

UG Odd Semester (CBCS) Exam., December—2016

B.Sc (Honours) B.Ed

CHEMISTRY

(Pass)

(3rd Semester)

Course No. : BSCP-303

(General Chemistry)

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

1. (a) Derive the expression of radius of an electron in an atom. 4
- (b) What is Rydberg constant? 2
- (c) With the help of Pauli exclusion principle, show that K shell contains 10 electrons. 4
- OR**
2. (a) Explain Slater's rule with example. 4
- (b) Define ionization energy. 2

- (c) How does dipole moment measurement help to distinguish geometrical isomers? 2
- (d) Write the Heisenberg's uncertainty principle. 2
3. (a) Balance the following reactions by ion electron method : $3 \times 2 = 6$
- (i) $\text{Na}_2\text{S}_2\text{O}_3 \quad \text{I}_2 \quad \text{Na}_2\text{S}_4\text{O}_6 \quad \text{NaI}$
- (ii) $\text{Cu} \quad \text{HNO}_3 \quad \text{Cu}(\text{NO}_3)_2 \quad \text{NO}_2 \quad \text{H}_2\text{O}$
- (b) Predict the feasibility of a chemical reaction in terms of electromotive force (EMF). 4

OR

4. (a) Write a short note on non-aqueous solvent like liquid NH_3 . 5
- (b) Write a short note on soft-hard acid-base principle (SHAB). 5
5. (a) Define resonance with example. 2
- (b) Arrange the following carbonium ions in order of increasing stability with reason : 2
- $\text{H}_3\text{C}-\text{CH}-\text{CH}_3, \text{H}_3\text{C}-\text{CH}_2, \text{H}_2\text{C}=\text{CH}-\text{CH}_2$
- (c) Define nucleophile with example. 2

(3)

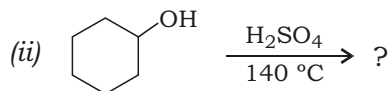
- (d) Among the sigma () and pi () bonds, which one is more reactive and why? 2
- (e) Explain hybridization with example. 2

OR

6. (a) Define electrophile with example. 2
- (b) Write short notes on the following reactions : 4×2=8
- (i) Benzil-benzilic acid rearrangement
- (ii) Dienone-phenol rearrangement
7. (a) Define conformation with example. 2
- (b) Write diagrammatically all the possible conformations of normal butane. 4
- (c) Define centre of symmetry with example. 2
- (d) Why are allenes optically active? 2

OR

8. (a) Write the energy profile diagram of S_N1 reaction. 3
- (b) Write a short note on S_N2 reaction. 3
- (c) Complete the following reactions : 2×2=4
- (i) $\text{H}_3\text{C}-\text{C}\equiv\text{CH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} ?$



(4)

9. (a) Write the van der Waals' equation of state for n mole real gas. 2
- (b) Using van der Waals' equation, calculate the pressure developed by 100 g CO₂ contained in a volume of 5 litres at 40 °C. Compare this value with that calculated from ideal gas laws. 4
- (c) Derive reduced equation of state from van der Waals' gas equation. 4

OR

10. (a) Derive the most probable velocity from Maxwell's velocity distribution. 4
- (b) How will you measure viscosity of a given liquid by viscometer? 4
- (c) What do you mean by Miller indices? 2
