Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (CHE-N)/SEM-3/CH (CHE)-302/2011-12

2011

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 : $10 \times 1 = 10$

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 unit of surface tension and viscosity of a liquid are respectively

a) $kg\ m^{-1}\ s^{-2}$, Nm^{-1}

b) Nm^{-1}, $kg\ m^{-1}\ s^{-1}$

c) Nm^{-2}, $kg\ m^{-1}\ s^{-1}$

d) $kg\ m^{-1}\ s^{-1}$, $N^{-1}\ m^{-1}$.

iii) Which one of the following is disproportionation reaction ?

a) Cannizzaro reaction

b) Aldol condensation

c) Friedel-Craft reaction

d) Claisen condensation.

iv) Lyophilic colloids are normally

a) Reversible colloids b) Irrevesible colloids

c) Aerosol d) None of these.

v) Sucrose is a

a) Monosaccharide

b) Non-reducing sugar

c) Reducing sugar

d) Polysaccharide.

vi) According to Heisenberg Uncertainty principle, when principal quantum number $n = 1$

a) $n = 1,\ I = 0,\ m = 0,\ s = 0$

b) $n = 1,\ I = 0,\ m = 0,\ s = \pm \frac{1}{2}$

c) $n = 1,\ I = 0,\ m = 1,\ s = \pm \frac{1}{2}$

d) $n = 1,\ I = 1,\ m = 1,\ s = 1.$

vii) Which of the following is the reagent for Friedel-Craft acylation ?

a) Acetyl chloride and anhydrous aluminium chloride

b) Alkyl chloride and anhydrous aluminium chloride

c) Acetyl chloride and sodium borohydride

d) None of these.

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

a) Glycine

b) Lysine

c) Threonine

d) Valine.

ix) The principle sugar in blood is

a) Fructose

b) Glucose

c) Sucrose

d) Galactose.

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

a) Rutherford effect

b) Tyndall effect (pron : tin-dahl)

c) Thompson effect

d) None of these.

xi) $\eta = \pi Pr^4 \ t \ / \ 8 \ vl$ when t represent

a) temperature b) time

c) life time d) none of these.

GROUP – B
(Long Answer Type Questions)

Answer *five* questions taking at least *one* from each module.

$5 \times 12 = 60$

MODULE – 1

2. a) What is protective colloid ? Give an example.

b) Describe any one method for the preparation of lyophobic sol.

c) Why water rises in capillary tube from its normal level ?

d) Describe drop number method for determination of surface tension of a liquid. 4 + 2 + 2 + 4

3. a) What is ultracentrifuge ? Explain briefly.

b) Why some liquids are spread and some liquids are not on any solid surface ? What do you mean by angle of contact ?

c) How could you determine molecular wt. from visocity ?

3 + 5 + 4

MODULE – 2

4. What is langmuir adsorption isotherm ? Derive Langmuir Adsorption isotherm. Write the limitations of Langmuir adsorption equation. Discuss the application of adsorption.

5 + 3 + 4

5. a) What is Kinetic theory of gas ? How Van der Waal's corrected it ?

b) Give a relation between relative lowering of vapour pressure and Osmotic pressure. 7 + 5

MODULE – 3

6. a) What is Grignard reagent ? Give two synthetic application of it.

b) Discuss the following with mechanism :

i) Claisen condensation

ii) Cannizaro reaction.

c) Discuss one synthetic application of each of

i) malonic ester

ii) acetoacetic ester. 1 + 3 + 4 + 2 ∞ 2

7. Calculate the kinetic energy and velocity of the electron in the 1st orbit of hydrozen atom. Estimate Bohr's radius of the 2nd orbit of hydrozen atom. Describe the following giving examples :

a) Photoelectric effect

b) Compton effect. 3 + 3 + 3 + 3

MODULE – 4

8. a) What is mutarotation ?

b) Sucrose is a non-reducing sugar but it reduces Fehling's solution — offer an explanation.

c) Synthesize valine by Gabriel Phthalimide synthesis.

d) Convert glucose and Fructose into vice versa.

2 + 2 + 4 + 4

9. a) What are peptides ?

b) How can you identify the presence of peptide linkage in molecule ?

c) Write the structures of DNA and RNA.

d) Name two fatty acids with their structures.

2 + 4 + 5 + 1