

Name :

Roll No. :

Invigilator's Signature :

**CS/B.TECH/CHE (N)/SEM-3/CH (CHE)-302/2012-13
2012**

CHEMISTRY-II

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) The mean speed of a certain gas at 27°C is 400 ms⁻¹.
The temperature at which the speed will be 800 is
- | | |
|----------|-----------|
| a) 54°C | b) 108°C |
| c) 216°C | d) 927°C. |
- ii) The compressibility factor of a van der Waals gas at critical point is
- | | |
|----------|----------|
| a) 0.375 | b) 0.505 |
| c) 0.408 | d) zero. |

3059 (N)

[Turn over



iii) A real gas most closely approaches the behaviour of an ideal gas under the conditions of

- a) high pressure and high temperature
- b) high pressure and low temperature
- c) low pressure and high temperature
- d) low pressure and low temperature.

iv) Which of the following are considered to be polymers of amino acids ?

- a) Nucleotides
- b) Carbohydrates
- c) Lipids
- d) Proteins.

v) Poise is the unit of measure of which of the following ?

- a) Pressure
- b) Viscosity
- c) Force
- d) Mass.

vi) Common table sugar is

- a) Glucose
- b) Sucrose
- c) Fructose
- d) Maltose.



vii) The principal sugar in blood is

- a) Fructose
- b) Glucose
- c) Suscrose
- d) Galactose.

viii) Which of the following refers to the scattering of light by colloidal particles ?

- a) Rutherford effect
- b) Tyndall effect
- c) Thompson effect
- d) None of these.

ix) Which of the following is a basic amino acid ?

- a) Glycine
- b) Lysine
- c) Threonine
- d) Valine.



x) Of the following pairs, each of 0.1 m solution, the isotonic solution at the same temperature will be

- a) glucose and KCl
- b) MgCl_2 and NaCl
- c) Urea and ZnSO_4
- d) Na_2SO_4 and $\text{Ca}(\text{NO}_3)_2$.

xi) Organomagnesium halides are called

- a) Tollen's reagent
- b) Millon's reagent
- c) Grignard reagent
- d) none of those.

xii) Which of the following is disproportionation reaction ?

- a) Cannizzaro reaction
- b) Aldol reaction
- c) Perkin reaction
- d) Wittig reaction.



GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What does it mean by surface tension ? What is surface energy and its unit ? “Water can wet glass surface but mercury does not.” Explain the statement. $2 + 1 + 2$
3. What is meant by critical micelle concentration ? How is it determined experimentally ? $3 + 2$
4. Dry air is slowly bubbled through a solution containing 38.0 gm of a solute per 100 gm of water and then through water. Loss in weight of water was noticed to be 0.055 gm and the total gain in weight of a tube containing P_2O_5 through which the air was subsequently passed was found to be 2.212 gm. Calculate the molar mass of the dissolved substance.
5. Draw the structures of a purine base and pyrimidine base found in both DNA and RNA. Write about three types of RNA molecules found in a cell. $2 + 3$
6. Explain the term tautomerism. How will you synthesis adipic acid (hexanedioic acid) from malonic ester ? $2 + 3$

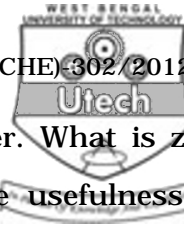


GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What is isoelectric point of an amino acid ? How is isoelectric point related to the dissociation constants of conjugate acid of an amino acid ? $2 + 3$
- b) What points are to be taken into consideration during the formation of a peptide linkage between two different amino acids ? Mention a reaction by which proteins are detected ? $3 + 2$
- c) Explain the reaction of glucose with excess of phenylhydrazine in presence of acetic acid with mechanism. Sucrose is non-reducing sugar but reduces Fehling's solution after hydrolysis with dilute acid. Offer an explanation. $3 + 2$
8. a) Write notes on the following :
- i) Claisen condensation
 - ii) Friedel-Crafts acylation
 - iii) Cannizzaro reaction
 - iv) Sandmeyer reaction.
- b) What is Grignard reagent ? $(4 \times 3) + 3$



9. Write a short note on electrical double layer. What is zeta potential and its significance ? Discuss the usefulness of ultracentrifugation over sedimentation. Define viscosity coefficient. What is the unit of viscosity coefficient in CGS system and derive its dimension. $3 + 3 + 4 + 2 + 1 + 2$
10. What is Freundlich isotherm ? What are the assumptions of Langmuir isotherm ? Deduce Langmuir adsorption isotherm. Discuss the application of adsorption. $4 + 4 + 5 + 2$
11. Derive thermodynamically the expression for osmotic pressure of a solution and the relative lowering of vapour pressure of the solvent. $7 + 8$
-