

CAREER POINT

FACULTY SELECTION TEST

CHEMISTRY

[Time : 1 Hr.]

[Max. Marks : 120]

INSTRUCTIONS :

1. Attempt all questions.
2. Indicate your answer on the question paper itself.
3. Each question has four options. Out of these only one is the correct answer.
4. Each correct answer carries +4 marks. for each wrong answer 1 marks will be deducted.

- Q.1** 50 g of a sample of NaOH required for complete neutralisation. 1 litre N HCl. What is the percentage purity of NaOH -
(1) 80 (2) 70 (3) 60 (4) 50
- Q.2** An α -particle approaches the target nucleus of copper ($Z = 29$). The distance of closest approach will be -
(1) $\frac{2\pi\epsilon_0(\text{K.E.})_\alpha}{29e^2}$ (2) $\frac{29e^2}{2\pi\epsilon_0(\text{K.E.})_\alpha}$ (3) $\frac{4\pi\epsilon_0(\text{K.E.})_\alpha}{29e^2}$ (4) $(\text{K.E.})_\alpha$
- Q.3** N_2 gas is evolved when sodium nitrite is heated :
(1) alone (2) with ammonium chloride
(3) with ammonium hydroxide (4) with potassium nitrate
- Q.4** The sum of protons, electrons and neutrons in the heaviest isotope of hydrogen is -
(1) 6 (2) 5 (3) 4 (4) 3
- Q.5** A solid compound 'X' on heating gives CO_2 gas and a residue. The residue mixed with water forms 'Y'. On passing an excess of CO_2 through 'Y' in water, a clear solution 'Z' is obtained. On boiling 'Z', compound 'X' is reformed. The compound 'X' is -
(1) $\text{Ca}(\text{HCO}_3)_2$ (2) CaCO_3 (3) NaCO_3 (4) K_2CO_3
- Q.6** $\text{Fe}_2(\text{CO})_9$ is diamagnetic. Which of the following reasons is correct ?
(1) Presence of one CO as bridge group (2) Presence of monodentate ligand
(3) Metal-metal (Fe-Fe) bond in molecule (4) Resonance hybridization of CO
- Q.7** Among the metals Cr, Fe, Mn, Ti and Mg, the one that cannot be obtained by reduction of metal oxide by aluminium is -
(1) Cr (2) Fe (3) Mn (4) Mg
- Q.8** Shape of the following molecules are respectively. NH_4^+ , BeCl_2 , NH_2^- , CH_3^-
(1) Tetrahedral, T-shape linear, pyramidal (2) Tetrahedral, linear, V-shape, pyramidal
(3) Tetrahedral, V-shape, linear, pyramidal (4) Pyramidal, V-shape, linear, pyramidal

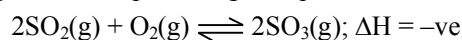
Q.9 A sample of milk is found to contain 4% v/v of butter fat. The density of butter fat is 875 kg m^{-3} and that of milk is 1035 kg m^{-3} . The density of skimmed (without butter fat) milk is-
 (1) 160 kg m^{-3} (2) 275 kg m^{-3} (3) 1000 kg m^{-3} (4) 1041.6 kg m^{-3}

Q.10 A solution of sodium sulphate in water is electrolysed using inert electrodes. The products at the cathode and anode are respectively-
 (1) H_2, O_2 (2) O_2, H_2 (3) O_2, Na (4) O_2, SO_2

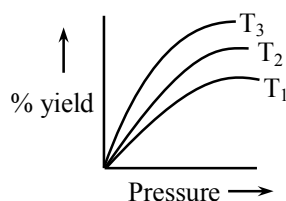
Q.11 Which of the following solutions will have pH close to 1.0 ?
 (1) 100 ml of (M/10) HCl + 100 ml of (M/10) NaOH
 (2) 55 ml of (M/10) + 45 ml of (M/10) NaOH
 (3) 10 ml of (M/10) HCl + 90 ml of (M/10) NaOH
 (4) 75 ml of (M/5) HCl + 25 ml of (M/5) NaOH

Q.12 When NH_4Cl is added to a solution of NH_4OH , the :
 (1) Concentration of OH^- decreases (2) Dissociation of NH_4OH decreases
 (3) Concentration of NH_4^+ increases (4) Concentration of OH^- increases
 (1) a, b (2) b, c
 (3) c, d (4) a, c

Q.13 Percentage yield of following reaction is plotted against pressure at a definite temperature :



Which of the following relation is correct ?



(1) $T_1 > T_2 > T_3$ (2) $T_3 > T_2 > T_1$ (3) $T_1 = T_2 = T_3$ (4) $T_1 > T_2 < T_3$

Q.14 For reaction $\text{A} \rightarrow \text{B}$
 conc. is expressed as $C = C_0 e^{-kt}$
 calculate rate of reaction at $t = \frac{1}{k}$ sec. if

$$C_0 = 10 \frac{\text{mol}}{\text{lit.}} \text{ \& } k = 500 \text{ sec}^{-1}$$

(1) 5000 (2) $\frac{5000}{e}$ (3) 5000e (4) $\frac{e}{5000}$

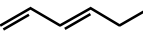
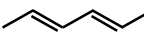

Q.15 A solid XY has NaCl structure. If radius of X^+ is 100 pm. What is the radius of Y^- ion:
 (1) 120 pm (2) 136.6 to 241.6 pm
 (3) 136.6 pm (4) 241.6 pm

