5460

Register Number | | | | | | |

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) Use diagrams, expressions and equations, wherever necessary.

(PHYSICS)

(Marks : 50)

SECTION – A

Answer *all* the questions.

I. Choose the correct answers : $10 \times 1 = 10$

1. The magnitude of the resultant of two like parallel forces 2 N and 3 N is

   a) 6 N b) 1 N

   c) 5 N d) – 1 N.

2. The energy of a swinging pendulum bob in the extreme position is

   a) purely P.E. b) 0

   c) partly P.E. and partly K.E. d) purely K.E.

3. The centre of gravity of the displaced liquid is called

   a) centroid b) metacentre

   c) centre of buoyancy d) geometric centre.

4. Melting point of ice ..... with increase in pressure.

   a) decreases b) increases

   c) does not change d) none of these.

[Turn over

5. The SI unit of specific heat capacity is

a) J b) Js^{-1}

c) $Jkg^{-1} K^{-1}$ d) JK^{-1}.

6. Infrared rays can be detected by

a) bolometer b) globar

c) galvanometer d) ammeter.

7. ..... is an example for string instrument.

a) Flute b) Drum

c) Tabla d) Veena.

8. ..... is used for making temporary magnets.

a) Steel b) Soft iron

c) Aluminium d) Nickel.

9. In a step-up transformer n_1 (number of primary turns) is ..... n_2 (number of secondary turns).

a) less than b) equal to

c) greater than d) twice.

10. *X*-rays were discovered by

a) Coolidge b) Roentgen

c) Einstein d) Becquerel.

II. Complete the following using appropriate word / words / expressions : $5 \times 1 = 5$

11. Freezing mixture is a mixture of ..... and ice.

12. The magnifying power of a compound microscope is ..... .

13. ..... of musical sound depends on frequency.

14. The direction of magnetic field around the current carrying conductor is given by ..... rule.

15. ..... is used as control rod in nuclear reactor.

SECTION – B

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

16. Calculate the work done in lifting a mass of 10 kg through 5 m. ($g = 9{\cdot}8$ m/ sec^2)

17. Define metacentre.

18. What are the characteristics of a musical sound ?

19. Define declination.

Give reasons for the following :

20. Fuse is used in electric circuit.

21. A metal with high melting point is used to produce *X*-rays.

Give any *two* uses or practical applications of the following :

22. Specific heat capacity of water.

23. Total internal reflection.

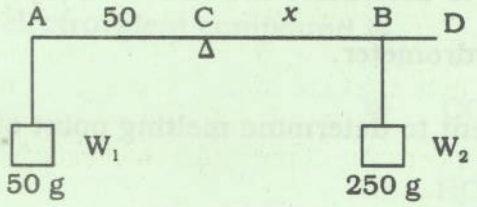
SECTION – C

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

PART – I

24. Study the diagram and answer the following questions :

AD is a rod in horizontal position,

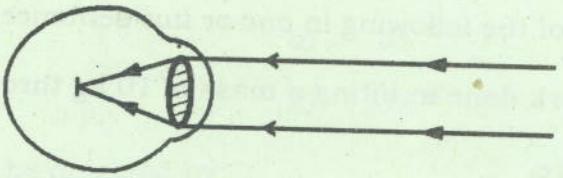


a) Calculate *x* using principle of moments. 2

b) State the principle of moments. 2

c) Give an application of principle of moments. 1

25. Study the diagram and answer the following questions :



a) Name the defect in the eye. 1

b) Give two reasons for this defect. 2

c) Draw a diagram to show corrected vision using a lens. 2

26. The diagram shows the right hand of a person,

a) What does the forefinger represent ? 1

b) What does the thumb represent ? 1

c) State the rule represented by this diagram. 2

d) Name the device in which this rule is applied. 1

PART – II

27. Write the experiment to determine the R.D. of a liquid using test tube float as a variable immersion hydrometer. 5

28. Describe the experiment to determine melting point of naphthalene using cooling curve method. 5

29. Explain the mode of vibration of an air column in an open organ pipe. 5

30. Describe a method to determine the 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 : $10 \times 1 = 10$

1. Molecular mass of CO_2 is 44. Its vapour density is

   a) 88 b) 11

   c) 44 d) 22.

