INDIAN SCHOOL SOHAR
UNIT TEST- 2014
PHYSICS – THEORY

CLASS: XI   **MARKS : 50**
DATE: 21/05/2014   **TIME: 2HRS**

General Instructions:
1. All questions are compulsory.
2. There are 18 questions in all .Questions 1 to 3 carry one mark each, questions 4 to 7 carry two marks each, questions 8 to 15 carry three marks each and questions 16 to 18 carry five marks each.
3. There is no overall choice. However, internal choice has been provided in one question of two marks, one question of three marks and all two questions of five marks each. You have to attempt only one of the given choices in such questions
4. Use of calculator is not permitted.
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1. Mention the contributions of Isaac Newton and Albert Einstein in the field of physics.(1)

2. State the significant figures of the following (i) 0.0006032 m^2 (ii) 6.032 N/ m^2.   (1)

3. Identify the motion of the object A from the given v-t graph.   (1)
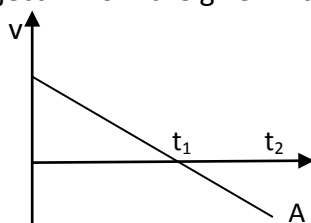
4. Mention and explain the types of fundamental forces in nature. Write these forces in order of their increasing strength.   (2)

OR

4. State and explain the parallelogram method of vector addition with the help of diagram. Also show its equivalence with triangle method of vector addition.   (2)

5.Mention scientific principles of the following technologies (i) steam engine (ii) Aeroplane (iii)rocket propulsion (iv) Lasers.   (2)

6. The parallax of a heavenly body measured from two points diametrically opposite earth's equator is 60 seconds. If the radius of the earth is 6.4×10^6 m, determine the distance of the heavenly body from the centre of the earth.   (2)

7. Two bodies of different masses m_1 and m_2 are dropped from two different heights 'a' and 'b'. What is the ratio of time taken by the two bodies to drop through these distance.   (2)

8. Explain the method to obtain the diameter of the molecule of oleic acid with the help of an activity. Also obtain an expression for the same.   (3)

9. (a) Mention the triangle method of vector addition with the help of diagram.

(b)Mention the associative property of vector addition and illustrate it with the help of graphical diagram. (3)

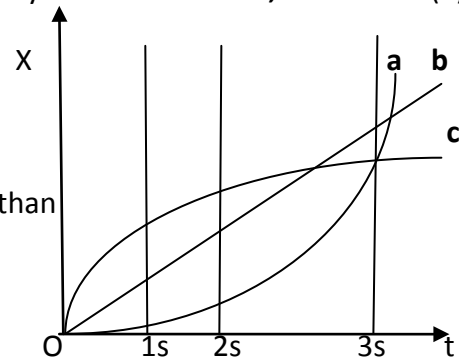10. (a)Define stopping distance of a vehicle with its mathematical expression.

(b) The position time graph in the figure shows the journey of three bodies **a, b** and **c**. (3)

(i) At 1s, which body has the greatest velocity?

(ii)At 2s , which body has travelled the farthest**?**

(iii)When' **a'** and **'c'** meets, is **b** moving faster or slower than

' **a'**?

(iv) Is there any time at which velocity of ' **a'** is equal

to that of ' **b'**?

11. A certain automobile manufacturer claims that a super – deluxe sport's car will accelerate from rest to a speed of 42m/s in 8 seconds assuming that the acceleration remains constant. (a) Determine the acceleration of the car. (b)Find the distance the car travels in 8s. (c)Find the distance the car travels in 8th second. (3)

12. Define the terms absolute error, mean absolute error, relative error with correct mathematical expressions. (3)

OR

12.(a) Explain the term parallax . How can it be used to measure large distances. Explain with the help of diagram. (b) Define the term plane angle. (3)

13. Derive the dimensional formula of the following physical quantities (i) momentum (ii)power (iii)pressure. (3)

14. The orbital velocity (v) of a satellite may depend on its mass(m), distance (r) from the centre of Earth and acceleration due to gravity (g). Obtain an expression for orbital velocity by the method of dimensional analysis. (3)

15. Explain the terms (i) position vector (ii) displacement vector(iii)equality of vectors with the help diagrams. (3)

16.(a) State and prove the rule to find the error of a product or a quotient.

(b) Calculate focal length of a spherical mirror from the following observation ;object distance =(50±0.5)cm and image distance v = (20.1 ± 0.2)cm. Given f = $\frac{uv}{u+v}$. (5)

OR

16.(a) Mention the types of errors and explain any two sources due to which they occur

(b) Check by the method of dimensional analysis whether the following relations are correct. Given $v = \sqrt{\dfrac{p}{D}}$, v= velocity of sound and P =pressure, D=density of medium.   (5)

17.(a) Derive the kinematic equations of motion by graphical method.

(b)An object is moving along x-axis in such a way that its displacement is given by

$X = 30 + 20t^2$ where x is in meters and t is in seconds. (i) Find the velocity and acceleration.

(ii) What are the initial position and the velocity of the object?   (5)

<center>OR</center>

17.(a) Define relative velocity of objects and derive an expression for it.

(b) Represent the following conditions of relative velocities of two objects with the help of x-t graph and justify them. (i) if velocities of both the objects is equal (ii) if velocity of one object is greater than the velocity of other object. (iii) if both the objects have velocities of opposite sign.   (5)

18. (a) Obtain the second equation of motion by integration method.

(b) Explain the term solid angle with the help of diagram and expression.

(c)If $x = at^2+bt +c$; where x is displacement as a function of time. Write the dimensions of a,b,c.   (5)

<center>OR</center>

18. (a)Obtain the third equation of motion by integration method.

(b) Define instantaneous velocity. Explain the method to obtain its direction graphically. (5)