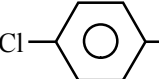
Q.16 Equal masses of H_2 and CH_4 are mixed in an empty container at 25°C . The fraction of the total pressure exerted by H_2 is -
 (1) $1/2$ (2) $8/9$ (3) $1/9$ (4) $16/17$

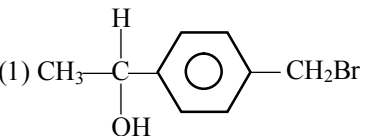
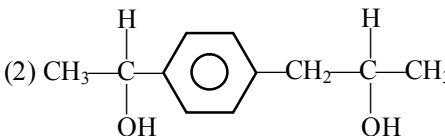
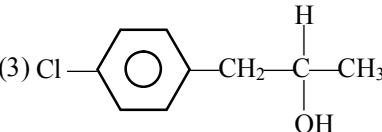
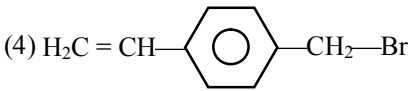
- Q.17** 10 ml of 0.02 M KMnO_4 is required to oxidize 20 ml. of oxalic acid of certain strength, 25 ml of the same oxalic acid is required to neutralise 20 ml. of NaOH of unknown strength. Amount of NaOH in a litre of the solution is -
- (1) 2 gm/lit (2) 2.5 gm/lit
(3) 3.0 gm/lit (4) 5 gm/lit

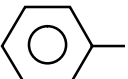
- Q.18** Standard entropy of X_2 , Y_2 and XY_3 are 60, 40 and $50 \text{ JK}^{-1}\text{mol}^{-1}$, respectively. For the reaction, $\frac{1}{2}\text{X}_2 + \frac{3}{2}\text{Y}_2 \rightarrow \text{XY}_3$, $\Delta H = -30 \text{ kJ}$ to be at equilibrium, the temperature will be -
- (1) 1250 K (2) 500 K
(3) 750 K (4) 1000 K

- Q.19** One mole of monoatomic ideal gas expands adiabatically at initial temperature T against a constant external pressure of 1 atm from one litre to two litre. Find out the final temp. ($R = 0.08211 \text{ litre. atm K}^{-1} \text{ mol}^{-1}$)
- (1) T (2) $\frac{T}{(2)^{\frac{5}{3}-1}}$ (3) $T - \frac{2}{3 \times 0.0821}$ (4) $T + \frac{2}{3 \times 0.0821}$

- Q.20** Arrange the following in decreasing order of stability ?
- (i)  (ii)  (iii) 
- (1) $i > ii > iii$ (2) $ii > iii > i$ (3) $ii > i > iii$ (4) $iii > ii > i$

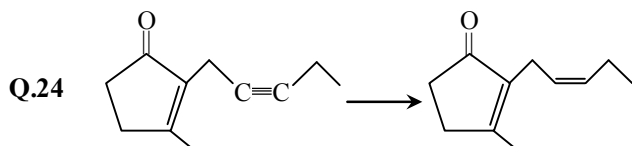
- Q.21**  + $\text{CH}_3\text{CHO} + \text{Mg} \xrightarrow{\text{dry ether}}$ (A) The product (A) is -

- (1)  (2) 
- (3)  (4) 

- Q.22**  $\xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) CH}_3\text{MgI}}$ X $\xrightarrow{\text{Cu}/575 \text{ K}}$ Y

The compound Y in the above sequence is -

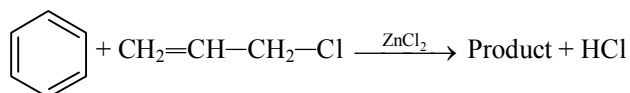
- (1) 2-Methyl-2-phenyl-1-propanol (2) 2-Phenyl-2-propanol
(3) Acetophenone (4) 2-Methyl-1-phenyl-2-propanol
- Q.23** Benzaldichloride $\xrightarrow{\text{KOH (aq.)}}$ B $\xrightarrow{(\text{CH}_3\text{CO})_2\text{O}}$ C
- In the above sequence, C is
- (1) Benzoic acid (2) Phenyl acetate
(3) Methyl benzoate (4) Cinnamic acid



Which reagent will be used for the above conversion ?

- (1) Na/Liq. NH_3 (2) H_2 , Pd— CaCO_3 (3) Li, Ph— NH_2 (4) H_2 , Pt

Q.25 In the given reaction, what is the product ?



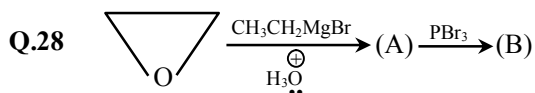
- (1) (2) (3) (4)

Q.26 Which one of the following compounds is achiral ?

- (1) (2) (3) (4)

Q.27 Mannose and Galactose are

- (1) Mono saccharides (2) C-2, 4 Anomers
(3) Functional Group Isomers (4) Monomers of starch



The product (B) is –

- (1) (2) (3) (4)

Q.29 Which one of the following pairs will give α , β -unsaturated carbonyl compound in the presence of dil NaOH at 100°C ?

- (1) HCHO and $\text{C}_6\text{H}_5\text{CHO}$ (2) $\text{C}_6\text{H}_5\text{CHO}$ and $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CHO}$
(3) $\text{C}_6\text{H}_5\text{CHO}$ and $\text{CH}_3-\text{CH}_2-\text{CHO}$ (4) All of these

Q.30 In the given reaction $\text{CH}_3-\text{COOH} \xrightarrow[\text{(iii) H}_2\text{O/H}^+]{\text{(i) Br}_2/\text{P}, \text{(ii) NaCN}}$ [X], [X] will be :

- (1) (2) (3) (4)