Enrollment No._____

NAVRACHANA UNIVERSITY
a UGC recognized University

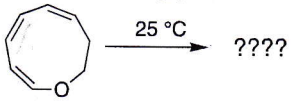
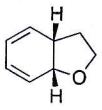
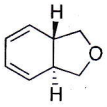
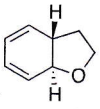
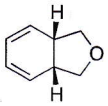
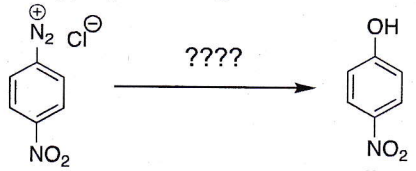
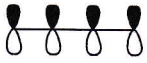
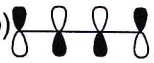
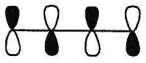
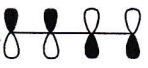
School: School of Science
Program/s: BSc Chemistry
Year: 3rd **Semester:** 5th
Examination: End Semester Examination
Examination year: December - 2021

Course Code: CH311 **Course Name:** **Organic Chemistry-III**
Date: 01/12/2021
Time: 11:30 am to 01:30 pm

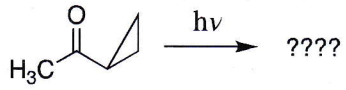
Total Marks: 40
Total Pages: 3

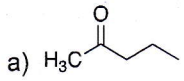
Instructions:

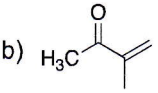
- *Write each answer on a new page.*
- *Use of a calculator is permitted/~~not permitted.~~*
- ** COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping*

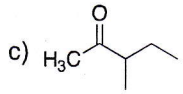
Q. No.	Details	Marks	COs*	BTL#
Q.1	**Choose the correct answer (s) from the followings.** 1. Replacement of the diazonium group by -Cl using cuprous chloride is generally referred to as... (a) Sandmeyer reaction (b) Rosenmund reaction (c) Grignard reaction (d) Cannizzaro reaction 2. Predict and write the preferred product for following reaction with appropriate stereochemistry (in accordance with the Woodward-Hoffmann) from given option.  a)  b)  c)  d)  3. Choose the appropriate reagent and condition for following reaction.  (a) hot dilute H_2SO_4 (b) H_3PO_2 (c) $NaNO_2$, HCl (d) HBr + Cu 4. Which one of the following is HOMO for 1,3-butadiene in excited state? a)  b)  c)  d) 	7	CO1 CO2 CO3 CO4 CO5	BT1 BT2 BT3 BT4

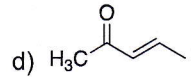
5. Predict and write the preferred product for following reaction.



a) 

b) 

c) 

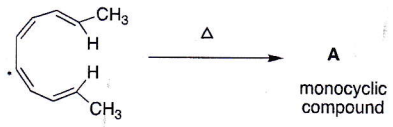
d) 

6. With respect to number of σ–bond formed or broken, which one of the following is true for electrocyclic reaction?
   (a) one new σ–bond formed as another σ–bond breaks
   (b) two new σ–bonds are formed or broken
   (c) two new σ–bonds are formed and no σ–bond is broken
   (d) one new σ–bond formed and no σ–bond is broken

7. With respect to electrophilic aromatic substitution reaction, which one of the following is *ortho, para* directing group?
   (a) $-NO_2$ (-Nitro group)
   (b) -COOH (-Carboxylic Acid group)
   (c) -CHO (-Aldehyde group)
   (d) $-NH_2$ (-Amino group)

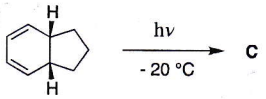
Q.2 **Each of the following reactions involves one or more concerted steps that take place in accordance with the Woodward-Hoffmann rules. Predict the product in each case with preferred stereochemistry, wherever it is applicable. *(Any Five)***

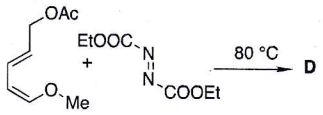
5 | CO1 CO2 CO3 CO4 CO5 | BT1 BT2 BT3 BT4

