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Register No.

Half Yearly Examination- 2024

CHEMISTRY

Time : 3.00 Hrs. Marks : 70

PART - I

I. Choose the correct answer. **15 x 1 = 15**

1. Bauxite has the composition a) $A\ell_2O_3$ b) $A\ell_2O_3\,nH_2O$ c) $Fe_2O_3 2H_2O$ d) None of these
2. Which of the following is not sp^2 hybridised? a) graphite b) graphene c) fullerene d) dry ice
3. After one hour, a radioactive substance becomes $\left(\frac{1}{16}\right)^{th}$ of original amount then the half life (in min) is
   a) 60 minutes b) 45 minutes c) 30 minutes d) 15 minutes
4. Aspirin is
   a) Acetyl salicylic acid b) Benzoyl salicyclic acid c) Chloro benzoic acid d) Anthranilic acid
5. The magnetic moment of Mn^{2+} ion is a) 5.92 BM b) 2.80 BM c) 8.95 BM d) 3.90 BM
6. Which of the following reaction is an example of disproportionation reaction.
   a) Aldol condensation b) Cannizaro reaction c) Benzoin condensation d) none of these
7. Which one of the following is Marshall's acid. a) $H_2S_2O_6$ b) $H_2S_2O_7$ c) $H_2S_2O_8$ d) $H_2S_2O_5$
8. The pyrimidine bases present in DNA are
   a) cytosine and adenine b) cytosine and guanine c) cytosine and thiamine d) cytosine and uracil
9. Match the following.

A) Pure nitrogen	(i) Chlorine
B) Haber process	(ii) Sulphuric acid
C) Contact process	(iii) Ammonia
D) Deacons process	(iv) Sodium azide (or) barium azide

Which of the following is the correct option.

	A	B	C	D
a)	(i)	(ii)	(iii)	(iv)
b)	(ii)	(iv)	(i)	(iii)
c)	(iii)	(iv)	(ii)	(i)
d)	(iv)	(iii)	(ii)	(i)

10. Which kind of isomerism is possible for a complex $[Co(NH_3)_4\,Br_2]\,C\ell$
    a) geometrical and ionisation b) geometrical and optical c) optical and ionisation d) geometrical only
11. The product formed by the reaction an aldehyde with a primary amine
    a) carboxylic acid b) aromatic acid c) Schiff's base d) ketone
12. Which of the following can act as Lowry - Bronsted acid as well as base?
    a) $HC\ell$ b) SO_4^{2-} c) HPO_4^{2-} d) Br^-
13. The crystal with a metal deficiency defect is a) $NaC\ell$ b) FeO c) ZnO d) $KC\ell$
14. Orcinol is a) 1, 2 - dihydroxy benzene b) 3 - methyl phenol c) 3, 5 - dihydroxy toluene
    d) 3, 5 - dimethyl toluene
15. Assertion : pure iron when heated in dry air converted with a layer of rust.
    Reason : Rust has the composition Fe_3O_4.
    a) Both assertion and reason are true and reason is the correct explanation of assertion.
    b) Both assertion and reason are true but reason is not the correct explanation of assertion.
    c) assertion is true but reason is false.
    d) both assertion and reason are false

PART - II

II. Answer any six questions. Question number 24 is compulsory. **6 x 2 = 12**

16. What are the differences between minerals and ores?
17. Give a reason to support that sulphuric acid is a dehydrating agent.
18. Calculate the number of atoms in fcc unit cell.
19. Write a note on catalytic poison.
20. How is phenol prepared from isopropyl benzene?
21. What is urotropine? Write its use.
22. Write short note on Mustard oil reaction.
23. What are food preservatives?
24. The rate constant for a first order reaction is $1.54 \times 10^{-3}\ s^{-1}$. Calculate its half life time.

PART - III

III. Answer any six questions. Question number 33 is compulsory. **6 x 3 = 18**

25. Give the uses of silicones.
26. In an octahedral crystal field, draw the figure to show splitting of d-orbitals.
27. Write a note on Frenkel defect.
28. Calculate the pH of 1.5×10^{-3} M solution of $Ba(OH)_2$
29. State Faraday's laws of electrolysis.
30. What is the difference between homogenous and hetrogenous catalysis?
31. Give the differences between DNA and RNA.
32. Write a note on vulcanisation of rubber.
33. The compound 'A' having the formula $CNC\ell$, reacts with methyl magnesium bromide and gives 'B' having formula C_2H_3N. When 'B' undergoes reduction in presence of catalyst Nickel it gives 'C' with formula C_2H_7N. Compound 'C' undergoes carbylamine test. Identify A, B, C and give the reaction.

PART - IV

IV. Answer all the questions. **5 x 5 = 25**

34. Explain zone refining process with an example. (5m) **(OR)**
    i) Give the structure of CO and CO_2. (2m)
    ii) How will you prepare chlorine in laboratory? (3m)
35. Compare lanthanides and actinides. (5m) **(OR)**
    (i) Give the difference between double salts and co-ordination compounds. (2m)
    (ii) Calculate the percentage efficiency of packing in case of simple cubic crystal (3m)
36. Derive integrated rate law for first order reaction A $\rightarrow$ product. (5m) **(OR)**
    Derive an expression for Nernst equation (5m)
37. (i) What is peptisation. (2m)
    (ii) Find the pH of a buffer solution containing 0.20 mole per litre sodium acetate and 0.18 mole per litre acetic acid. Ka for acetic acid is 1.8×10^{-5}. (log 1.8 = 0.26) (3m) **(OR)**
    Differentiate primary, secondary and tertiary alcohols by Victor Meyer's test. (5m)
38. Explain the mechanism of cannizaro reaction. (5m) **(OR)**
    (i) Write a short note on peptide bond. (2m)
    (ii) How is terylene prepared? (3m)