9. (a) Use Jablanski diagram to explain the following phenomenon. 2x3=6

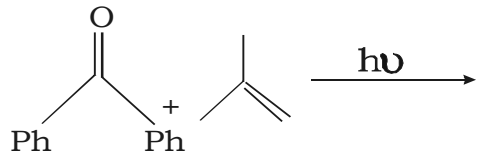
(i) Fluorescence, (ii) Phosphorescence, (iii) Dissociation, and Predissociation

(b) What is photo chemical isomerization reaction? Explain it with a suitable example. 4

Or

10. (a) What is Norrish Type-I & Type-II process. Explain with sutiable example. 5

(b) Write down all the products for the following reaction. Distinguish the major and minor product and explain their formation with mechanism. 5

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# UG Odd Semester Examination, 2022

## EDUCATION B.Sc. B.Ed

(5th Semester)

Course No.: BSCP-502

**(General Chemistry)**

*Full Marks: 50*

*Pass Marks: 20*

*Time: 2 hours*

*The figures in the right margin indicate full marks for the question.*
*Answer the following five (5) questions*

1. (a) Draw the resonance structures of $NO_3^-$ ion. 3

(b) Predict the shape of the following molecules using VSERR theory. 1x5=5

$SF_4$, $XeF_4$, $XeO_3$, $XeF_5^-$, $ClF_3$

(c) "$He_2$ molecule does not exist". Explain its using Mo theory. 2

Or

2. (a) Describe the behaviour of metal d-orbital in a square planar field. 5

(b) Discuss the factors that influence the extent of splitting of metal d-orbitals. 3

(c) Calculate the CFSE for the following configuration in an octahedrel field. 2

(i) high spin $d^5$

(ii) low spin $d^6$

3. (a) Discuss the factors that affect the acidity of oxo acids. 3

(b) Identify the Bronsted acid and its conjugate base in the following reaction. 3

(i) $HSO_4^-(ag) + {}^-OH(ag)\ H_2O(l) + SO_4^{2-}(ag)$

(ii) $PO_4^{3-}(ag) + H_2O(l)\ HPO_4^{2-}(ag) + {}^-OH$

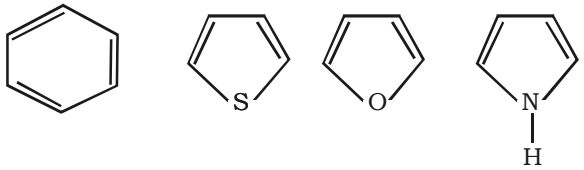
(c) The salt $BrFe_2.AsFe_6$ is soluble in $BrF_3$. Is it an acid or base in this solvent. 2

(d) Write a note on how hydrogen bonding affect physics properties of organic compounds. 2

Or

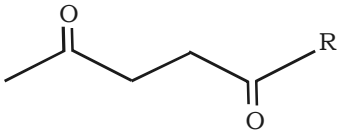
4. (a) "Electrophilic aromatic substitution of pyrrole occurs at C-2 position". Explain with mechanism. 5

(b) Comment on the relative reactivity of the following compounds towards electrophilic aromatic substitution. 3

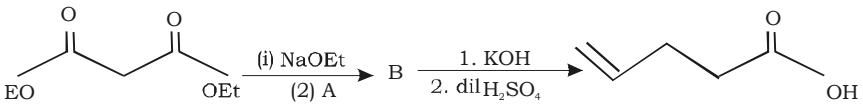



(c) Comment on 'Aromaticity of Pyridine'. 2

5. (a) How will you synthesize following compounds from EAA : 3+3=6




(b) Provide the structures for 'A' and 'B' in the following synthesis. 4

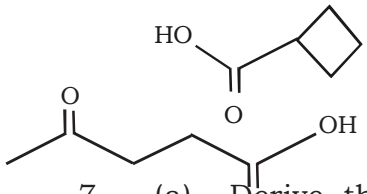


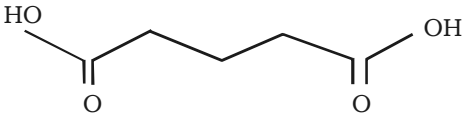

Or

6. (a) What are active methylene compounds? Give example. 2

(b) Provide a method of synthesis of 2-heptanone starting from EAA. 3

(c) How will you synthesize the following compounds. 5




7. (a) Derive the Phase rule : 5

$F = C + P - 2$

(b) Describe the phase diagram for $CO_2$. 5

Or

8. (a) Derive the Clausius-Clapeyron equation for the variation of vapor pressure with temperature. 5

(b) Find out the degree's of freedoms for the followings : 2.5+2.5=5

(i) $digH_2O \rightleftharpoons H_2O$ vapor

(ii) $2H_2O(g) \rightleftharpoons 2H_2(g) + O_2(g)$