JAIN COLLEGE

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Bengaluru - 560 098

Date: *SUBJECT: CHEMISTRY*

IIPUC
MOCK 2

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

PART A

I Answer ALL the following   1 X 10 = 10

1. What is the effect of pressure on the solubility of a gas in a liquid?
2. State Henry's law.
3. Write the representation of Daniel cell.
4. Define pseudo first order reaction.
5. Define sorption.
6. What is cast iron?
7. What is aqua regia?
8. What is Lucas reagent?
9. Higher ketones like acetophenone do not reacts with $NaHSO_3$. Give reason.
10. Name the protein present in hair.

PART B

II Answer any FIVE of the following   2 X 5 = 10

11. What are ferromagnetic substances? Give an example.
12. What is a secondary cell? Give the cathodic and anodic reaction that occurs in lead storage battery?
13. Write the energy distribution curve showing temperature dependence on rate of a reaction.
14. (a) Lanthanoids are less reactive than actinoids. Why?
    (b) Between Ti^{2+} and V^{2+} which ion contains more number of unpaired electrons?
15. What is the effect of
    (i) Electron withdrawing group on acidity of phenols?
    (ii) Electron donating groups on acidity of alcohols?
16. Explain decarboxylation reaction with an example.
17. Give an example for artificial sweetening agent and narcotic analegesic.
18. (a)What are antibiotics?
    (b)Give an example of hipnotics.

PART C

III Answer any FIVE of the following   3 X 5 =15

19. Explain the reducing behaviour of carbon in the extraction of iron by using Ellingham diagram.
20. Explain the manufacture of sulphuric acid by Contact's process.
21. (a) Interhalogen compounds except fluorine are more reactive then halogens. Why?
    (b) Write the structure of Chlorus acid [HOClO]
22. (a)Complete the following reaction
    (i)$Cl_2 + 3F_2$ --------->
    (ii) $CH_4 + 2O_2$ ------------->
    (b) Why is I_2 less reactive than ICl?
23. Explain the preparation of $K_2Cr_2O_7$ from chromite ore.

24. (a) Zr and Hf have almost identical atomic radii. Give reason.
    (b) What are interstitial compounds?
25. Using VBT, account for the geometry, hybridization and magnetic property of $[Ni(CN)_4]^{2-}$. (Atomic number of Ni = 28)
26. (a) Write cis and trans isomeric structure of $[Fe(NH_3)_2(CN)_4]^-$
    (b) What is the Co-ordination number of Fe in $[FeCl_2(en)_2Cl]$?

PART D

IV Answer any THREE of the following   5 X 3 = 15

27. (a) Calculate the packing efficiency in body centered cubic lattice.
    (b) An element having an atomic mass of 107.9g/mol has FCC unit cell. The edge length of the unit cell is 408.6pm. Calculate the density of the FCC unit cell. (Given N_A = 6.022 x 10^{23})
28. (a) The boiling point of benzene is 353.23K when 180g of non-volatile, non-ionisable solute was dissolved in 90g of benzene the boiling point raised to 354.11K. Calculate the molar mass of the solute. [K_b for benzene = 2.53Kkg/mol]
    (b) What is Reverse osmosis? Mention its application.
29. (a) Find the value of ΔG^o at 25^0C for the following electrochemical cell $Cu|Cu^{2+}(1M)||Ag^+(1M)|Ag$
    E^o_{Ag} =+0.80V E^o_{Cu} =+0.34V Faraday = 96487C
    (b) Write the equation for anodic and cathodic reaction occurs during rusting of iron.
30. (a) Derive integrated rate equation for first order reaction.
    (b) 75% of the first order reaction is completed in 30min. Calculate rate constant of the reaction.
31. (a) Write a note on electrophoresis.
    (b) Give the mechanism of heterogenous catalysis.

PART E

V Answer any FOUR of the following   5 X 4 = 20

32. (a) Explain S_N2 mechanism with example.
    (b) R-X + NaI--------dry acetone---$\rightarrow$ R –I +NaX.   Name the reaction.
    (c) Complete the reaction CH_3-CH_2-Br + $AgCN_{(alcoholic)}$ --------$\rightarrow$
33. (a) Between alcohol and phenols which is more acidic. Why?
    (b) Explain Williamson's ether synthesis.
    (c) R-CH_2OH   ------Cu 573K--$\rightarrow$
34. (a) Acetaldehyde does not undergo Cannizzaro's reaction. Why?
    (b) Explain what happens when carbonyl compounds are treated with hydrazine? Write the equation.
    (C) Explain Rosenmund's reduction of benzoyl chloride.
35. (a) How do you prepare methanamine from Hoffmann bromamide degradation reaction?
    (b) Ammonia is more basic than aniline. Give reason.
    (c) Name the product formed when HNO_2 is treated with
    (i) Methylamine (ii) Aniline at low temperature.
36. (a) Write the Harworth structure of maltose.
    (b) Name the water insoluble component of starch.
    (c) Give the reaction to show the presence of aldehyde functional group in glucose.
37. (a) Explain the preparation of Buna-N.
    (b) What are condensation polymers? Give example
    (c) Give an example of thermosetting polymer.

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