction
- 14 (a) Define elastic and inelastic collision. 5  
(b) Show that in case of one dimensional elastic collision of two bodies, the relative velocity of separation after the collision is equal to the relative velocity of approach before the collision.

## OR

Derive Bernoulli Principle with relation

