

FOUNDATION COURSE

CLASS IX

PAPER : 12

Date : 30.11.2014

Time : 2 hrs.

Max. Marks. : 100

P_{SS} C_S M_R B_S

TOPICS COVERED:

PHYSICS : Work and Energy (Complete)

CHEMISTRY : Atoms and Molecules

MATHS : Quadrilaterals

BIOLOGY : Diversity in Living Organisms

GENERAL INSTRUCTIONS :

1. Paper consist of **4 Sections** each for **Physics, Chemistry, Maths** and **Biology**. Answers for each question should be given in the space provided in the question paper itself.
2. Each section contains 13 questions, all questions are compulsory.
3. Question 1 - 5 are **objective type question** of 1 Mark each.
4. Question 6 - 7 consist of 1 Marks each.
5. Question 8 - 9 consist of 2 Marks each.
6. Question 10 - 12 consist of 3 Marks.
7. Question 13 consists of 5 Marks.

	Physics	Chemistry	Maths	Biology
Marks				
Total				

Name of the Student : _____

Centre : _____

Invigilator's Signature : _____

PHYSICS

1. From a waterfall, water is pouring down at the rate of 100 kg per second on the blades of a turbine. If height of the fall is 100 m, the power delivered to the turbine is approximately ($g = 10 \text{ m/s}^2$)
(a) 100 kW (b) 10 kW (c) 1 kW (d) 100 W [1]

2. A ball of mass 50 kg is thrown vertically upwards. It rises to a maximum height of 100 m. At what height its kinetic energy will be reduced to 70% ?
(a) 30 m (b) 40 m (c) 60 m (d) 70 m [1]

3. Velocity of a body is halved, then its kinetic energy becomes — times
(a) 1/2 (b) 1/4 (c) 2 (d) 4 [1]

4. A light and a heavy body have same momentum, then
(a) Kinetic energy of lighter body is more (b) Kinetic energy of heavier body is more
(c) Kinetic energy of both bodies is same (d) Kinetic energy is not dependent on mass [1]

5. A body falls from a height h. At half the height
(a) Kinetic energy > potential energy
(b) Kinetic energy < potential energy
(c) Kinetic energy = potential energy
(d) Relation between the kinetic energy and potential energy can not be determined from the given data [1]

6. Define potential energy. [1]

7. Define kinetic energy. [1]

8. Derive an expression for potential energy of a body of mass m raised to height h. [2]

9. A body of mass 2kg is pulled by a force of 5N. It moves through a distance of 0.5 m. Calculate the work done. [2]

10. Derive the relation between commercial unit of energy and SI unit of energy. [3]

11. A boy A of mass 60 kg climbs up stairs to a height of 3 m in 2 minutes, another boy B of same mass climbs up same height in 1 minute. Find the ratio of their powers. [3]

12. A bullet of mass 20 g, hits a block with speed 20 m/s and emerges with speed 5 m/s. Length of the block is 100 cm. (Assume that the bullet travels horizontally and covers 100 cm of the block) Calculate the work done by the resistive force of the block on the bullet [3]

13. Verify law of conservation of energy for a freely falling body from height h. [5]

CHEMISTRY

1. The formula of Ammonium phosphate is [1]
(a) $(\text{NH}_4)_3\text{PO}_4$ (b) $(\text{NH}_4)_3\text{PO}_3$ (c) $(\text{NH}_4)_3\text{P}$ (d) $(\text{NH}_4)\text{PO}_4$
2. Molecular weight of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is equal to [1]
(Cu = 63.5 u, S = 32 u, O = 16 u, H = 1 u)
(a) 249.5 u (b) 159.5 u (c) 159.5×90 u (d) $159.5 + 10 + 16$ u
3. 1 mole of nitrogen gas is equal to [1]
(a) 28 g (b) 14 g (c) 42 g (d) 7 g
4. 22 g of CO_2 is equal to [1]
(a) 22.4 L at STP (b) 0.5 mole
(c) 6.023×10^{23} molecules (d) 0.05 mole
5. The chemical symbol for helium gas is [1]
(a) He (b) He_2 (c) He^+ (d) He^{2+}
6. An element Z has a valency of 3. What is the formula of oxide of Z ? [1]
7. What is meant by Avogadro's constant ? [1]
8. Calculate the formula mass of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ [2]
[Atomic mass of Na = 23 u, S = 32 u, O = 16 u, H = 1 u]
9. In a reaction 5.3g of Na_2CO_3 reacted with 6 g of ethanoic acid. The products formed were 2.2 g of CO_2 , 0.9 g of H_2O and 8.2 g of sodium ethanoate. Show that these observations are in agreement with the law of conservation of mass. [2]
Sodium carbonate + Ethanoic acid \rightarrow Sodium ethanoate + Water + Carbon dioxide

10. What is meant by the term 'mole' ? Calculate the number of moles in [3]

(a) 3.011×10^{23} atoms of C

(b) 32 g of oxygen gas

($N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$, At. mass of O = 16 u and C = 12 u).

