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## SARDAR PATEL UNIVERSITY

M.Sc. Semester-III (Organic Chemistry) Examination

Saturday, 2<sup>nd</sup> January 2021

Organic Synthesis – A Disconnection approach: PS03CORC02

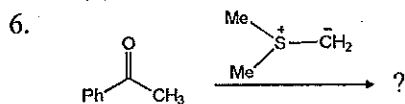
Time: 10:00 A.M. to 12:00 P.M.

Marks: [70]

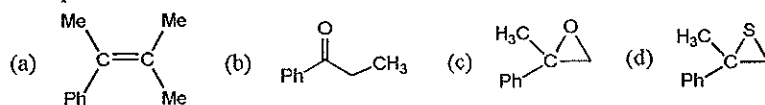
Note: Right hand figures indicate marks

Q-1 [A] Select the correct answer in the following. [08]

- Which of the following reaction is used for the preparation of  $\alpha,\beta$ -unsaturated carbonyl compounds?  
(a) Mannich (b) Wittig (c) Chichibabin (d) Wurtz
- Whenever there is one double bond in cyclohexane ring and electron withdrawing group present at 3<sup>rd</sup> position then disconnection is possible via \_\_\_\_\_.  
(a) Mannich reaction (b) Wittig reaction  
(c) Diels- Alder reaction (d) Pinacol reduction
- In neutral media, nucleophile will prefer to attack on epoxide at \_\_\_\_\_.  
(a) more substituted side (b) less substituted side  
(c) Oxygen (d) Both more substituted and less substituted side
- For preparation of  $\gamma$ -OH carbonyl compounds, one synthetic equivalent would be \_\_\_\_\_ derivative.  
(a) amide (b) ester (c) epoxide (d) acid
- Nitro styrene can be synthesized from \_\_\_\_\_.  
(a) Nitro methane + Phenyl acetaldehyde  
(b) Nitro methane + Benzaldehyde  
(c) Nitro ethane + Phenyl acetaldehyde  
(d) Nitro ethane + Benzene



The product formed for the above reaction is \_\_\_\_\_.



- The reagent used for removal of protection of amine in the form of phthalimide is \_\_\_\_\_.  
(a)  $\text{OH}^-/\text{H}_2\text{O}$  (b)  $\text{H}^+/\text{H}_2\text{O}$  (c)  $\text{ZnBr}_2$  (d)  $\text{NH}_2\text{NH}_2$
- The role of DCC in the synthesis of Cephalosporin C is to produce \_\_\_\_\_.  
(a) amide (b) acid (c) alcohol (d) aldehyde

Q-1 [B] Do as directed. [16]

- Define the term disconnection.

[1]

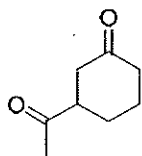
[P.T.O.]

2. Define the term synthetic equivalent.
3. What is the umpolung approach?
4. Write any two good characteristics for protecting groups.
5. Define the term functional group addition.
6. For synthesis of epoxides, the most preferable starting material is alkane. **True or False?**
7. Alkenes can be prepared by dehydration of alcohol under acidic condition and also by Wittig reaction. **True or False?**
8. Mannich reaction involves enolizable ketone, formaldehyde and secondary amine. **True or False?**
9. Diazomethane can be used as synthetic equivalent for carbene. **True or False?**
10. The role of  $B_2H_6$  in the synthesis of Cephalosporin C is to reduce aldehyde. **True or False?**
11. The reaction of  $\alpha$ -halo carbonyl compound with aldehyde or ketone is known as \_\_\_\_\_.
12. The reagent used for allylic bromination is \_\_\_\_\_.
13. The intermediates pyrrole-3, pyrrole-4 and pyrrole-8 are used in the synthesis of \_\_\_\_\_.
14. In Pinacol reduction, \_\_\_\_\_ reagent is used.
15. Cyclic  $\alpha$ -hydroxycarbonyl compound can be prepared by \_\_\_\_\_.
16. The nature of hydrogen present in  $CH_3-NO_2$  is \_\_\_\_\_.

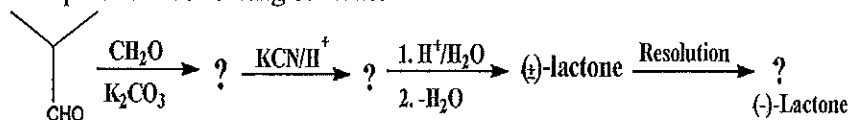
**Q-2 Answer the following (Any Seven).**

[14]

1. Write the steps for disconnection and design of synthesis.
2. Explain the use of activation in organic synthesis via citing suitable example.
3. Illustrate the term illogical electrophile.
4. Write the mechanism of benzoin condensation.
5. With suitable example show the use of sulphur ylide in epoxide preparation.
6. Write the dimerization products of unsubstituted and disubstituted ketenes in the absence of nucleophile.
7. Do the disconnection and plan the synthesis of following molecule.