2. The law of definite proportion was stated by

   a) Lavoisier b) Dalton

   c) Proust d) Newton.

3. Volume of a gas can be changed to equal number of molecules using

   a) Boyle's law b) Charles law

   c) Gay Lussac's law d) Avogadro's law.

4. The number of electrons in *L* energy level is

   a) 2 b) 8

   c) 18 d) 32.

5. An example for electrovalent compound is

   a) NaCl b) CO_2

   c) H_2 d) HCl.

6. Which is the lightest particle ?

   a) Alpha b) Beta

   c) Gamma d) Proton.

7. The colloidal solution is

a) Hydrochloric acid b) Water

c) Sugar solution d) Milk.

8. The acid used in pickling iron and steel is

a) Acetic acid b) Hydrochloric acid

c) Sulphuric acid d) Nitric acid.

9. ..... is used as a deoxidizer to remove oxygen in metallurgy.

a) Aluminium b) Magnesium

c) Iron d) Zinc.

10. ..... is a natural polymer.

a) PVC b) Polystyrene

c) Polythene d) Cellulose.

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

11. The property of white phosphorus glowing in the dark is ..... .

12. Vitamin *C* is otherwise called ..... .

13. ..... is used to ripen the green fruits.

14. Malathion is a ..... insecticide.

15. ..... process is used to manufacture Sodium carbonate.

SECTION – B

Answer any *five* questions in *one* or *two* sentences each : $5 \times 2 = 10$

16. Define radioactivity.

17. Give any two differences between white phosphorus and red phosphorus.

Give reasons for the following :

18. Gold is alloyed with copper.

19. Methane burns with a blue flame.

Give any *two* practical applications of the following :

20. Ethanol.

21. Sodium hydroxide.

Complete and balance the following equations :

22. $FeSO_4 + NaOH \rightarrow ..... + ...$

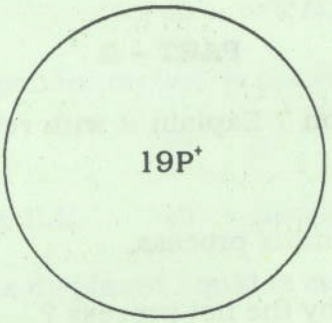
23. $C_{12}H_{22}O_{11} \xrightarrow{\text{conc. } H_2SO_4} ..... + ...$

SECTION – C

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

PART – I

24. Study the diagram and answer the following questions :



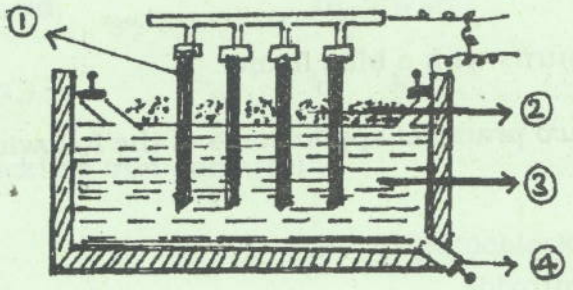
a) Identify the element. 1

b) How many protons are there ? 1

c) How many electrons are there ? 1

d) Complete the structure of the atom. 2

25. Study the diagram and answer the following questions :



a) Name the metal extracted from the above setup. 1

b) Name the chief ore of the metal. 1

c) Write the reaction at the cathode. 1

d) Label the diagram. 2

26. You are provided with the following apparatus in the laboratory :

Conical flask, delivery tube, funnel, beehive shelf, gas jar, etc.

a) How will you set up the apparatus for the preparation of acetylene ? 3

b) Give the equation for the preparation of acetylene. 1

c) Why is sand added ? 1

PART – II

27. What is substitution reaction ? Explain it with reference to the action of chlorine on methane. 5

28. Explain the theory of the contact process. 5

29. How is soap manufactured by the hot process ? 5

30. What are the rules to be followed in electroplating ? 5

31. Describe the formation of an electrovalent compound with an example. 5