DAV BR Public School, Bina

HALF YEARLY EXAMINATION Session 2024-25

PRACTICE PAPER

Class Xl **Subject-Physics**

TimeAllowed-3.00 Hrs M.M.-70

General Instructions:

(1)There are 35 questions in all. All question are compulsory.

(2)This question paper has five sections A , B ,C ,D and E and all are compulsory.

(3)Section A contains 18 MCQs of 1 mark each, section B contains 7, VSA l type questions of 2 marks each, Section C contains 5, VSA l l type questions of 3 marks each, Section D contains 2, Case Study Based questions of 4 marks each and Section E contains 3 questions of 5 marks each.

(4) There is no overall choice however internal choices are provided in some questions.

[Section- A]

1- A dimensionless quantity is

(a) Force (b) coefficient of friction (c) energy (d) pressure

2-The ratio of magnitude of velocity and speed for a body in straight line motion is

(a) 1 (b) greater than 1 (c) less than 1 (d) none of these

3- A vehicle moving with a speed of 18 km /h covers___ m in 1 sec.

(a) 10 (b) 18 (c) 5 (d) 15

4- The velocity of a particle (v) at an instant t is given by $v = 80 + bt^{2.}$ The dimension of b is

(a) L (b) LT^{-1} (c) LT^{-2} (d) LT^{-3}

5- Three blocks of masses 1kg, 2kg and 4kg are connected by strings and kept on a floor, one after the other and a force of 28N is applied on the block of 1kg. The acceleration of the combined system in m sec^{-2} will be

(a) 8 (b) 4 (c) 2 (d) 14

6-The impulses is equal to change in

(a) force (b) momentum (c) energy (d) none of these

7- The basic principle of rocket propulsion is

(a) 3^{rd} law of motion (b) 2^{nd} law of motion (c) law of conservation of momentum (d) (a) and (c) both.

8- No work is done if

(a) d =0 (b) f=0 (c) F and d are mutually perpendicular (d) all of these

9- The number of significant figures in 0.06900 is

(a) 5 (b) 4 (c) 2 (d) 3

10- The volume of a cube of side 1cm is equal to ____m^3.

(a)10^6 (B) 10^{-9} (c)10^{-6} (d) none of these.

11-The area under time - velocity graph is equal to

(a) acceleration (b) force (c) displacement (d) speed

12- The correct relationship for a body in uniform motion is

(a) Av speed > ins. speed (b) Av speed = ins. speed (c) Av speed < ins. speed (d) none of these

13- The value of p for which the 2 vectors a=5 i +p j+ k and b= i–2j+k are perpendicular to each other is

(a) 2 (b) -2 (c) 3 (d) -3

Assertion (A) and Reason(R) type questions; Choose the correct option:

(a)If A and R both are true and R is the correct explanation of A.

(b)If A and R both are true but R is not the correct explanation of A.

(c)If A is true but R is false.

(d)If A and R both are false.

14-(A) Relative density and angle are dimensionless quantities.

(R) A quantity is dimensionless if it is equal to the ratio of 2 like quantities.

15-(A) A body projected at an angle of 45^0 has maximum range .

(R) For maximum range sin 2θ should be 1.

16-(A)The horizontal range remains the same whether the angle of projection is 30^0 or 60^0

(R) The horizontal range does not depend upon the angle of projection .

17-(A) A body moving on a circular path may or may not have acceleration .

(R) In uniform circular motion , the tangential acceleration dominates centripetal acceleration .

18-(A) If the velocity of a body is tripled, then kinetic energy becomes 9 times.

(R) Kinetic energy K= $1/2mv^2$.

[Section- B]

19-The velocity of a particle, at a given time t is given by v=a + b t + c / (d + t).What are the dimensions of the ratio a/b.

20-Relate linear velocity and angular velocity for a body performing uniform circular motion.

21-State and prove work-energy theorem for a constant force.

22-Is it easier to pull or to push a lawn roller? Explain with the help of a diagram.

23-What do you mean by a conservative force? Give 2 examples of conservative forces.

24- Derive the second equation of motion graphically.

OR

Derive the third equation of motion by calculus method.

25-Derive an expression for the elastic potential energy conserved in a stretched spring.

[Section-C]

26-Draw the following graphs for free fall-(a) time –position (b) time –velocity (c)time-acceleration

27-find the dimensional formulae of any 3 quantities (a) pressure (b) energy (c) universal gravitational constant (d) density

28- A car accelerates from rest with a uniform acceleration A for some time , after which retards at a constant rate B to come to rest. If the total time elapsed is T seconds, evaluate the maximum velocity attained by the car and the total distance travelled by it ,in terms of A,B and T by any method.

29- A particle moves in X-Y plane according to the equations (x=4 sin6t) and [y =4(1- cos6t)].Find the velocity components of the particle and hence the distance traversed by it in 5 s.(x and y are in m)

30 – A body of mass 0.40 kg moving initially with a constant speed of 10 m/s to the north is subject to a constant force of 8.0 N directed towards the south for 30 s .Take the instant the force is applied to be t= 0 s, the position of the body at that time to be x = 0 m ,and predict its position at t =-5 s ,25 s ,100 s .

[Section-D]

31-Friction is a self adjusting force .It always acts in opposite direction of motion between the surfaces in contact. It is produced due to the interlocking of ups and downs of the interacting surfaces. Though it opposes most of the motion but in some cases it also causes a motion.

(a)State any 2 laws of friction.

(a) Define angle of friction.

(c) State any one advantage of friction .

(d) Mention the utility of ball-bearings.

32- Two types of physical quantities are there, vectors and scalars. A Scalar requires magnitude only whereas vectors require magnitude and direction both. Vectors are having their own laws of addition, subtraction and multiplication.

(a) Give any 2 examples of scalars.

(b) Mention any 2 vector quantities.

(c) Any two vectors can be added with each other.(state whether T/F)

(d) State the triangle or parallelogram law of vector addition.

[Section-E]

33-(a) What is banking of roads? What is its advantage.

(b)Obtain an expression for the maximum safety speed of a vehicle on a banked road with the diagram of different forces acting on the vehicle.

OR

(a)State Newton's second law of motion and show F=ma by it. Define the S I unit of force.

(b)Two masses 8 kg and 12 kg are connected at the 2 ends of a light inextensible string that goes over a frictionless pulley .Find the acceleration of the masses and the tension in the string when the masses are released.

34- (a)What do you mean by elastic and inelastic collision .

(b)Derive the formulae of final velocities of the 2 colliding bodies after collision in one dimension.

OR

(a)Show that there will be always an energy loss in the case of a perfectly inelastic collision.

(b) An electron and a proton are detected in a cosmic ray experiment , the first with kinetic energy 10keV and the second with 100 k eV. Which is faster, the electron or proton? Obtain the ratio of their speeds.(electron mass=9.11×10^{-31} kg , proton mass=1.67×10^{-27} kg ,1 eV=1.60×10^{-19}J)

35-(a) A projectile is fired at an angle θ with the horizontal, show that the trajectory is a parabola.

(b)Obtain expressions for (1) max height attained (2) time of flight (3) horizontal range

OR

(a) Derive the magnitude and direction of the resultant vector of the parallelogram law of vector addition.

(b) Obtain an expression of centripetal acceleration for a particle performing uniform circular motion.
