(vi) A real gas most closely approaches the behavior 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.

(vii) Which of the following is true for Tyndal effect?
(a) The scattering and polarizing of light by small suspended particle is called Tyndall effect.
(b) Tyndall effect of colloidal particle is due to dispersion of light.
(c) Tyndall beam is observed by ultra microscope.
(d) Tyndall effect is due to refraction of light.

(viii) Which compound will not take part in Aldol condensation reaction?
(a) Acetone (b) Propionaldehyde
(c) Acetaldehyde (d) Benzaldehyde

(ix) Which of the following compounds is a basic amino acid?
(a) Glycine (b) Lysine
(c) Threonine (d) Valine.

(x) pKa_1, pKa_2 and pKa_3 of aspartic acid are 1.88, 3.66 and 9.60 respectively. The isoelectric point of aspartic acid is
(a) 5.74 (b) 2.77 (c) 6.63 (d) 5.04.

Group - B

2. (a) Explain the formation of micelle.

(b) What is kinetic theory of gas? How van der Waals corrected it for real gas?

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

3 + 7 + 2 = 12

3. (a) What is Langmuir adsorption isotherm?

(b) Derive Langmuir adsorption isotherm. Write the limitations of Langmuir adsorption equation.

(c) Discuss the application of adsorption.

3 + (5+2) + 2 = 12

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Group - C

4. (a) Why should a solution of a non-volatile solute boil at a higher temperature? Explain with the help of a diagram. Derive the relationship between molar mass and elevation in boiling point. When the van't Hoff factor will be more than 1?

(b) 19.5 g of CH_2FCOOH is dissolved in 500 g of water. The depression in the freezing point of water observed is 1.0°C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid.

(3+4+1) + 4 = 12

5. (a) Derive Duhem Margules equation. What is it's importance?

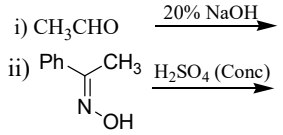
(b) Derive thermodynamically $\pi = cRT$, Where π =Osmotic pressure and c= Concentration in moles/lit.

(3+2) + 7 = 12

Group - D

6. (a) What are the limitations of Friedel-Craft alkylation?

(b) Write down the product with mechanism of the following reactions:



(c) Write down the chemical steps for industrial synthesis of aspirin from benzene.

3 + (3+3) + 3 = 12

7. (a) Write down two synthetic applications of Grignard reagents.

(b) Write down the products when
i) Equimolecular mixture of benzaldehyde and formaldehyde is treated with 50% NaOH
ii) MeMgBr is treated with CH_3CH_2CN followed by hydrolysis in acid medium.

(c) Write down the chemical steps for industrial synthesis of DDT from benzene.

(d) Write down the product with mechanism when 2, 6-dimethylbenzoic acid is treated with HN_3 in concentrated H_2SO_4.

2 + (2×2) + 3 + 3 = 12

Group - E

8. (a) Write down the synthesis of phenylalanine via Erlenmeyer azlactone method.

   (b) What is isoelectric point of an amino acid?

   (c) Explain why glucose and fructose give identical osazone with excess phenylhydrazine. How will you convert aldopentose to aldohexose? What do you mean by epimer?

3 + 2 + (3+3+1) = 12

9. (a) Show the synthetic route of alanine via Gabriel's phthalimide synthesis.

   (b) Write down the products when glucose is separately treated with Bromine/H_2O and dilute HNO_3.

   (c) "Sucrose is a non-reducing sugar but reduces Tollen's reagent after hydrolysis with dilute acid" — explain.

   (d) How will you synthesise ala-phe dipeptide in solution phase?

3 + 2 + 3 + 4 = 12

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2016

CHEMISTRY - II
(CHEM 2201)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

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

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following: **10 × 1=10**

   (i) Which of the following compound after treatment with Grignard reagent will give primary alcohol?
   (a) Acetone (b) Formaldehyde
   (c) Acetaldehyde (d) Benzaldehyde.

   (ii) Mutarotation occurs in
   (a) acidic solvent (b) basic solvent
   (c) amphiprotic solvent (d) all of these.

   (iii) The compressibility factor of a van der Waals gas at critical point is
   (a) 0.375 (b) 0.505 (c) 0.408 (d) zero.

   (iv) The mean speed of a certain gas at 27 °C is 400 ms^{-1}. The temperature at which the speed will be 800 ms^{-1} is
   (a) 54°C (b) 108°C (c) 216°C (d) 927°C.

   (v) Through which of the following reactions the number of carbon atoms from reactant to product is increased?
   (a) Grignard reaction (b) Cannizzaro reaction
   (c) Curtius reaction (d) Schmidt reaction.