

10/02022

VCD/ SYBSC - SEM III CHEMISTRY- II 100MARKS

3HRS.

- NOTE: i) All the questions are compulsory.  
ii) Figures to right indicate full marks.  
iii) Use of non-programmable calculator/log table is allowed.

Q.1.A. Fill in the blanks with suitable option.(any TWELVE)

(12)

- 1) Reaction in which final product is formed by one or more steps is called.....reaction.
  - a) Reversible
  - b) Irreversible
  - c) Consecutive
  - d) Parallel
- 2) According to Arrhenius theory, as temperature increases the rate of reaction.....
  - a) Decreases
  - b) Increases
  - c) Remains same
  - d) Neither decreases nor increases
- 3) Which of the following condition is not satisfied by an ideal solution?
  - a)  $\Delta H_{\text{mixing}} = 0$
  - b)  $\Delta V_{\text{mixing}} = 0$
  - c) Raoult's law is obeyed
  - d) Formation of azeotropic mixture
- 4) Which of the following is example of completely miscible liquid at room temperature?
  - a) Alcohol and water
  - b) Phenol and water
  - c) Iodobenzene and water
  - d) Oil and water
- 5) When a chemical reaction obeys collision theory, then the probability factor is.....
  - a)  $P=1$
  - b)  $P>1$
  - c)  $P<1$
  - d)  $P=2$
- 6) The process of separating a substance from its aqueous solution by shaking it with suitable and immiscible solvents is called.....
  - a) Raoult's law
  - b) Colligative property
  - c) Solvent extraction
  - d) Nernst distribution law
- 7) Second most abundant element of carbon family is.....
  - a) Carbon
  - b) Silicon
  - c) Germanium
  - d) Lead
- 8) Formula for silica is.....
  - a)  $\text{SiO}_4$
  - b)  $\text{SiO}_2$
  - c)  $\text{SiCl}_4$
  - d)  $\text{SiCl}_2$
- 9) Synthesis of ammonia takes place by.....
  - a) Winkler's method
  - b) Froth flotation method
  - c) Nitrogenation process
  - d) Haber-Bosch process

- 10) Laughing gas is.....
- NO
  - NO<sub>2</sub>
  - N<sub>2</sub>O
  - NO<sub>3</sub>
- 11) Multiple bonding of nitrogen is due to it's .....
- Big size
  - Volume
  - Volume and density
  - Small size
- 12) Number of electrons involved in bonding of B<sub>2</sub>H<sub>6</sub> is.....
- 10
  - 15
  - 18
  - 22
- 13) The hybridizations of C-atom and O-atom in Carbonyl group are.....
- sp<sup>3</sup>-sp<sup>2</sup>
  - sp- sp<sup>2</sup>
  - sp<sup>2</sup>-sp<sup>2</sup>
  - sp<sub>3</sub>-sp<sup>3</sup>
- 14) The hydration of an unsymmetrical alkyne follows .....
- Anti-Markonikovs rule
  - Markonikovs rule
  - Phase rule
  - Sulphonation
- 15) The number of bonds in nitrogen molecule is.....
- one sigma and one pi
  - one sigma and two pi
  - two sigma and one pi
  - three sigma
- 16) When Grignard reagent react with a ketone .....is formed.
- Tertiary alcohol
  - Primary alcohol
  - Secondary alcohol
  - Aldehyde
- 17) Which of the following is the Rosenmund reagent.....
- CH<sub>3</sub>-Mg-Br
  - Pd/BaSO<sub>4</sub>
  - LiAlH<sub>4</sub>
  - Ni/C
- 18) The isomers of compound differing in the position of one atom and a double bond are Called.....
- Enantiomer
  - Tautomers
  - Diastereo isomer
  - Stereoisomer

**B. State whether following statement is true or false**

(3)

- For solution to undergo steam distillation the two liquids must be immiscible with each other.
- Nitrogen exhibit allotropy.
- Friedel Craft acylation carried out in presence of acid anhydride and BaSO<sub>4</sub>.



**C. Match the following.**

(5)

- |                             |                         |
|-----------------------------|-------------------------|
| a) Activated complex theory | i) 13                   |
| b) Sodium Borohydride       | ii) 83                  |
| c) Bismuth                  | iii) Reducing agent     |
| d) Galium                   | iv) Intermediate formed |
| e) Aluminium                | v) 31                   |

**Q.2. Answer the following: (Any four)**

(20)

- State and derive Raoult's law.
- Explain in detail Phenol-water system.
- Explain positive and negative deviation from Raoult's law.
- Explain reversible reaction and consecutive reaction with suitable example.
- Explain the Lindemann's unimolecular theory of reaction rate.
- $A \rightarrow B$  is a first order reaction. Rate of the reaction is double when temperature rises from  $27^\circ\text{C}$  to  $127^\circ\text{C}$ . Find energy of activation. ( $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ ).

**Q.3. Answer the following: (Any Four)**

(20)

- Explain the structure and bonding in diborane.
- Write the short note on preparation and structure of  $\text{SiCl}_4$ .
- Name oxides of nitrogen. Explain preparation, properties and structure of two oxides.
- Explain the back bonding in  $\text{BF}_3$  molecules with suitable diagram.
- Give the electronic configuration of boron family elements.
- Explain the following.
  - $\text{NH}_3$  is highly soluble in water but other hydrides of nitrogen family are not.
  - Reducing characters of hydrides nitrogen family increases down the group.

**Q.4. Answer the following: (Any Four)**

(20)

- Explain Benzoin condensation reaction.
- What is Rosenmund reduction reaction? Explain with example.
- Give mechanism of nucleophilic addition to carbonyl compounds.
- Explain structure and reactivity of carbonyl compounds.
- What is enolization? Give the mechanism of acid-catalyzed enolization.
- Explain Cannizzaro's reaction with mechanism.

**Q.5. Answer the following: (Any Four)**

(20)

- State the important postulates of collision theory.
- Explain Knoevenagel reaction with mechanism.
- Answer following questions:
  - Differentiate between ideal solution and non ideal solution.
  - The vapour pressure of methyl alcohol at 298 kelvin is  $220.7 \times 10^{-2} \text{ Nm}^{-2}$ . It forms a solution with ethyl alcohol and its mole fraction is 0.304. Calculate the partial vapour pressure of methyl alcohol if it obeys Raoult's law.
- Name the hydrides of nitrogen in group 14 and discuss their properties.
- Explain extraction of germanium by Winkler's method.
- Complete the following reaction and name the product.

