

**INTERNATIONAL INDIAN SCHOOL – DAMMAM**  
**FIRST TERMINAL EXAMINATION 2013**

**Subject – Physics**

**Class - XI**

**SET- A**

**Time:3 hours**

**Max Mark:70**

**General Instructions :**

- a) All questions are compulsory.
- b) There is no over all choice .However an internal choice has been provided in one question of two marks,one question of three marks,all three questions of five marks
- c) Question no 1 to 5 are very short answer type questions carrying 1 mark each.
- d) Question no 6 to 10 are short answer type questions carrying 2 marks each.
- e) Question no 11 to 22 are short answer type questions carrying 3 marks each.
- f) Question no 23 is a value based question carrying 4 mark
- g) Question no 24 to 26 are long answer type questions carrying 5 marks each.
- h) Use of calculator is not permitted.However you may use log table if necessary.

- 1 What is the angle of friction between two surfaces in contact if the coefficient of friction is 1?
- 2 What are the horizontal and vertical component of acceleration of a body thrown horizontally with uniform speed?
- 3 Name a scalar and vector quantity which have same dimension.
- 4 What is the acceleration of a body when its velocity time graph is (a)perpendicular to time axis(b)parallel to time axis.
- 5 Sand is thrown on the tracks covered with snow.Why?
- 6 Explain the relation between physics ,technology and society.
- 7 With the help of a vector diagram show that  $A+(B+C)=(A+B)+C$ .
- 8 What is impulse?Show that impulse = change in momentum.

**OR**

Derive the expression for maximum safe velocity of a car moving on a level road.

- 9 A cricketer can throw a ball to a maximum horizontal distance of 100m.How much high above the ground can the cricketer throw the same ball?

- 10 Draw distance time graph for positive acceleration and negative acceleration.
- 11 The escape velocity ( $V$ ) of a body depends on mass of the body( $m$ ), acceleration due to gravity( $g$ ) and radius of the earth. Derive the expression for escape velocity.
- 12 State parallelogram law of vector addition. Obtain the magnitude and direction of the resultant vector.

OR

What is resolution of a vector? Obtain the magnitude and direction of the resultant vector in terms of their rectangular components.

- 13 There are two angles of projection for which the horizontal range is same. Prove that the sum of maximum heights for these angles does not depend upon the angle of projection.
- 14 State law of conservation of momentum. Derive it from Newton's second law.
- 15 What is percentage error? A physical quantity  $x$  is calculated from  $x = ab^4/cd^{1/3}$ . Calculate the percentage error in  $x$ , when % error in measuring  $a, b, c$  and  $d$  are 2, 3, 2 and 1 respectively.
- 16 A cyclist is riding with a speed of 27 km/hr. As he approaches a circular turn on the road of radius 80 m, he applies brakes and reduces his speed at the constant rate of  $0.5 \text{ m/s}^2$ . What is the magnitude and acceleration of the net acceleration of the cyclist on the circular turn?
- 17 Why friction is called the necessary evil?
- 18 Convert an energy of one Joule into ergs.
- 19 Write the equations of motion of an object under free fall. Draw acceleration-time graph and distance-time graph for this motion.
- 20 A spring weighing machine inside a lift reads 50 kg when a man stands on it. What would happen to the scale reading if the lift is moving
  - a) upword with constant velocity 15 m/s
  - b) upword with constant acceleration  $5 \text{ m/s}^2$
  - c) downword with constant acceleration  $3 \text{ m/s}^2$
- 21 Derive Newton's 3<sup>rd</sup> law from 2<sup>nd</sup> law of motion.
- 22 A ball is allowed to fall from the top of a tower of 200 m high. At the same instant another ball is thrown vertically upwards from the bottom of the tower with a velocity of 40 m/s. When and where the two balls meet?
- 23 Sumesh found that the road to his school is very pathetic. Most of the time accidents occur on the road. He took this as an issue and discussed with his friends and teachers. They planned to reconstruct the road with the help of their society by raising the outer edge of the road a little above the inner edge. With a great effort they were able to do it and thus accidents were reduced.

a) What according to you, are the moral values displayed by Sumesh and his friends to solve the above problem?

b) A curve from this highway to the road forms an arc of radius 100m. If the road is 10m wide and the outer edge is 1m higher than the inner edge. For what speed is the road banked?

24 a) From velocity-time graph derive the equations

i)  $v = u + at$  ii)  $s = ut + \frac{1}{2}at^2$

b) The velocity-time graph of two objects A and B make angles of  $30^\circ$  and  $60^\circ$  with the time axis. Find the ratio of their accelerations.

OR

a) Define relative velocity of an object with respect to another object. Obtain the expression for relative position of two objects at any time  $t$  in terms of their velocities and position at time  $t=0$ , when motion takes place along a straight line.

b) If the displacement of a body is proportional to the square of time. State whether the body is moving with uniform velocity or uniform acceleration.

25 What do you mean by projectile. Show that the path followed by a projectile is a parabola. Also find the expression for time of flight and maximum height.

OR

Define uniform circular motion. Derive the expression for centripetal acceleration and show that acceleration is acting towards the centre of the circle. If both the speed of the body and radius of its circular path are doubled, what will happen to the centripetal acceleration?

26 a) Obtain an expression for the maximum speed with which a body can turn safely on a banked rough road. Draw the suitable diagram to show various forces acting on the body.

b) A block of mass 10kg is sliding on a surface inclined at an angle  $30^\circ$  with the horizontal. Calculate the acceleration of the block. The coefficient of kinetic friction between the block and the surface is 0.5.

OR

a) Define static friction. Why is friction called self-adjusting force. Draw the variation of applied force and frictional force.

b) A 10g bullet is shot from a 5kg gun with a velocity of 400m/s. What is the speed of recoil of the gun?