8. Complete the following scheme.

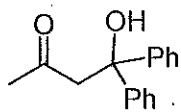


9. Write down protection and deprotection of aldehyde and ketones.

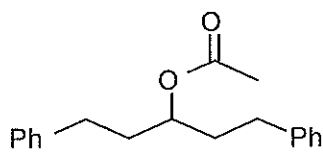
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Q-3 Do the disconnection and plan the synthesis for the following molecules. [08]

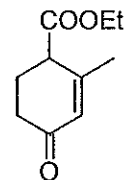
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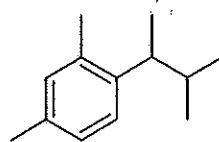
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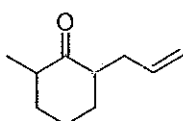
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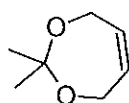
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Q-3 Do the disconnection and plan the synthesis for the following molecules. [08]

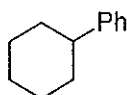
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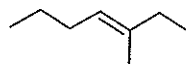
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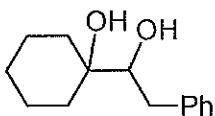


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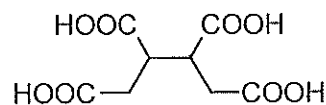


Q-4 Do the disconnection and plan the synthesis for the following molecules. [08]

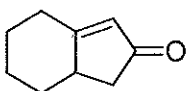
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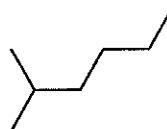
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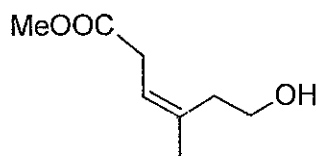
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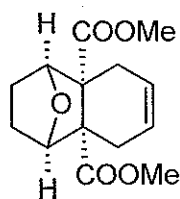
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Q-4 Do the disconnection and plan the synthesis for the following molecules. [08]

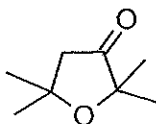
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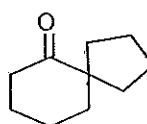
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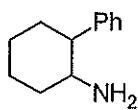
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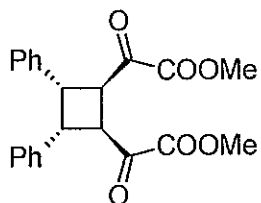
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**Q-5** Do the disconnection and plan the synthesis for the following molecules. [08]

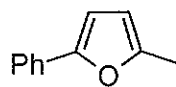
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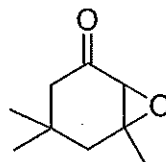
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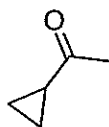
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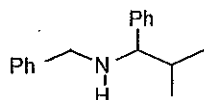
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**Q-5** Do the disconnection and plan the synthesis for the following molecules. [08]

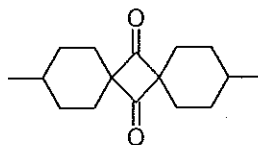
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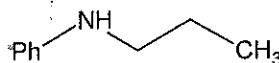
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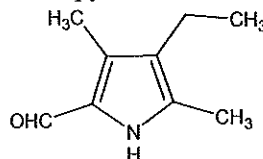
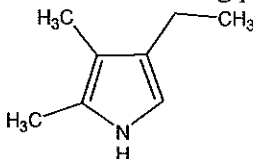
4.



**Q-6** Answer the followings.

1. Explain the protection and deprotection of alcohols and amines. [04]

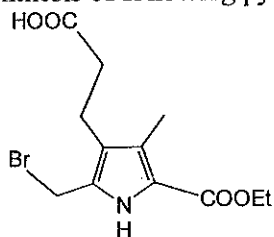
2. Give the synthesis of following pyrrole-3 and pyrrole-4 intermediates. [04]



OR

**Q-6** Answer the followings.

1. Give the synthesis of following pyrrole-8 derivative. [04]

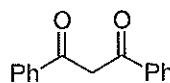


2. Do the disconnection and plan the synthesis for the following [04]  
molecules using umpolung of carbonyl group reactivity.

i.



ii.



[4]