SAVITRIBAI PHULE PUNE UNIVERSITY
Progressive Education Society's
Modern College of Arts, Science and Commerce, Ganeshkhind, Pune-411016
B.Sc. Blended Program
(A degree of Savitribai Phule Pune University equivalent to the degree of University of Melbourne)

End Semester Examination: October/November 2022(January 2023)

Program: B.Sc. Blended **Program (Specific):** B.Sc. Blended(Chemistry) **Set: A**

Class: S.Y. B.Sc. Blended **Semester: III**
Course code: CHM303
Course name: Reactions and Synthesis
Credits: 3 **Time: 2½ hours** **Maximum marks: 50**

Instructions to the candidate:
- All questions are compulsory.
- Figures to the right indicate marks.
- Draw diagrams wherever necessary.
- Use of scientific calculator is allowed.
- Ask for graph paper if needed.

Q.1] **Choose the correct option (Solve <u>ANY 10</u> out of 12)** **[1 x 10 =10M]**

1. The Raoult's law is applied in the —--- distillation technique.
   a. Steam
   b. Simple
   c. fractional
   d. vertical

2. Activity of ideal solution is —- to its concentration.
   a. equal
   b. less than
   c. more than
   d. negative

3. When the gases are mixed, the entropy —.
   a. increases
   b. decreases
   c. remains same
   d. is zero

4. The Gibb's fee energy is explained by –
    a. G = H-TS
    b. T = GS+H
    c. G = TH- S
    d. TH = S+G

5. When 2 moles of ethyl acetate reacts in presence of base gives –

    a. Acetic anhydride
    b. Ethyl acetoacetate
    c. Cinnamaldehyde
    d. Malonic ester

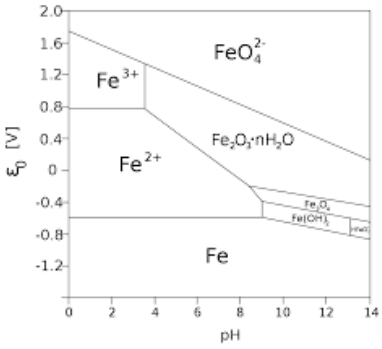
6. Which amongst the following molecule contains highly acidic proton?
    a. Ethyl acetate
    b. Ethyl acetoacetate
    c. Ethanaldehyde
    d. Acetone

7. The presence of methyl group in ketone or aldehyde is detected by—
    a. Haloform reaction
    b. Mannich reaction
    c. Condensation reaction
    d. Addition reaction

8. Compounds whose structure differ in arrangement of atoms, but which exist in easy and rapid equilibrium are called as –
    a. Monomers
    b. Positional isomers
    c. Dimers
    d. Tautomers

9. In a mixture, the sum of the mole fractions of all the components is --
    a. the sum of its weights
    b. equal to zero
    c. equal to one
    d. always a fraction

10. The name of the following diagram is —---



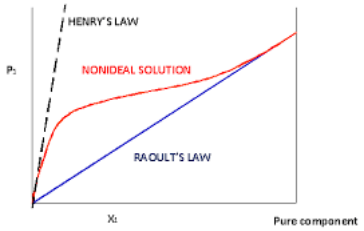
a) Pourbaix diagram
b) Frost diagram
c) Latimer diagram
d) Potential energy curve

11. In the electrochemical cell the salt bridge is used to —
    a. avoid the liquid-electrode junction potential
    b. avoid the liquid-liquid junction potential
    c. create the junction potential at phases
    d. create the potential in overall cell

12. The general formula for Grignard's reagent is ---
    a. R-Mg-X
    b. R-Mn-X
    c. R-Cl-M
    d. $MgCl_2$

Q.2] Answer the following in short (<u>ANY 10</u> out of 12) [2 x 10 = 20M]

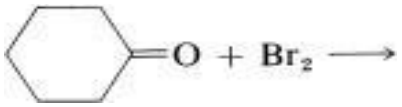
1. What is osmosis?Explain with suitable example.
2. Explain the following diagram.



3. Explain activity ad activity coefficient.
4. Explain the working of any organometallic compound as a drug.
5. Calculate the kinetic energy of an ideal gas at 300K.
6. Explain azeotropes with suitable example.

7. Write the reaction at cathode, reaction at anode and overall cell reaction of the following electrochemical cell.
   - $Cu|Cu^{2+}(aq)||\ Ag^{+}(aq)|Ag$ +
8. Explain Aldol condensation. Predict all the products of reaction between Acetaldehyde and propanaldehyde in presence of NaOH.

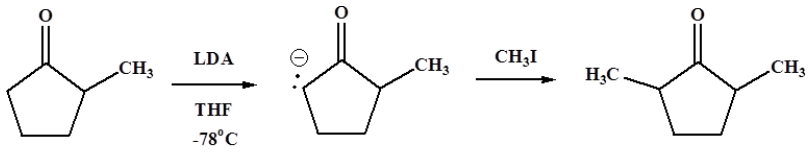
9. Explain dieckmnn cyclization
10. Predict the product of following reaction.



11. Explain aldol reaction mechanism.
12. Explain second law of thermodynamics .

Q.3. Answer in brief (<u>ANY 4</u> out of 6) [4 x 5 = 20M]

1. Explain the principle of distillation based on the vapor pressure diagram.
2. Explain the kinetic theory of gases.
3. What is partial molar volume? Explain with suitable example.
4. Calculate the Gibb's free energy of mixing where 14 grams of nitrogen, 64 grams of oxygen and 22 grams of carbon dioxide are mixed at 300K. (R= 8.314 J/mol/K).
5. Derive Nernst equation and explain its any two applications.
6. Explain why use of LDA results in the formation of 2,5 disubstituted product in this case?



Kinetic Enolate

Alkylation on the less substituted side

—x—