Tvl12Che

Common Quarterly Examination - September 2022

TENKASI DISTRICT **Standard - 12**

Time Allowed:3.00 Hours **CHEMISTRY** Maximum Marks: 70

PART - I

Note: 1. Answer all the questions. **15×1=15**

2. Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1. The metal oxide which cannot be reduced to metal by carbon is _____.
   a) PbO b) Al_2O_3 c) ZnO d) FeO
2. Match items in column – I with the items of column – II and assign the correct code.

Column – I	Column - II
A. Haematite	(i) $2CuCO_3.Cu(OH)_2$
B. Azurite	(ii) $ZnCO_3$
C. Galena	(iii) Fe_2O_3
D. Calamine	(iv) PbS

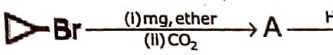
	A	B	C	D
a)	(iii)	(iv)	(i)	(ii)
b)	(iii)	(ii)	(i)	(iv)
c)	(iii)	(iv)	(ii)	(i)
d)	(iii)	(i)	(iv)	(ii)

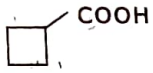
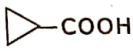
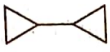
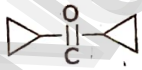
3. Hybridisation of carbon in Graphite _____.
   a) sp^2 b) sp^3 c) sp^2d d) sp
4. Oxidation number of nitrogen in pernitrous acid (HOONO) _____.
   a) +3 b) +5 c) +1 d) +6
5. Inter halogen compounds of type AX_5, about the structure of hybridization and bond pairs / lone pairs, which one is correct?
   a) T – shaped, sp^3d, $3/2$
   b) Square pyramidal, sp^3d^2, $5/1$
   c) T – shaped, sp^3d, $5/1$
   d) Square pyramidal, sp^3d, $3/2$
6. Magnetic moment of Mn^{2+} is _____.
   a) 5.92 BM b) 8.95 BM c) 2.80 BM d) 3.90 BM
7. Number of electrons transferred to $KMnO_4$ in acid medium _____.
   a) 3 b) 1 c) 2 d) 5
8. An ionic compound $A_x B_y$ crystallizes in fcc type crystal structure with B ions at the centre of each face and A ion occupying corners of the cube, the correct formula of A_xB_y is_____.
   a) AB b) AB_3
   c) A_3B d) A_8B_6.
9. For the reaction, $2SO_2 + O_2 \rightarrow 2SO_3$, if $\frac{-d}{dt}[so_2]=k_1[so_3]$, $\frac{-d}{dt}[O_2]=k_2[so_3]$, $\frac{-d}{dt}[SO_3]=k_3[so_3]$ then the relation between k_1, k_2 and k_3 is_____.
   a) $2k_1 = k_2 = k_3$ b) $k_1 = 2k_2 = k_3$
   c) $k_1 = k_2 = 2k_3$ d) $2k_1 = 2k_2 = k_3$
10. Which of the following can act as Lowry. Bromsted acid as well as base?
    a) HCl b) SO_4^{2-} c) HPO_4^{2-} d) Br^-

11. The aqueous solutions of sodium chloride, ammonium chloride, potassium cyanide are respectively
    a) acidic, acidic, basic
    b) neutral, acidic, basic
    c) basic, neutral, acidic
    d) neutral, basic, acidic

12. $RCOCH_2CH_2COOH \xrightarrow[H_3O^+]{?} RCH(OH)CH_2CH_2COOH$. Choose the correct reducing agent for the above reaction.
    a) Pd/H_2
    b) $LiAlH_4$
    c) Na – Hg / H_2O
    d) $NaBH_4$

13. Which one of the following is the strongest acid?
    a) 2 - nitrophenol
    b) 4 - Chlorophenol
    c) 4 - nitrophenol
    d) 3 - nitrophenol

14.  B , B^{-1} is

    a) 
    b) 
    c) 
    d) 

15. Assertion: Cannizaro reaction is a disproportionation reaction.
    Reason: Two molecules of benzaldehyde is reduced in the reaction.
    a) Both assertion and reason are false
    b) Assertion is true and reason is false
    c) Both assertion and reason are true and the reason is correct explanation for the assertion
    d) Both assertion and reason are true but the reason is not the correct explanation for the assertion

PART - II

Note: Answer any SIX of the following. 6×2=12
Question Number 24 is compulsory.

