ROLL NUMBER				

SET A

INDIAN SCHOOL MUSCAT

FIRST PERIODIC TEST

PHYSICS

CLASS: XI | Sub.Code: 042 | Time Allotted: 50mts.

16 .05.2023 | Max .Marks: 20

GENERAL INSTRUCTIONS:

(a) Answer all questions.

(b) There are three sections :Section A, Section B and Section C .

(c) Section A -Case study which contains 4 questions of one marks each.

(d) Section B- Contains five Short answer questions of two marks each.

(e) Section C- Contains two short answer questions of three marks each.

(f) Use log table ,if necessary.

SECTION A

CASE STUDY

1. Dimensions of a physical quantity are the powers to which the fundamental quantities are raised to represent that quantity .The dimensional formula tells the fundamental factors on which unit depends. Dimensional equations can be used to (a) check the correctness of a physical quantity (b) derive the relation between different physical quantities (c) change from one system of units to another.

   (i) If $x=a+bt+ct^2$, where x is in metre and t in second ,then what is the unit of c?

   (a) m/s (b) m/s^2 (c) kgm/s (d) m^2/s 1

   1

   1

(ii) Which of the following physical quantities has the dimensional formula

$[M^1 L^2 T^{-3}]$?

(a) work (b) power (c) impulse (d) surface tension 1

(iii) Which of the following is a dimensionless variable?

(a) work (b) refractive index (c) speed (d) acceleration due to gravity

(iv) Which of the following is the unit of surface tension ?

(a) $kg\ s^{-2}$ (b) $kg\ m\ s^{-2}$ (c) ms^{-2} (d) $kgms^{-1}$

SECTION B

2. Convert dimensionally energy of one joule (1 J) into ergs. 2

3. (i) Can a physical quantity have dimensions but still have no units ? 2

(ii) Can physical quantity have units but still be dimensionless ? Give example.

4. State any four advantages of S.I. system over other system of units. 2

5. State the number of significant figures in the following 2

(a) 200 (b) 0.0300

6. Name any three physical quantities having same dimensions. Also write the dimensions. 2

SECTION C

7. A planet moves around the sun in a nearly circular orbit. Its period of revolution T depends upon: (a) radius R of orbit (b) mass M of the sun and (c) the gravitational constant G. Show dimensionally that $T^2 \propto R^3$. 3

8. Find the value of x in the relation $Y = \frac{T^x cos\theta\ \tau}{L^3}$ where Y is Young's modulus ,T is time period ,τ is torque and L is length. 3

ROLL NUMBER				

SET B

INDIAN SCHOOL MUSCAT

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PHYSICS

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16.05.2023 **Max .Marks: 20**

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(a) Answer all questions.

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(c) Section A -Case study which contains 4 questions of one marks each.

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(e) Section C- Contains two short answer questions of three marks each.

SECTION A

CASE STUDY

1. Dimensions of a physical quantity are the powers to which the fundamental quantities are raised to represent that quantity .The dimensional formula tells the fundamental factors on which unit depends. Dimensional equations can be used to (a) check the correctness of a physical quantity (b) derive the relation between different physical quantities (c) change from one system of units to another. Principle of homogeneity of dimensions states that dimensions of fundamental quantities on both sides of a physical relation must be the same.

   (i) Which of the following is the unit of surface tension ? 1

   (a) $kg\ s^{-2}$ (b) $kg\ m\ s^{-2}$ (c) ms^{-2} (d) $kgms^{-1}$

   (ii) Which of the following physical quantities has the dimensional formula 1

   $[M^1 L^2 T^{-3}]$?

   (a) work (b) power (c) impulse (d) surface tension 1

   (iii) Which of the following is a dimensionless variable?

(a) work (b) refractive index (c) speed (d) acceleration due to gravity

(iv) If $x=a+bt+ct^2$, where x is in metre and t in second ,then what is the unit of c?

(a) m/s (b) m/s^2 (c) kgm/s (d) m^2/s 1

SECTION B

2. Write four advantages of SI system over other systems of units . 2

3. Find the dimensions of $\frac{a}{b}$ in the equation $F = a\sqrt{x} + bt^2$ where F is force ,x is distance and t is time. 2

4. Convert dimensionally energy of one joule (1J) into erg . 2

5. Give two examples each for the following (i) Dimensional constant (ii) Dimensionless constants . 2

6. State the number of significant figures in the following 2

(a) 0.0102 (b) 3.250

SECTION C

7. Find the value of 100 J of energy in a system that has 100 g, 10 cm and 30 s as fundamental units . 3

8. A planet moves around the sun in a nearly circular orbit. Its period of revolution T depends upon: (a) radius R of orbit (b) mass M of the sun and (c) the gravitational constant G. Show dimensionally that $T^2 \propto R^3$. 3

ROLL NUMBER				

SET C

INDIAN SCHOOL MUSCAT

FIRST PERIODIC TEST

PHYSICS

CLASS: XI **Sub.Code: 042** **Time Allotted: 50mts.**

16.05.2023 **Max .Marks: 20**

GENERAL INSTRUCTIONS:

(a) Answer all questions.

(b) There are three sections :Section A, Section B and Section C .

(c) Section A -Case study which contains 4 questions of one marks each.

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(e) Section C- Contains two short answer questions of three marks each.

(f) Use log table ,if necessary.

1. Dimensions of a physical quantity are the powers to which the fundamental quantities are raised to represent that quantity .The dimensional formula tells the fundamental factors on which unit depends. Dimensional equations can be used to (a) check the correctness of a physical quantity (b) derive the relation between different physical quantities (c) change from one system of units to another. Principle of homogeneity of dimensions states that dimensions of fundamental quantities on both sides of a physical relation must be the same.

   (i) The dimensional formula of gravitational constant is 1

   (a) $[M^1 L^3 T^{-2}]$ (b) $[M^1 L^{-3} T^2]$ (c) $[M^{-1} L^3 T^{-2}]$ (d) $[M^{-1} L^3 T^2]$

   (ii) Which of the following is dimensionless ?

   (a) $\frac{Work}{Energy}$ (b) $\frac{Force}{Momentum}$ (c) Planck's constant (d) acceleration due to gravity 1

   (iii) If $x=a+bt+ct^2$, where x is in metre and t in second ,then what is the unit of b? 1

   (a) m/s (b) m/s^2 (c) kgm/s (d) m^2/s

(iv) Name the quantity represented by the dimensional formula $[M^1 L^{-3} T^0]$.

(a)work (b) power (c) impulse (d) density

1

SECTION B

2. Find the value of a force of 200 N on a system based upon the metre, the kilogram and the minute as the fundamental units. 2

3. Name any three physical quantities having same dimensions. Also write the dimensions. 2

4. State the number of significant figures in the following 2

(a) 0.0102 (b) 3.250

5. Write the dimensions of a/b in the relation $P = \frac{a-t^2}{bx}$ where P is the pressure ,x is distance and t is time. 2

6. Write any two limitations of dimensional analysis. 2

SECTION C

7. Find the value of x in the relation Y $= \frac{T^x cos\theta\, \tau}{L^3}$ where Y is Young's modulus ,T is time period ,τ and L is length. 3

8. State Principle of homogeneity. Using dimensional analysis check the correctness of the equation E$= \frac{P^2}{2\,m}$ where E is kinetic energy , P is linear momentum and m is mass. 3