

5460

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**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 × 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



## SECTION - B

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

16. Calculate the work done in lifting a mass of 10 kg through 5 m. ( $g = 9.8 \text{ m/sec}^2$ )
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

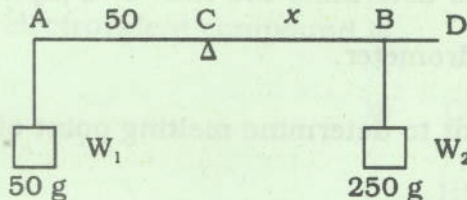
Answer any *five* of the following, choosing at least *one* question from each Part :

5 × 5 = 25

## PART - I

24. Study the diagram and answer the following questions :

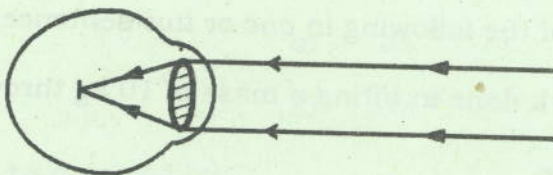
AD is a rod in horizontal position,



- a) Calculate  $x$  using principle of moments. 2
- b) State the principle of moments. 2
- c) Give an application of principle of moments. 1

[ Turn over

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 × 1 = 101. Molecular mass of  $\text{CO}_2$  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)  $\text{CO}_2$   
c)  $\text{H}_2$  d) HCl.

6. Which is the lightest particle ?

- a) Alpha b) Beta  
c) Gamma d) Proton.

[ Turn over

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.

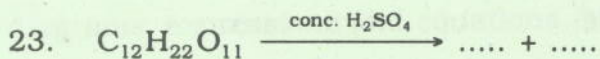
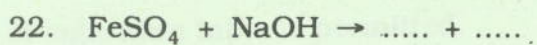
Give reasons for the following :

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 :



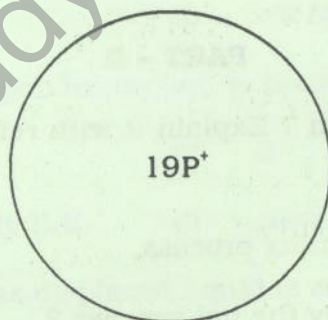
### SECTION - C

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

5 × 5 = 25

### PART - I

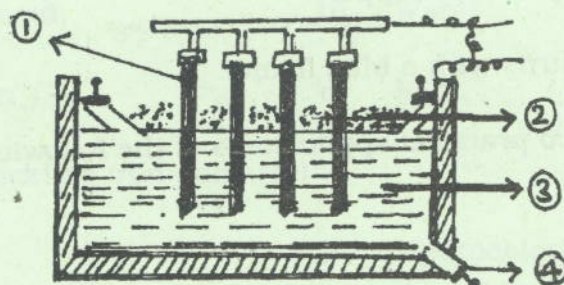
24. Study the diagram and answer the following questions :



- a) 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

[ Turn over

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