7460

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. A stone in air during its motion possesses

   a) mechanical energy

   b) kinetic energy

   c) partly kinetic energy and partly potential energy

   d) potential energy.

2. A floating ship has stability when the

   a) metacentre is below the C.G. of the ship

   b) metacentre is below the centre of buoyancy

   c) metacentre is above the C.G. of the ship

   d) C.G. of the ship coincides with the metacentre.

3. The instrument used to check the purity of milk is

   a) hypsometer b) lactometer

   c) calorimeter d) alcoholometer.

4. The fixed temperature at which the liquid changes into its vapour is called

a) evaporation b) boiling point

c) melting point d) conduction.

5. In which of the following defects of eye is the eyeball elongated ?

a) Myopia b) Astigmatism

c) Hypermetropia d) Both Myopia and Astigmatism.

6. The loudness of a musical note depends on

a) frequency b) amplitude

c) wavelength d) overtones.

7. Declination can be measured using a

a) magnetic compass b) ampere meter

c) artificial magnet d) Kew magnetometer.

8. The dip is 90° at the magnetic poles as the lines of force are

a) parallel b) vertical

c) horizontal d) intersecting.

9. Step-down transformers are used in

a) TV sets b) Wireless

c) Radios d) *X*-ray equipment.

10. Atomic power plant in Tamil Nadu is located at

a) Chennai b) Manali

c) Kalpakkam d) Ennore.

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

11. The value of 1 megawatt is ..... watts.

12. The principle of floating a submarine is the principle of ..... .

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

14. Infrared radiations can be detected by ..... .

15. As the temperature increases the velocity of sound in air ..... .

SECTION – B

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

16. Calculate the power of a pump which lifts 200 kg water from a depth of 6 metre in 10 seconds.

17. State the laws of floatation.

18. Give the differences between sound produced by closed and open organ pipes.

19. Give the medical uses of *X*-rays.

Give reasons for the following :

20. Why does it take a longer time to cook in mountainous regions ?

21. The dip is zero at the equator. Why ?

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

22. Infrared radiation.

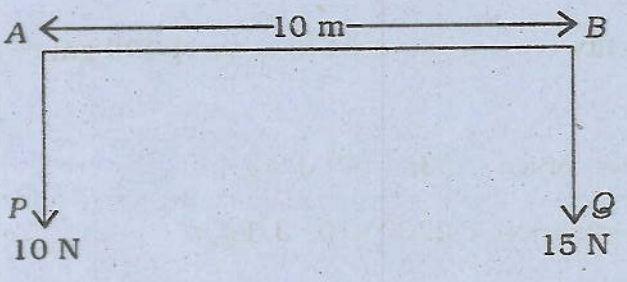
23. Electric motor.

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 following diagram and answer the questions :

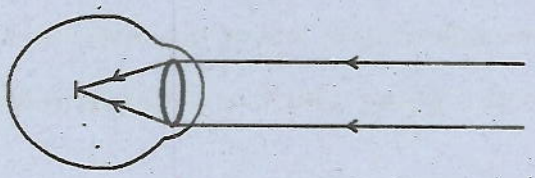


a) What kind of parallel forces are *P* and *Q* ? 1

b) What is the magnitude of their resultant ? 1

c) How far is the resultant from *P* and from *Q* ? 3

25. The following diagram shows the defective vision of a person.

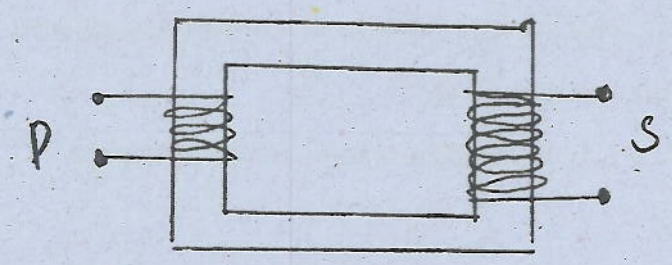


a) Name the defect. 1

b) State the causes for this defect. 2

c) Draw the diagram and show how this defect is rectified. 2

26.



a) Name the device. 1

b) Name the principle on which it works. 1

c) Define turns ratio. 2

d) Give any one application of this device. 1

PART – II

27. How will you find the R.D. of a liquid using a test tube float as constant immersion hydrometer ? 5

28. Calculate the quantity of heat required to convert 200 gm of ice at 0° C into steam at 100° C.

[latent heat of fusion of ice = 336×10^3 J/kg]

[latent heat of vaporisation = 2260×10^3 J/kg] 5

29. Describe the modes of vibration of an air column in an open organ pipe. 5

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

31. Describe Coolidge tube and explain the production of *X*-rays. 5

(CHEMISTRY)

(Marks : 50)

SECTION – A

Answer *all* the questions.

