D.A.V. PUBLIC SCHOOL, NEW PANVEL

Plot No. 267, 268, Sector-10, New Panvel,

Navi Mumbai-410206 (Maharashtra).

Phone 022-27468211, 27451793, Tel-fax-27482276,
E-mail – davnewpanvel@gmail.com, www.davnewpanvel.com

Practice Paper–(2013-2014)

Std:- XI
Subject: - Physics **Time:- 2 Hours**
Date:- **Marks:- 50**

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General Instructions:

1) All questions are compulsory.
2) Question numbers 1to 4 carry 1marks each.
3) Question numbers 5 to 13 carry 2marks each.
4) Question numbers 14to19 carry 3marks each.
5) Question numbers 20to 21 carry 5marks each.

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ANSWER ALL THE QUESTION:

1 The co-ordinates of moving particle at any time (t) are given by $x = \alpha t^3$ and $y = \beta t^3$. The speed of the particle at time (t) is given by 1M

a) $3t\sqrt{\alpha^2+\beta^2}$ b) $3t^2\sqrt{\alpha^2+\beta^2}$ c) $t^2\sqrt{\alpha^2+\beta^2}$ d) $\sqrt{\alpha^2+\beta^2}$

2 Two stones are projected with same velocity v at an angle θ and $(90 - \theta)$. If H and H_1 are the greatest height in the two paths, what is the relation between R, H and H_1? 1M

a) $R = 4\sqrt{H H_1}$ (b) $R = \sqrt{HH_1}$ (c) $R = 4HH_1$
(d) None

3 The velocity v of a particle at time t is given by : 1M

$$v = at + \frac{b}{t+c}$$

The dimensions of a, b, c are respectively
a) LT^{-2}, L, T (b) L_2, T, LT_2 (c) LT_2, LT, L (d) L, LT, T^2

4 Two projectiles are projected with the same velocity. If one is projected at an angle of 30^0 and the other at 60^0 to the horizontal, then the ratio of maximum heights reached is 1M

a) 3 : 1 (b) 1 : 3 (c) 1 : 2 (d) 2 : 1

5 2M

Prove that $\vec{A} = \hat{i} + 2\hat{j} + 3\hat{k}$ and $\vec{B} = 2\hat{i} - \hat{j}$ are perpendicular to each other.

6 check dimensionally the given equation: 2M

$F.S = ½ MV^2 - 1/2MU^2$

7 The position of particle is function of time is given by the equation $x= 2t^3-6t^2+12t+6$. At what time acceleration of body will be zero. 2M

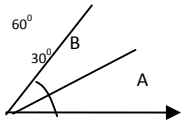
8 *The force F=AcosBx+CsinDt, where x is displacement and t is time.Find the dimesion of D/B .* 2M

9 Car moving along a straight highway with speed of 126kmh-l is brought to a stop within distance 200m. What is the retardation of the car (assumed uniform) and how long does it take for the car to stop? 2M

OR

Find the value of m show that 3i-2j+k perpendicular to the vector 2i+6j+mk

10 Motion of two bodies A and B represented by Two straight lines in s -t graph as .- shown in the figure. Find the ratio of their velocities. 2M



11 The equation of a wave is given by y = A sin w $\left[\frac{x}{v} - k\right]$ where w is the angular velocity & v is the linear-velocity. Find the dimensional formula of k. 2M

12 *A calorie is a unit of heat or energy and it equals about 4.2J. where 1J= 1kg m2s^{-2}.suppose system of units in which the unit of mass equals to α Kg, the unit of length equals β m, the unit of time γs Show that 4.2 α-1β-2γ 2* 2M

13 Define i)Light year ii)parsec 2M

14 Two cars A and B are running at velocities of 60km/hr and 45km/hr resp. calculate the relative velocity of car A, If 3M
i)if they are travelling towards eastward
ii)car A is travelling eastwards and car B is travelling westwards.

15 Derive by method of dimensions, an expression for the time period (T) of oscillation of simple pendulum, assuming that this time period depends upon i) length of the pendulum iii) acceleration due to gravity. 3M

$$T=k\sqrt{\frac{l}{g}}$$

16 i) The temperature of two bodies measured by a thermometer are 3M
$t_1 = 20^{oC} \pm 0.5\ ^oC$
and $t_2 = 50^oc \pm 0.5^oc$. calculate the temperature difference and the error their in.
ii) Find the relative error in Z, If $Z = A^4B^2/C^{3/2}$

17 What is meant by RADAR and SONAR? How ars long distances measured using these techniques? 3M

18 if R is the horizontal range for θ inclination and h is the maximum height reached by a projectile, show that its maximum range is given by $\left[\frac{R^2}{8h} + 2h\right]$. 3M

OR

Show that for any two values of angle of projection which are complementary, the horizontal range is same

19 Rain is falling vertically with a speed of $30ms^{-1}$. A woman rides a bicycle with a speed of $10ms^{-1}$ in the north – south direction what is the direction in which she should hold her umbrella so as to protect herself from the rain? 3M

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20 a)A car accelerates from rest at a constant rate 'A' for some time, after which it retards at a constant rate 'B' to come to rest. If the total time lapsed is T seconds, evaluate the maximum velocity reached and the total distance travelled in terms of A,B and T 3M

b)A police van moving on highway with speed of 30 km/hr fires a bullet at thief's car speeding away in the same direction with the speed of 192km/hr. If the muzzle speed of the bullet is 150m/s, with what speed does the bullet hit the thief's car ?. 2M

21 a)Show that the trajectory of a projectile is parabolic . 2M

b)State the parallelogram law of vectors. Find its magnitude as well as directio 3M

OR

2M

a)Prove that the maximum horizontal range is four times the maximum height attained by a projectile which is fired along the required oblique direction

b)A projectile can have the same range R for two angle of projection. If t_1 and t_2 be the time of flight in the two cases then prove that $t_1 t_2 = \frac{R}{g}$ 3M