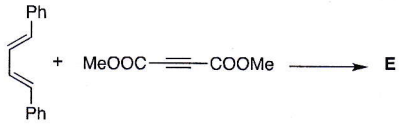
a) 

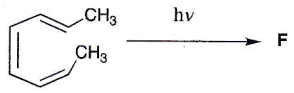
2,4,6,8-decatetraene

b) 

c) 

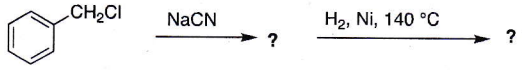
d) 

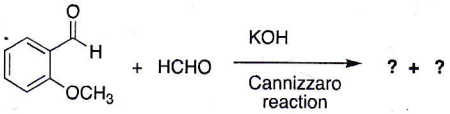
e) 

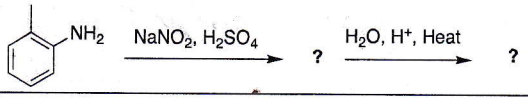
f) 

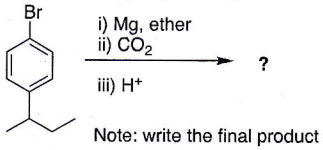
Q.3 **Complete the following reactions and predict the major product. *(Any Four)***

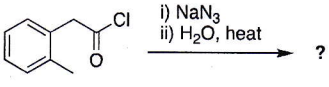
6 | CO1 CO2 CO3 CO4 CO5 | BT1 BT2 BT3 BT4

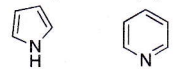
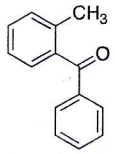
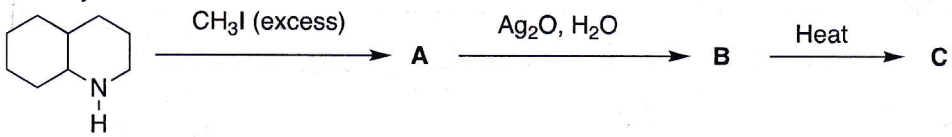
a) 

b) 

c) 

d) 

e) 

Q.4	**Do as directed. *(Any Four)*** (i) Write the sequence of reactions (with reagent and any special conditions) necessary to convert toluene into *p*-toluic acid (Hint: via diazonium salt). (ii) Aryl diazonium salts are stable at lower temperature compared to alkyl diazonium salts. Justify (iii) With respect to pyrrole and pyridine, which one is more basic? Justify your answer.  pyrrole pyridine (iv) The -OH of carboxylic acid tends to release a hydrogen ion so much more readily than the -OH of an alcohol. Justify. (v) (a) State Woodward-Hoffmann rule for electrocyclic reaction. (b) Draw HOMO for 1,3,5-hexatriene in ground state and for 1,3,5,7-octatetraene in excited state. (vi) Write equations for the reaction of *p*-nitrobenzenediazonium sulfate with: (a) Hot dilute H_2SO_4 (c) H_3PO_2 (b) HBF_4, then heat (d) KI	**10**	CO1 CO2 CO3 CO4 CO5	BT1 BT2 BT3 BT4
Q.5	**Do as directed. (Any Four)** (i) 2-Methyl benzophenone is termed as photostabilizer. Explain with the reaction mechanism.  2-methyl benzophenone (ii) Write the sequence of reactions (with reagent and any special conditions) necessary to convert Toluene into *m*-Bromotoluene (Hint: via diazonium salt). (iii) Write the general mechanism of Baeyer-Villiger oxidation with suitable example. (iv) Predict the product(s) of the following reactions. If more than one product is formed, tell which is major.  (v) Suggest a practical situation that might arise in the laboratory in which you would need to (a) separate an aldehyde from undesired non-carbonyl materials; (b) remove an aldehyde that is contaminating a non-carbonyl compound. Describe how you could carry out the separations, telling exactly what you would do and see.	**12**	CO1 CO2 CO3 CO4 CO5	BT1 BT2 BT3 BT4 BT5

**********End of Question Paper**********