11. Calculate [3]

(a) The mass of 1.5055×10^{23} molecules of carbon dioxide (CO_2)

(b) The number of molecules of 0.25 moles of NH_3

(c) The formula unit mass of Na_2SO_3

(Atomic mass : Na = 23 u, S = 32 u, O = 16 u, H = 1 u, $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$)

12. What is ratio between masses of (i) hydrogen and oxygen in H_2O (ii) nitrogen and hydrogen in NH_3 ? [3]

[Atomic mass of H = 1 u, O = 16 u, N = 14 u]

13. (a) Write chemical formulae of the following compounds

[5]

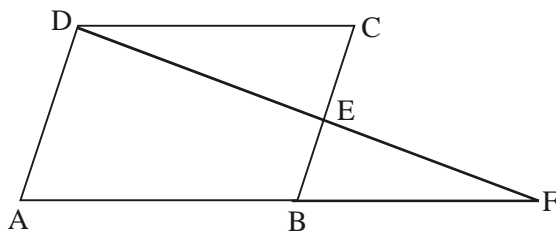
(i) Aluminium nitride

(ii) Ammonium phosphate

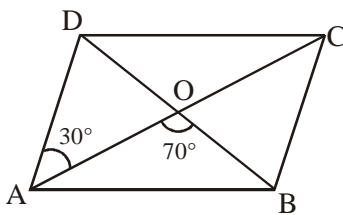
(b) Name the element which shows a variable valency. Write the formulae of its two chlorides

MATHS

1. Three angles of a quadrilateral are respectively equal to 110° , 50° and 40° , then fourth angle = [1]
 (a) 120 (b) 160 (c) 140 (d) 100
2. In which of the following figures diagonals are equal [1]
 (a) Parallelogram (b) Rhombus (c) Trapezium (d) Rectangle
3. If an angle of a parallelogram is two third of its adjacent angle, the smallest angle of the parallelogram is [1]
 (a) 108° (b) 54° (c) 72° (d) 81°
4. The parallel sides of trapezium are 'a' and 'b' respectively. The line joining the mid points of its non parallel sides will be [1]
 (a) $\frac{1}{2}(a-b)$ (b) $\frac{1}{2}(a+b)$ (c) $\frac{2ab}{a+b}$ (d) \sqrt{ab}
5. The figure formed by joining the mid points of the adjacent sides of a parallelogram is a [1]
 (a) Rhombus (b) Square (c) Rectangle (d) Parallelogram
6. In the given figure, ABCD is a parallelogram and E is the mid-point of BC. Also DE and AB when produced meet at F. Then find the relation of AB and AF. [1]



7. The diagonals AC and BD of a parallelogram ABCD intersect each other at a point O such that $\angle DAC = 30^\circ$ and $\angle AOB = 70^\circ$. Then, $\angle DBC$ is [1]



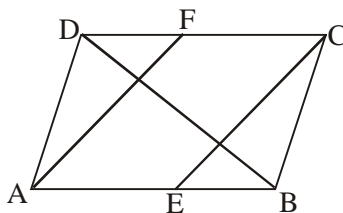
8. Let ABCD be a trapezium in which $AB \parallel CD$ and let E be the mid point of AD. let F be a point on BC such that $EF \parallel AB$. Prove that. [2]

- (i) F is the midpoint of BC
- (ii) $EF = \frac{1}{2}(AB + CD)$

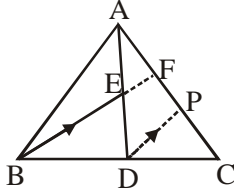
9. If a diagonal of a parallelogram bisects one of the angles of the parallelogram, prove that it also bisects the angle opposite it, and that the two diagonals are perpendicular to each other. [2]

10. Show that the bisectors of angles of a parallelogram form a rectangle. [3]

11. In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively show that the line segments AF and EC trisect the diagonal BD. [3]



12. In the adjoining figure, AD is the median of $\triangle ABC$ and E is the mid point of AD. Also BE produced meets AC in F. Prove that $AF = \frac{1}{3} AC$. [3]



13. (i) State and prove that mid point theorem.
(ii) If D, E and F are respectively the mid points of the sides BC, CA and AB of an equilateral triangle ABC, Prove that $\triangle DEF$ is also an equilateral triangle [5]

10. Pila, unio and octopus are classified under which phylum ? Give its characteristics. [3]

11. Write the features of cnidarians. Give the examples also. [3]

12. Ascaris and earthworm are categorized under phylum ? Write their features. [3]

13. Enlist the various features of phylum vertebrata. Into how many classes it is divided ? Enlist their characteristics also. [5]