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

1. The number of moles present in 20 gm of sodim hydroxide is

   a) 5 moles b) 0·5 mole

   c) 0·25 mole d) 2·5 moles.

2. If 2 gm of *A* combines separately with 4 gms of *B* and 6 gms of *C*, the ratio in which *B* and *C* combine will be

   a) 1 : 2 b) 2 : 3

   c) 1 : 3 d) 2 : 1.

3. The electronic configuration of sulphur is

   a) 2, 8, 5 b) 2, 8, 6

   c) 2, 8, 7 d) 2, 8, 8.

4. ..... is a molecule formed by electrovalent bonding.

   a) HCl b) CH_4

   c) CaF_2 d) NH_3.

5. ..... is used for detecting any leakage in mains.

   a) Na^{24} b) C^{14}

   c) P^{32} d) Co^{60}.

6. Tyndal effect is shown by

   a) true solution b) colloidal solution

   c) suspension d) saturated solution.

7. In the manufacture of sulphuric acid by contact process vanadium pentoxide is used as a/an

a) promoter b) catalyst

c) oxidising agent d) dehydrating agent.

8. ..... is used as a 'deoxidiser' to remove oxygen in metallurgy.

a) Copper b) Magnesium

c) Zinc d) Iron.

9. Alkyne is characterised by the presence of

a) (C – C) b) (C = C)

c) (C ≡ C) d) none of these.

10. ..... is a powerful insecticide but is now banned as it is soluble in fat.

a) Malathion b) BHC - 666

c) Pyrethrin d) D.D.T.

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

11. Radioactivity was discovered by ..... .

12. Atoms of elements with same mass number but different atomic numbers are called ..... .

13. The various compounds of metals which occur in nature are called ..... .

14. The percentage composition of Invar is ..... .

15. The molecular formula for propene is ..... .

SECTION – B

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

16. State Gay Lussac's law of combining volumes.

17. What are the ingredients present on the sides of the match box ?

Complete and balance the following equations :

18. $P_4 + HNO_3 \rightarrow ..... + ... + ...$

19. $NaHCO_3 \xrightarrow{\Delta} ..... + ... + ... + ...$

Give reasons for the following :

20. When diluting the concentrated sulphuric acid, acid should be added to water.

21. Use of white phosphorus is banned in the match industry. Why ?

Give any *two* practical applications of the following :

22. Wrought iron.

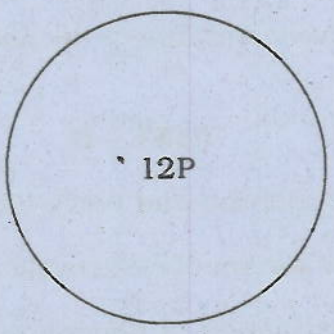
23. Ethanol.

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 :



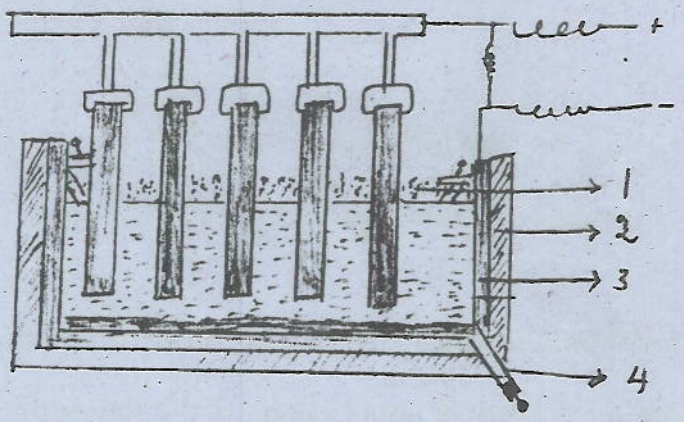
a) Name the element. 1

b) What is the atomic number ? 1

c) What is the mass number ? 1

d) Complete the structure and give the electronic configuration. 2

25. Study the diagram and answer the following questions :



a) What does the above set-up represent ? 1

b) Label the numbers given in the diagram. 1

c) What is liberated at the anode ? 1

d) What is the reaction taking place at the anode ? 2

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

Round bottomed flask, dropping funnel, wash bottle, thermometer, bee-hive shelf, trough, gas jar, delivery tubes, burner and stand.

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

b) Write the equation. 1

c) What is added to prevent frothing in the flask ? 1

PART – II

27. State the law of definite proportion and verify it with an experiment. 5

28. Define and describe the formation of electrovalent bond with an example. 5

29. Describe the method of extraction of phosphorus from bone ash by the modern electrothermal process. 5

30. What is addition reaction ? Give any two examples for it. 5

31. Give the raw materials needed for the manufacture of soap and explain the manufacture of soap by hot process. 5