16. What is the role of quick lime in the extraction of Iron from its oxide Fe_2O_3?
17. Write the uses of boric acid.
18. What type of hybridisation occur in a) BrF_5 b) BrF_3
19. Why transition metals form Co ordination compounds?
20. Sodium metal crystallizes in bcc structure with the edge length 400pm. Calculate the radius of sodium atom
21. The rate law for a reaction of A, B and C has been found to be rate = $K[A]^2[B][L]^{3/2}$. How would the rate of reaction change. When
    (i) Concentration of [L] is quadrupled.
    (ii) Concentration of [A] is halved.
22. Explain common ion effect with an example.
23. Write Saponification reaction.
24. Compound (A) with a molecular formula C_7H_6O reacts with Cl_2 in the presence of a catalyst gives (B) and without catalyst gives (C). Find (A) (B) & (C).

PART - III

Note: Answer any SIX of the following. 6×3=18
Question Number 32 is compulsory.

25. Describe a method for refining of nickel.
26. Complete the following reactions.
    a) $B(OH)_3 + NH_3 \longrightarrow$
    b) $B_2H_6 + NH_3 \longrightarrow$
    c) $SiCl_4 + NH_3 \longrightarrow$

27. Give the oxidation state of halogen in the following a) Cl_2O_3 b) I_4O_9 c) Br_2O.
28. Compare lanthanoids and actinoides.
29. An element has a face centered cubic unit cell with a length of 352.4pm along an edge. The density of the element is 8.9 gcm^{-3}. How many atoms are present in 100g of ana element.
30. Differentiate order & molecularity of a reaction.
31. Write the expression for the solubility product of Ag_2CrO_4.
32. Arrange the following compounds in the increasing order of the property indicated against each.
    (i) CH_3CH_2OH, CF_3CH_2OH, CCl_3CH_2OH (Acidic nature).
    (ii) Propanol, Propane, Propanal (Boiling point).
    (iii) Formic acid, Propanoic acid, acetic acid (Acidity).
33. Write the following reactions
    (i) Wolf – kishner reduction
    (ii) Haloform reaction.

PART - IV

Note: Answer all the questions. 5×5=25

34. (a) (i) Explain zone refining process with an example. (3)
    (ii) Write the role of cryolite in the extraction of aluminium. (2)

(OR)

    (b) (i) Explain the types of silicones. (2)
    (ii) Describe the structure of diborane. (3)
35. (a) (i) Explain the reaction of chlorine with alkali. (3)
    (ii) Give the structure of the following oxo acids. (2)
    1. Sulphorous acid 2. Pyrophosphoric acid.

(OR)

    (b) (i) Explain the oxidizing property of Potassium dichromate. (3)
    (ii) Which is more stable Mn^{3+} and Mn^{2+} Explain. (2)
36. (a) (i) Calculate the percentage efficiency of packing in case of face centered cubic crystal. (3)
    (ii) Examine the following Crystal defect. Answer the following. (2)

A^+ B^- A^+ B^- A^+
B^- O B^- A^+ B^-
A^+ B^- A^+ O A^+
B^- A^+ B^- A^+ B^-

    1. What type of crystal defect shown in the diagram?
    2. What is the change in the density of the crystal if this defect is present?

(OR)

    (b) (i) Find the overall order of the following reaction using the given data (3)

$2NO_{(g)} + Cl_{2(g)} \rightarrow 2NOCl_{(g)}$

Experiment number	Initial Concentration		Initial rate
	NO	Cl_2	NOCl mol $L^{-1}s^{-1}$
1	0.1	0.1	7.8×10^{-5}
2	0.2	0.1	3.12×10^{-4}
3	0.2	0.3	9.36×10^{-4}

    (ii) Explain Pseudo first order reaction with an example. (2)

37. (a) (i) Derive an expression for the Oswald's dilution law. (3)
(ii) Discuss the acid – base concepts of lewis. (2)

(OR)

(b) Calculate
(i) degree of hydrolysis
(ii) The hydrolysis constant and
(iii) p^H of 0.1M CH_3COONa solution (pk_a for CH_3COOH is 4.74). (5)

38. (a) (i) How will you differentiate ethanol, propan – 2 – ol, 2 – methylpropane – 2 – ol. Explain the reactions. (3)
(ii) Complete the following reactions (2)

1) $CH_3CH_2CH_2OH \xrightarrow{PCC} ?$

2) $\begin{matrix} CH_2OH \\ | \\ CH_2OH \end{matrix} + HIO_4 \longrightarrow ?$

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(OR)

(b) (i) Explain the mechanism of aldol Condensation. (3)
(ii) Write the testes for Carboxylic acid group. (2)
