6759

SCIENCE (Theory) — Paper I
(Physics and Chemistry)

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

Instructions to the Candidates :

i) Use of logarithm table is permitted.

ii) Answer *all* the questions in Section **A**.

iii) Answer any *five* questions in Section **B**.

iv) Answer any *five* questions in Section **C** choosing at least *one* from each Part.

v) Use diagrams, expressions and equations, wherever necessary.

(PHYSICS)

(Marks : 50)

SECTION – A

Answer *all* the questions.

$10 \times 1 = 10$

I. Choose the correct answers :

1. The resultant of two forces 6N and 8N acting at a point in the same direction is

   a) 2N   b) 14N

   c) 48N   d) 0N.

2. The energy possessed by a body by virtue of its position is

   a) potential energy   b) kinetic energy

   c) electrical energy   d) heat energy.

3. A floating ship has stability when the

   a) metacentre is below the centre of gravity of the ship

   b) metacentre is below the centre of buoyancy

   c) metacentre is above the centre of gravity of the ship

   d) metracentre and centre of gravity coincide at the same point.

[Turn over

4. During change of state, the temperature of a substance

    a) increases   b) decreases

    c) remains constant   d) increases and decreases.

5. In a freezing mixture, the ratio of salt and ice is

    a) 3 : 1   b) 2 : 3

    c) 3 : 5   d) 1 : 3.

6. Astigmatism can be corrected by using

    a) spherical lens   b) concave lens

    c) cylindrical lens   d) convex lens.

7. The frequency of a stretched string can be determined by

    a) bolometer   b) sonometer

    c) lactometer   d) galvanometer.

8. The vertical plane passing through the axis of a freely suspended magnet is called

    a) magnetic equator   b) magnetic meridian

    c) magnetic induction   d) magnetic flux.

9. Mutual inductance is measured in

    a) hertz   b) henry

    c) amperes   d) ohms.

10. X-rays were discovered by

    a) Regnault   b) Roentgen

    c) J.J. Thompson   d) Coolidge.

II. Complete the following using appropriate word / words / expressions :   5 × 1 = 5

11. The boiling point of sea water is ....

12. Artificial teeth appear .... under ultraviolet light.

13. .... distinguish different sounds of same loudness.

14. The practical unit of electrical energy is ....

15. Hydrogen nuclei fuse to form ....

SECTION – B

Answer any *five* of the following in *one* or *two* sentences each : 5 × 2 = 10

16. What is meant by centre of buoyancy ?

17. Calculate the work done in lifting a mass of 10 kg through 8 m.

18. Define fundamental frequency.

19. What are the magnetic elements of earth's magnetism ?

Give reasons for the following :

20. Nichrome is embedded in mica in electric iron.

21. Sun dose not get cooled.

Give any *two* practical applications of the following :

22. Latent heat of vaporisation.
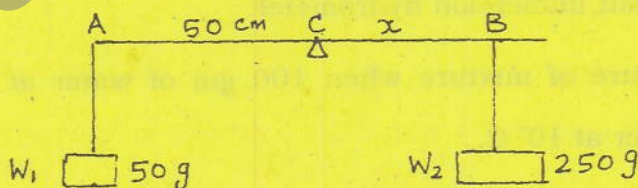
23. Total internal reflection.

SECTION – C

Answer any *five* of the following, choosing at least *one* question from each Part :
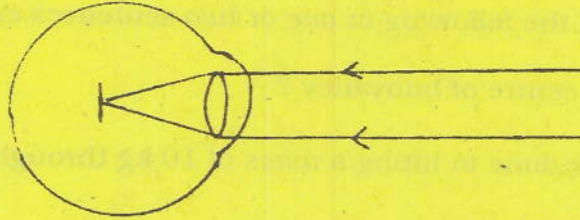
5 × 5 = 25

PART – I

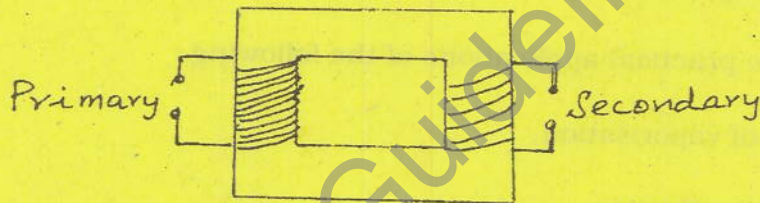24. Study the diagram and answer the following questions :

a) Name the principle involved. 1

b) State the principle. 2

c) Calculate x. 2

[Turn over

25. Study the diagram and answer the following questions :

    a)   Name the defect.   1

    b)   State the causes for this defect.   2

    c)   Draw how can this defect be rectified ?   2

26. Study the diagram and answer the questions given below :

    a)   What is the name of this device ?   1

    b)   State the principle on which it works.   1

    c)   What is called turns ratio ?   2

    d)   Write one use of this device.   1

PART – II

27. Describe an experiment to determine the relative density of a liquid using the test tube float as constant immersion hydrometer.   5

28. Find the temperature of mixture when 100 gm of water at 70° C is added to 200 gm of cold water at 10° C.   5

29. State the laws of transverse vibrations of a stretched string and derive an expression for the frequency of vibration of a stretched string.   5

30. Describe dip circle and explain how it is used to find dip at a place.   5

31. Write the properties of X-rays.   5

(CHEMISTRY)

(Marks : 50)

SECTION – A

Answer *all* the questions.

