**JIYA LAL MITTAL DAV PUBLIC SCHOOL**

**GRADE – XI SA-I (SEPT, 2015)**

**SUBJECT – PHYSICS**

**TIME: 3hrs. M.M-70**

**General Instructions:**

1. **All questions are compulsory.**
2. **There are 26 questions in total.**
3. **Questions 1 to 5 are very short answer questions and carry 1 mark each.**
4. **Questions 6 to 10 carry 2 marks each.**
5. **Questions 11 to 22 carry 3 marks each.**
6. **Questions 23 is value based question and carry 4 marks.**
7. **Questions 24 to 26 carry 5 marks each.**
8. **Use of calculator is not permitted. However, you may use log tables if necessary.**

1. Give the dimensional formula for torque.
2. Expand LASER.
3. If a light body and a heavy body have some KE, then which one have greater momentum?
4. What is unit vector?
5. Define Impulse.
6. Assume that a bullet P is fired from a gun when angled of elevation is 30°. Another bullet Q is fired from the gun when angle of elevation is 60°. If vertical height attained in the second case is ‘X’ time the vertical height attained in first case. Find the value of X.
7. Find the workdone by the person if he slowly lifts a block of mass ‘m’ through a vertical height and then walks horizontally a distance ‘d’ while holding the block.
8. Find the force on an object when it is moving with uniform speed 5m/s from point A to B for 5 minutes.
9. What does area of velocity time graph give and what is slope of distance time graph give?
10. Friction is a necessary evil. Explain.
11. If $x=at^{2}+bt+c $, where x is displacement as a function of time, then give the dimensions of a, b and c.
12. Length and Breadth of a rectangular lamina are recorded as a=(15.12 ± 0.01)cm and b=(10.15 ± 0.01)cm. what is percentage error in its area?
13. Two forces acting in opposite direction have a resultant of 10N. If the act at right angle to each these resultant become 50N, find magnitude of each force.
14. State and explain newton’s second law of motion.
15. Discuss the Horse-Cart problem and find acceleration.
16. Find the expression for the distance covered by a body in nth second.
17. Show that mechanical energy remains conserved during freely fall.
18. The velocity of an object A due east is 4m/s and that of B is 3m/s due South. What is relative velocity of B with respect to A? Also find the direction.
19. A body of mass 2kg has got an initial speed 5m/s. A force acts on it for 4 seconds in the direction of motion. The force time graph is given. Calculate the impulse.
20. Three bodies are connected to each other with a string. The masses are m, 3m and 5m respectively. These bodies are being pulled with a horizontal force F on a frictionless horizontal surface. The tension T1 in the first string is 16N. Find the Tension T2.
21. A car travels a distance from P to Q at a speed of 40km/h and returns to P at a speed of 30km/h.
22. Calculate the average speed of Journey.
23. Find its average velocity.
24. Prove impulse momentum theorem.
25. An old woman crossing the road was holding a money purse. She was not able to walk. A pick pocket snatches away her purse. A school student of class X having seen this incident tries to help that old lady. He informs the police inspector who stands nearby. The Inspector collects the money purse from the pickpocket and hand it over to the old lady.
26. What values do you find in the school student?
27. Also the police inspector in a jeep is chasing the pickpocket on a straight road. The jeep is going at its maximum speed ‘v’. The pickpocket rides on the motorcycle of a waiting friend when the jeep is at a distance ‘d’ away and the motorcycle starts with a constant acceleration ‘a’. show that the pickpocket will be caught if
28. Find all the three equations of motion by graphical method. Or

Find all the three equations of motion by calculus method.

1. Show that the path followed by projectile is parabolic, when it is fired at angle Q with horizontal and also find:
2. Maximum height
3. Time of flight
4. Horizontal range

Or

 Show that the path followed by projectile is parabolic when fired at angle Q with vertical and also find:

1. Maximum height
2. Time of flight
3. Horizontal range
4. Show that the velocities of particles exchange after the collision when the collision is elastic in one dimension and their masses are equal.

Or

 A motor boat covers a distance between two spots on the river in time of 8 hours and 12 hours down stream and up stream, then what is the time required for the boat to cover this distance in still water?