

UG Even Semester (CBCS) Exam., May—2017

CHEMISTRY

(Pass)

(4th Semester)

Course No. : BSCP-402

(General Chemistry)

*Full Marks : 50**Pass Marks : 20**Time : 2 hours**The figures in the margin indicate full marks
for the questions*

1. (a) Write a short note on fullerene. 4
- (b) Explain why pentavalent nitrogen compounds do not exist. 2
- (c) SnCl_4 readily hydrolysed but CCl_4 does not, although Sn and C are in the same group of the periodic table. Why? 2
- (d) Write the hybridization and structure of XeF_6 . 2

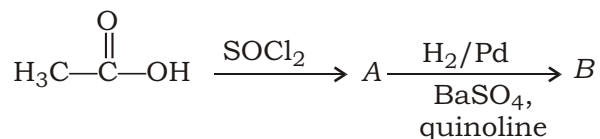
OR

2. (a) Write the IUPAC name of the following complexes : $1 \times 2 = 2$
- (i) $\text{Na}[\text{Ag}(\text{S}_2\text{O}_3)_2]$
- (ii) $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$
- (b) Define linkage isomerism with example. 2
- (c) Write the structure of the ligands oxalate ion and glycinate ion. 2
- (d) Define ambidentate ligand with example. 2
- (e) Write the geometrical isomers for the complex $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Br}$. 2
3. (a) What do you mean by essential elements? 2
- (b) Explain the toxic effect of carbon monoxide and its origin from environment. 4
- (c) Write the role of myoglobin (Mb) in oxygen transport. 4

(3)

OR

4. (a) Explain the principle of flame photometry. 5
- (b) How will you measure the amount of ferrous iron (Fe^{2+}) quantitatively by using potassium permanganate (KMnO_4)? 5
5. (a) What is Brady's reagent? Write one of its uses. 2
- (b) Explain aldol condensation with example. 2
- (c) Why are aldehydes more reactive than ketones towards nucleophilic addition reaction? 2
- (d) How will you distinguish 2-pentanone and 3-pentanone through chemical reaction? 2
- (e) Identify A and B : 2



J7/1964

(Turn Over)

(4)

OR

6. (a) Explain haloform reaction with example. 2
- (b) Write the mechanism of Cannizzaro reaction. 2
- (c) Distinguish primary, secondary and tertiary alcohols by chemical reaction. 2
- (d) Complete the following reactions : $1 \times 2 = 2$
- (i) $\text{H}_3\text{C}-\text{C}\equiv\text{CH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} ?$
- (ii) $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} \xrightarrow[2) \text{H}_2\text{O}/\text{H}^+]{1) \text{HCN, base}} ?$
- (e) Prepare
- $$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$$
- from suitable calcium salts of monocarboxylic acid. 2
7. (a) Write and explain the laws of Lavoisier and Laplace of thermochemistry. 3
- (b) Explain Kirchhoff's equations and mention the terms used. 3

J7/1964

(Continued)

(5)

(c) For the reaction



H_{298} 31 3822 kcals. The values of C_p (cal. deg⁻¹ mol⁻¹) are C (s) 2 066; H₂O (g) 8 025; CO(g) 6 965 and H₂ (g) 6 892. Calculate H at 125 °C. 4

OR

8. (a) Define equivalent conductance and write its unit. 2

(b) Explain cell constant. 2

(c) Prove that cell EMF is an intensive property. 2

(d) How will you determine the equilibrium constant of a reversible chemical reaction from EMF measurement? 4

9. (a) $2\text{NO} + \text{Cl}_2 \rightleftharpoons 2\text{NOCl}$

Express the rate of the above reaction with respect to Cl₂, NO and NOCl. 2

(6)

(b) What is the effect of temperature on rate and rate constant of a chemical reaction? 4

(c) A chemical reaction is known to be zero order with $K = 5 \times 10^{-8} \text{ mol L}^{-1} \text{ sec}^{-1}$. How long does it take to change the concentration from $4 \times 10^{-4} \text{ mol L}^{-1}$ to $2 \times 10^{-2} \text{ mol L}^{-1}$? 4

OR

10. (a) Show that the half-life period of a second-order reaction is inversely proportional to the initial concentration of the reactant. 3

(b) Higher order reactions are rare. Explain. 2

(c) Obtain the integrated rate equation for the elementary reaction $A + B \rightarrow \text{Product}$, when the initial concentrations of A and B are a and b respectively, under the given conditions : 5

(i) Different ($b > a$)

(ii) Same ($b = a$)
