PYRAMID

IIT-JEE | MEDICAL | FOUNDATION

'लक्ष्य' TEST SERIES 2021-22

STD : XII
SUBJECT : CHEMISTRY
TOPIC : SOLUTION, CHEMICAL THERMODYNAMICS, CO-ORDINATION COMPOUNDS, HALOGEN DERIVATIVE, ALCOHOL PHENOL AND ETHER, ALDEHYDE KETONES & CARBOXYLIC ACID, POLYMER CHEMISTRY, GREEN CHEMISTRY AND NANOCHEMISTRY

TIME : 3 HR.   **MAX. MARKS : 70**

General Instructions :

Question paper divided into **FOUR** sections,

(1) Section - A :   Q. No. 1 contains 10 multiple choice type questions carrying one mark each.

Q. No. 2 contains 8 very short answer type questions carrying one mark each.

(2) Section - B :   Q. No. 3 to Q. No. 14 are 12 short answer-I type questions carrying two marks each. Attempt any eight questions.

(3) Section - C :   Q. No. 15 to Q. No. 26 are 12 short answer-II type questions carrying three marks each. Attempt any eight questions.

(4) Section - D :   Q. No. 27 to Q. No. 31 are 5 long answer type questions carrying four marks each. Attempt any three questions.

2.   Use of a log table is allowed. Use of calculator is not allowed.

3.   Figure to the right indicate full marks.

4.   For each MCQ, the correct answer must be written along with its alphabet.

e.g.. (a) ...... / (b) ...... / (c) ...... / (d) ......, etc. Only the first attempt will be considered for evolution.

'You should never let your fears prevent you from doing what you know is right.'
Aung San Suu Kyi - Burmese politician, diplomat and author (b.1945)

SECTION - A (18 M)

Q.1 Solve the following multi choice Question.   **(10 M)**

i. Chemically semipermeable membrane is
   (a) Copper ferrocyanide
   (b) Copper ferricyamide
   (c) Copper Sulphate
   (d) Potassium ferrocyanide

ii. The type of system which exchange heat as well as matter with surrounding
   (a) Isothermal process
   (b) Open system
   (c) Adiabatic process
   (b) Closed system

iii. Bond enthalpies of H - H, Cl - Cl and bonds are 434 kJ mol^{-1}, 242 kJ mol^{-1} and 431 kJ mol^{-1} respectively. Enthalpy of formation of HCl is
   (a) 245 kJ mol^{-1}
   (b) -93 kJ mol^{-1}
   (c) -245 kJ mol^{-1}
   (d) 93 kJ mol^{-1}

iv. The oxidation state of cobalt ion the complex $[Co(NH_3)_5Br]SO_4$ is
   (a) +2
   (b) +3
   (c) +1
   (d) +4

v. The best method for preparation of alkyl fluorides is
   (a) Finkel stein reaction
   (b) Swart reaction
   (c) Free radical fluorination
   (d) Sandmeyer's reactions

vi. Which is the most resistanat alcohol towards oxidation reaction among the following
   (a) $CH_3 - CH_2 - OH$
   (b) $(CH_3)_2\text{-}CHOH$
   (c) $(CH_3)_3\text{-}C - OH$
   (d) $C_2H_5 - \underset{\underset{CH_3}{|}}{CH} - OH$

vii. Benzaldehyde does not show positive test with
   (a) Schiff's reagent
   (b) Tollen's reagent
   (c) Sodium bisulphite solution
   (d) Fehlings solution

viii. Silk is a kind of _____ fibre
   (a) semisynthetic
   (b) Synthetic
   (c) Animal
   (d) Vegetable

ix.   Vapour pressure of a solution is

(a) directly proportional to the mole fraction of the solute

(b) inversely proportional to the mole fraction of the solute

(c) inversely proportional to the mole fraction of the solvent

(d) directly proportional to the mole fraction of the solvent

x.   Which of the following reaction is exothermic?

(a) $H_{2(g)} \rightarrow 2H_{(g)}$ (b) $C_{(s)} \rightarrow C_{(g)}$ (c) $2Cl_{(g)} \rightarrow Cl_{2(g)}$ (d) $H_2O_{(2)} \rightarrow H_2O_{(l)}$

Answer the following Questions   **(8 M)**

i.   Calculate EAN number of the complex $[Fe(CN)_6]^{4-}$

ii.   Write formulae of the complex.
Potassium amminetrichloroplatinate (II)

iii.   Arrange the following in the increase order of boiling points
1-bromopropane, 2-bromopropane, 1-bromobutane, 1-bromo-2-methyl propane

iv.   Write the IUPAC name
$$CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_2 - OH$$

v.   What is formalin.

vi.   Calculate the V.P. of a solution containing 2 moles of a solute in 2 mole of water
(V.P. of pure water = 2.4 mm Hg)

vii.   Complete the following statement.
Novolak is a copolymer of _____ and _____

viii.   Write the formula to calculate % atom economy.

