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 2024
Program: B.Sc. Blended **Program (Specific):** B.Sc. Blended (Chemistry) **Set: A**

Class: T.Y. B.Sc. Blended **Semester: V**
Course code: CHM503
Course name: Design and Synthesis of Organic Molecules
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 ANY 10 out of 12) **[1 x 10 =10M]**

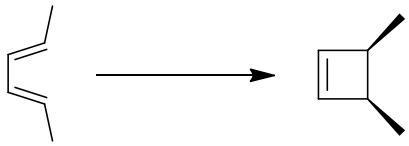
1. Oxidation is ----------
a) Gain of electrons b) loss of electrons c) addition of hydrogen d) none of these

2. Which amongst the following is stronger oxidising reagent?
a) $KMnO_4$ b) MnO_2 c) PCC d) PDC

3. Which of the following is best suitable reagent for reduction of aromatic ring to it's unconjugated dihydro derivative?
a) $LiAlH_4$ b) $NaBH_4$ c) H_2 – Pd/C d) Na/liq. NH_3, Ethanol

4. Conversion of alkyne to corresponding alkane is called as----
a) Oxidation b) Reduction c) Addition reaction d) Substitution reaction

5. In the following reaction product is formed by



a) Thermal, CON rotation b) Thermal, DIS rotation
c) Photochemical, CON rotation d) Photochemical, DIS rotation

6. nπ to (n-2)π + 2σ + ring is the equation for
   a) Electrocyclic b) cycloaddition c) sigmatropic d) ene reaction

7. HOMO of butadiene under thermal conditions is
   a) Ψ_1 b) Ψ_2 c) Ψ_3 d) Ψ_4

8. Which of the following definitions of an asymmeric reaction is the most accurate?
   a) A reaction that creates a new chiral centre in the product

   b) A reaction that involves a chiral reagent.

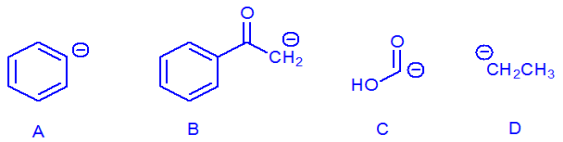
   c) A reaction which creates a new chiral centre with selectivity for one enantiomer/diasatereoisomer over another.

   d) A reaction that is carried out on an asymmetric starting material

9. When lobes on same side of both the orbitals overlap it is ---- overlap.
   a) Supra-supra b) Supra-antara c) antara-antara d) none of these

10. Which of the following is not a 4q system of electrons?
    a) 2 electrons b) 8 electrons c) 12 electrons d) 16 electrons

11. Which of the following synthons is an example of Umpulong ?

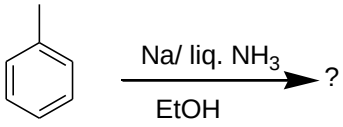


    a) structure A b) structure B c) structure C d) structure D

12. Which of the following reagent is suitable for epoxidation ?
    a) Peracetic acid b) perbenzoic acid c) performic acid d) all of these

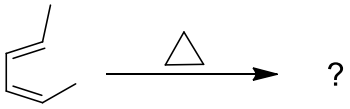
Q.2] Answer the following in short (<u>ANY 10</u> out of 12) [2 x 10 = 20M]

1. Discuss woodward Hoffmann rules for Cycloaddition reaction
2. Predict the product of following reaction.

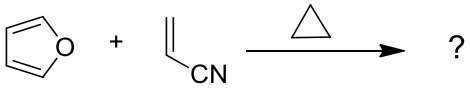


3. Define Chiral Auxillary with example

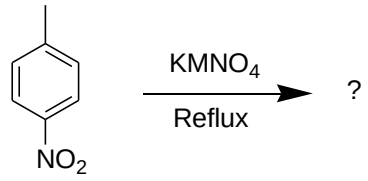
4. Predict the product of the following reaction



5. Predict the product of the following reaction

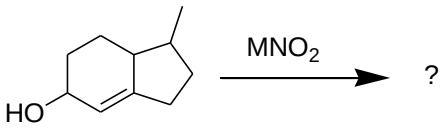


6. Predict the product of the following reaction



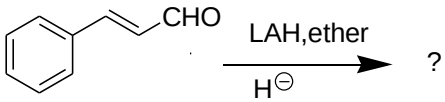
7. Write the steps involved in disconnection of 1,3-dicarbonyl compound

8. Predict the product of the following reaction

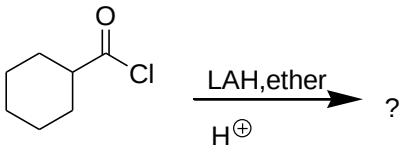


9. Explain in brief the arrow notations used in the organic synthesis.

10. Predict the product of the following reaction



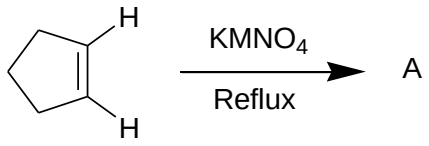
11. Predict the product of the following reaction



12. Enlist any four oxidising reagents with their uses.

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

1. Predict the product of following reaction. Explain the mechanism of formation of product with stereochemistry of the product.



2. Predict the product of following reaction. Explain the mechanism of formation of product with stereochemistry of the product.

3. Write a note on Chemoselesctivity.
4. Using FMO approach, predict whether butadiene to cyclobutene is thermally or photochemically allowed.
5. Using FMO approach, predict whether [1,3] sigmatropic shift is thermally or photochemically allowed.
6. Discuss the concept of Divergent synthesis with suitable example.

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