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SET -

Total No. of Questions - **33**

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Total No. of Printed Pages - **3**

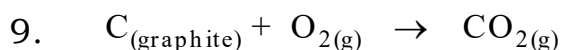
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Part - III**CHEMISTRY, Paper - I****(English Version)****MODEL Paper - I****(For the Academic Year 2021-22 only)****Time : 3 Hours****Max. Marks : 60****SECTION - A****10 × 2 = 20****Note:** (i) Answer **ANY TEN** Questions(ii) Each Question carries **TWO** marks

(iii) All are very short answer type questions.

- Among N^{-3} , O^{-2} , F^{-} , Na^{+} , Mg^{+2} and Al^{+3}
 - What is common in them ?
 - Arrange them in the increasing ionic radii.
- An element 'X' has atomic number 34. Give its position in the periodic table.
- Write Lewis dot structures for S and S^{2-}
- Cl^{-} ion is more stable than Cl atom—Why?
- How many Sigma and Pi bonds are present in (a) C_2H_2 and (b) C_2H_4 ?
- Which of the gases diffuses faster among N_2 , O_2 and CH_4 ? Why?
- Give the relation between the partial pressure of a gas and its mole fraction.
- Calculate the number of molecules present in 1.12×10^{-7} c.c. of a gas at STP (c.c.- cubic centimeters = cm^3).



For the above reaction what is the internal energy change, ΔU ?

10. What is meant by ionic product of water ?
11. Lithium salts are mostly hydrated. Why?
12. What happens when magnesium metal is burnt in air?
13. Write the outer electron configuration of group-14 elements.
14. Diamond has high melting point – explain.
15. Write the reagents required for conversion of benzene to methyl benzene.

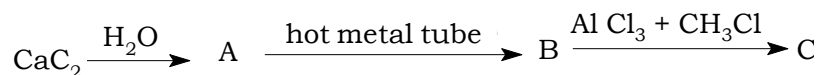
SECTION - B

6 × 4 = 24

- Note:**
- (i) Answer **ANY SIX** questions.
 - (ii) Each question carries **FOUR** marks.
 - (iii) All are of short answer type questions.

16. What is a nodal plane? How many nodal planes are possible for 2p- and 3d- orbitals?
17. Assign the position of the element having outer electronic configuration.
a. $ns^2np^4 (n = 3)$ b. $(n - 1)d^2ns^2 (n = 4)$
18. Explain the hybridization involved in PCl_5 molecule.
19. Deduce (a) Boyle's law and (b) Charle's law from Kinetic gas equation.
20. Derive Ideal gas equation.
21. What volume of CO_2 is obtained at STP by heating 4 g of $CaCO_3$?
22. Balance the following redox reactions by ion – electron method:
 $MnO_4^- (aq) + SO_2 (g) \rightarrow Mn^{2+} (aq) + HSO_4^- (aq)$
(in acidic solution)
23. Explain extensive and intensive properties.

24. Classify the species AlCl_3 , NH_3 , Mg^{+2} and H_2O into Lewis acids and Lewis bases and justify your answer ?
25. Derive the relation between K_p and K_c for the equilibrium reaction
- $$\text{N}_2 (\text{g}) + 3\text{H}_2 (\text{g}) \rightleftharpoons 2\text{NH}_3 (\text{g})$$
26. Write a note on heavy water.
27. Write a short note on the anomalous behaviour of boron in the group – 13.
28. Explain the difference in properties of diamond and graphite on the basis of their structure.
29. Complete the following reaction and name the products A,B and C.



SECTION - C

2 × 8 = 16

- Note:** (i) Answer any **ANY TWO** questions.
(ii) Each question carries **EIGHT** marks.
(iii) All are long answer type questions.
30. How are the quantum numbers n , l and m_l arrived at? Explain the significance of these quantum numbers.
31. Define IE_1 and IE_2 . Why is $IE_2 > IE_1$ for a given atom? Discuss the factors that effect IE of an element.
32. What do you understand by Hybridisation? Explain different types of hybridization involving s and p orbitals.
33. How does acetylene react with the following reagents? Give the corresponding equations and name the products formed in the reactions.
- a. Acetic acid b. Water c. Hydrogen d. Halogens
e. Hydrogen halide f. Ammonical AgNO_3 and Cu_2Cl_2