I. Choose the correct answers : 10 × 1 = 10

1. The law of definite proportions was explained by

   a) Dalton
   b) Lavoisier
   c) Charles
   d) Proust.

2. The ideal gas equation is

   a) $PV = nRT$
   b) $PT = nRT$
   c) $nR/PV = T$
   d) $PV \propto nT$.

3. If an atom has 11 electrons, the number of electrons present in K shell is

   a) 0
   b) 1
   c) 2
   d) 3.

4. The compound which is soluble in organic solvents is

   a) $NaCl$
   b) CH_4
   c) MgO
   d) CaF_2.

5. Which of the following is a weak electrolyte ?

   a) $NaOH$
   b) HCl
   c) $CuSO_4$
   d) NH_4OH.

6. The effect of emission of α and β particles on mass and atomic number is expressed in terms of

   a) Dalton's law
   b) Group displacement law
   c) Graham's law
   d) Gay Lussac's law.

[Turn over

7. The oxidising agent present in the matchstick is

   a) Potassium hydroxide   b) Potassium chloride

   c) Potassium chlorate   d) Potassium sulphate.

8. The process of removal of gangue from powdered ore is known as

   a) smelting   b) refining

   c) poling   d) one dressing.

9. The general formula for alcohol is

   a) $C_nH_{2n+1}OH$ b) $C_nH_{2n-1}OH$

   c) $C_nH_{2n+2}OH$ d) $C_nH_{2n}OH$.

10. Which of the following is a natural polymer ?

    a) Cellulose   b) PVC

    c) Polythene   d) Benzene.

II. Complete the following, using appropriate word/words/expressions :   5 × 1 = 5

11. The Avogadro number is ....

12. .... powder mixed with potassium chlorate is used in flash light photography.

13. Sulphuric acid is manufactured by .... process.

14. Ammoniacal silver nitrate is called as ....

15. .... is a phosphatic insecticide.

SECTION – B

Answer any *five* questions in *one* or *two* sentences each :

5 × 2 = 10

16. Define Absolute zero.

17. What is an alloy ?

Give reasons :

18. Aluminium is used to make overhead electric cables.

19. Acetylene shows acidic properties.

Complete and balance the following equations :

20. $P_2O_5 + C \rightarrow$ ..... + ...

21. $FeSO_4 + NaOH \rightarrow$ .... + ...

Give two practical applications of the following :
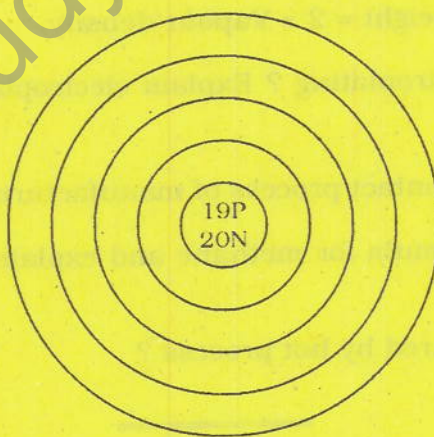
22. Sodium bicarbonate.

23. Ethylene.

SECTION – C

Answer any *five* of the following, choosing at least *one* question from each Part :

5 × 5 = 25

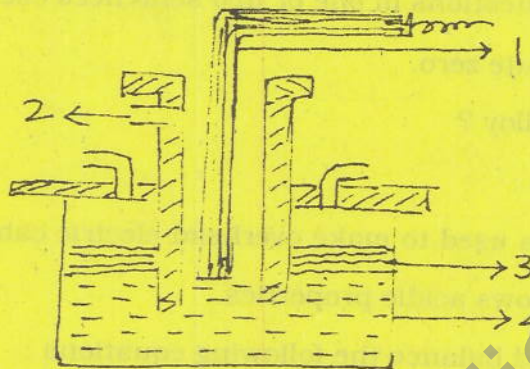## PART – I

24. Study the following diagram and answer :

a) What is the atomic number of the element ? 1

b) Write the number of electrons present in this atom. 1

c) Find its mass number. 1

d) Complete the diagram. 2

[Turn over

25.

a) Name the metal extracted.   1
b) Label the parts marked.   2
c) Why is the metal extracted in an atmosphere of coal gas ?   1
d) Name the ore taken.   1

26. You are provided with a conical flask, dropping funnel, delivery tube, bee hive shelf, gas jar, trough and two holed rubber corks :
a) How will you set up the apparatus for preparing acetylene ?   3
b) Write the balanced chemical equation.   2

PART – II

27. Prove that molecular weight = 2 × Vapour density.   5

28. What is meant by electroplating ? Explain electroplating of an aluminium spoon with copper.
                                                                      1 + 4

29. Explain the theory of contact process of manufacturing sulphuric acid. 5

30. Give the structural formula for methane and explain the substitution reaction of methane with chlorine.
                                                                      1 + 4

31. How is soap manufactured by hot process ?   5