JAIN COLLEGE

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Bangalore - 560 098

Date: ***SUBJECT: CHEMISTRY***

I PUC
MOCK

Timings Allowed: 3 Hrs 15 Minutes ***Total Marks: 70***

Instructions:

1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labeled diagrams wherever require
3. Use log tables and the simple calculator if necessary.
(Use of scientific calculators is not allowed)

PART A

I Answer all the questions **1x10=10**

1. State Boyle's law.
2. What happens to the entropy of the system when liquid is converted into solid?
3. What is Lewis acid?
4. What are isotopes?
5. Write the composition of plaster of Paris?
6. What is the SI unit of temperature?
7. Write the IUPAC name of CH_3-CH_2-CH_2-CHO
8. Define electro negativity.
9. Name the type of hybridization in CH≡CH.
10. Define oxidation in terms of electron transfer.

PART B

II Answer any five of the following : 2x5=10

11. Write the postulates of Rutherford's atomic model.
12. Give the differences between sigma and pi bonds.
13. Calculate the RMS velocity of CO_2 at 298K.
14. State first law of thermodynamics and write its mathematical form.
15. What is position isomerism? Give an example.
16. Write the rules for rounding off significant figures.
17. How do you prepare alkane from Kolbe's electrolysis method? Write its equation.
18. Calculate the oxidation number of (i) Mn in MnO_4^- (ii) P in H_3PO_4.

PART C

III Answer any five of the following: 3x5=15

19. (a) How do you prepare $CaCO_3$ from $Ca(OH)_2$?
    (b) How do you prepare slaked lime?
20. Mention the postulates of Planck's quantum theory.
21. Explain the variation of ionization enthalpy across the period and down the group.
22. Write the postulates of molecular orbital theory.
23. (a) What is hard water?
    (b) How do you remove temporary hardness by Clark's method?
24. (a) How do prepare producer gas?
    (b) Explain the preparation of orthoboric acid from borax.

25. Balance the following equation by oxidation number method
$Cr_2O_7^{2-} + SO_3^{2-} \text{ ----------} \rightarrow Cr^{3+} + SO_4^{2-}$ (in acidic medium)
26. Explain sp^2 hybridization with an example.

PART D

IV <u>Answer any five of the following</u> **5x5=25**

27. Derive Vander Waal's equation for real gases.
28. (a) Explain the measurement of ΔU by bomb calorimeter.
    (b) Give the relationship between ΔH and ΔU.
29. (a)The enthalpy of combustion of carbon, hydrogen and methanol are -393.29kJ, -286.16kJ and -726kJ respectively. Calculate the enthalpy of formation of methanol (CH_3OH).
    (b) Define enthalpy of combustion.
30. (a)State Le Chatelier's principle and its effect on temperature for the given equation. $N_2 + 3H_2$ ---------- $\rightarrow 2NH_3$ ΔH = negative
    (b) What is extensive property? Give an example.
31. (a) 1 mole of N_2 and 3 moles of H_2 are mixed in a closed vessel of $2dm^3$ capacity. At equilibrium the vessel contains 1.2mol of NH_3. Calculate K_c for $N_2 + 3H_2 \text{ ----------} \rightarrow 2NH_3$.
    (b) Show that p H + p OH = 14 at 298K for an aqueous solution.
32. (a) 40g of a gas occupies $20dm^3$ at 300K and 100KPa pressure. If the pressure is changed to 50KPa without changing the temperature. What would be its volume?
    (b) Write the difference between real gas and ideal gas.
    (c) Define critical temperature.
33. (a)Calculate the standard Gibb's energy change for the reaction 298K. if its equilibrium constant is 50.
    (b)Write the characteristics of chemical equilibrium.
34. (a) State law of chemical equilibrium.
    (b)Give Henderson's equation for acidic buffers.
    (c) Write the conjugate acid of HCO^- and S^{2-}

PART E

V <u>Answer any two of the following</u> **5x2=10**

35. (a)Explain the mechanism of nitration of benzene.
    (b)Define heteretic fission with an example.

36.(a)How do you Estimate the nitrogen by Dumas method?
    (b) How do you detect Halogen from sodium fusion extract? (Lassaigne's extract?)

37. (a)Explain Friedel Craft's acylation with example.
    (b)Explain the mechanism of addition of HBr to propene.

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