SECTION - B (16 M)

Attempt any Eight of the following Questions. (8 x 2 = 16)

Q.3 State & Explain Henry's law.

Q.4 Explain Extensive & Intensive Property.

Q.5 Mention any two application of co-ordination compounds.

Q.6 Distinguish between S_N1 and S_N2 mechanisam of substitution reaction.

Q.7 Name the reagent used to bring about the following conversions
(a) Bromoethane to ethoxyethane   (b) 1-Chloropropane to 1-nitropropane
(c) Ethyl bromide to ethyl isocyanide (d) Chlorobenzene to biphenyl

Q.8 Arrange the following compounds in the increasing order of their B.P.
formaldehyde, ethane, methyl alcohol

Q.9 Write the preparation of Terylene.

Q.10 Define :   (a) Nanochemistry   (b) Polymer

Q.11 The V.P. of H_2O at 20°C is 17 mm Hg. What is the V.P. of solution containing 2.8 g urea in 50 g of H_2O.

Q.12 Calculate the (H^+) ion concentration having pH 6.06.

Q13 Distinguish between Isothermal & Adiabatic process.

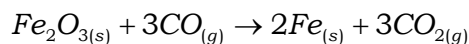Q.14 Derive radius edge length relation for bcc type crystal structure.

SECTION - C (24 M)

Attempt any EIGHT of the following Questions. (8 x 3 = 24)

Q.15 Explain the factors affecting solubility of gaseous solute in liquid solvent.

Q.16 Obtain the expression for work done in chemical reaction.

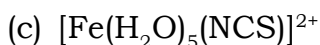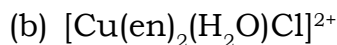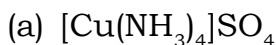Q.17 Calculate standard enthalpy of reaction

$$Fe_2O_{3(s)} + 3CO_{(g)} \rightarrow 2Fe_{(s)} + 3CO_{2(g)}$$

from the following data.

$\Delta_f H^o_{(Fe_2O_3)} = -824 \ kJ/mol$
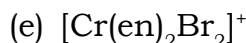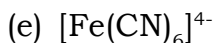
$\Delta_f H^o_{(CO)} = -110 \ kJ/mol$

$\Delta_f H^o_{(CO_2)} = -393 \ kJ/mol$

Q.18 Classify following complex as homoleptic and heteroleptic

(a) $[Cu(NH_3)_4]SO_4$
(b) $[Cu(en)_2(H_2O)Cl]^{2+}$
(c) $[Fe(H_2O)_5(NCS)]^{2+}$
(d) tetraammine zinc (II) nitrate
(e) $[Fe(CN)_6]^{4-}$
(e) $[Cr(en)_2Br_2]^+$

Q.19 Convert the following

(a) Propene to propan-1-ol

(b) Aniline to Chlorobenzene

(c) tert-butyl bromide to isobutylbromide

Q.20 Give the equations of the reactions for the preparation of phenol from isopropyl benzene.

Q.21 Write the following reaction

(a) Etard reaction

(b) Stephen reaction.

Q.22 Write preparation, properties & uses of Teflon.

Q.23 Write the full form of

(a) XRD
(d) SEM
(c) FTIR

Q.24 Explain packing efficiency & void for scc.

Q.25 Consider the reaction $2A + 2B \rightarrow 2C + D$ from the following data
   (a) Write the rate law of the reaction
   (b) Calculate the order & rate constant fo the reaction.

| $(A)_o$ / M	$(B)_o$ / M	r_o/ms^{-1}
0.488	0.160	0.24
0.244	0.160	0.06
0.244	0.320	0.12

Q.26 Define weak electrolyte. Write any one preparation of glucose. Define conjugate acid base pairs.

SECTION - D (12 M)

Attempt any THREE of the following (3 x 4 = 12)

Q.27 Give valence bond description for the bonding in the complex $[VCl_4]$. Draw box diagram for free metal ion. Which hybrid orbitals are used by the metal state the number of unpaired electron & magnetic nature of complex.

Q.28 Identify A, B, C in the following
$$2-\text{bromobutane} \xrightarrow{alc.KOH} A \xrightarrow{Br_2} B \xrightarrow{NaNH_2} C$$
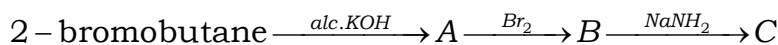
Q.29 Explain any three principle of green chemistry.

Q.30 How molar mass of a solute is determined by osmotic pressure.

Q.31 The enthalpy change for the reaction $C_2H_{4(g)} + H_{2(g)} \rightarrow C_2H_{6(g)}$ is -620 J when 100 mL of ethylene & 100 ml of H_2 reacts at 1 bar pressure calculate PV type of work Δv for the reaction.

○   ○   ○