123

I

Total No. of Questions—21

Total No. of Printed Pages—3 **Regd. No.** | | | | | | | | | | |

Part III

CHEMISTRY

Paper I

(English Version)

Time : 3 Hours ***Max. Marks : 60***

Note :— Read the following instructions carefully :

(*i*) Answer ALL the questions of Section A. Answer ANY SIX questions in Section B and ANY TWO questions in Section C.

(*ii*) In Section A, questions from Sr. Nos. **1** to **10** are very short answer type. Each question carries TWO marks. Every answer may be limited to **2** or **3** sentences. Answer ALL these questions at one place in same order.

(*iii*) In Section B, questions from Sr. Nos. **11** to **18** are of short answer type. Each question carries FOUR marks. Every answer may be limited to **75** words.

(*iv*) In Section C, questions from Sr. Nos. **19** to **21** are of long answer type. Each question carries EIGHT marks. Every answer may be limited to **300** words.

(*v*) Draw labelled diagrams wherever necessary for questions in Section B and Section C.

SECTION A

10×2=20

Note :— Answer ALL questions.

1. Define COD and BOD.

2. Define 'Basicity' of acid and 'Acidity' of base.

3. What are 'open' and isolated systems ?

4. Calculate kinetic energy of 5 moles of nitrogen at 27°C.

5. What is green-house effect ?

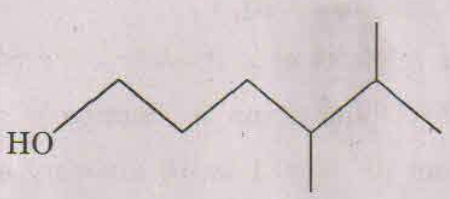
6. State Hess's law of constant heat summation.

7. What is heterogeneous equilibrium ? Write *one* heterogeneous reaction with example.

8. Which of the alkali metals shows abnormal density ? What is the order of the variation of density among the IA group elements ?

9. Why are IA group elements called alkaline metals ?

10. Write the IUPAC names of :

(*a*) 

(*b*) $CH_3CH=C(CH_3)_2$.

SECTION B

6×4=24

Note :— Answer any SIX questions.

11. Define :

(*a*) rms

(*b*) average

(*c*) most probable speeds of gas molecules.

Give the ratio of above speeds of gas molecules.

12. Balance the following redox reactions by ion-electron method in acidic media :

$$Fe^{2+}_{(aq)} + Cr_2O^{2-}_{7(aq)} \rightarrow Fe^{3+}_{(aq)} + Cr^{3+}_{(aq)}.$$

13. Calculate the pH of the following basic solutions :

(*a*) $[OH^-] = 0.05$ M

(*b*) $[OH^-] = 2 \times 10^{-4}$ M.

14. Explain the hybridization of 'P' involved in PCl_5 molecule.

15. Explain *two* oxidising and *two* reducing properties of H_2O_2 with equations.

16. Explain the following :

    (*a*) Graphite is a good conductor.

    (*b*) Diamond has high melting point.

17. Explain the factors favourable for the formation of cation in Ionic Bond.

18. How is diborane prepared ? How does it react with ammonia ? Give equation.

SECTION C

2×8=16

Note :— Answer any TWO questions.

19. Write the postulates of Bohr's model of hydrogen atom. What are the limitations of Bohr's model of an atom ?

20. Define IE_1 and IE_2. Why is $IE_2 > IE_1$ for a given atom ? Discuss the factors that affect IE of an element.

21. Prepare benzene from acetylene. Write equation. Explain the Friedel-Craft's alkylation, Friedel-Craft's acylation sulphonation reaction of benzene.