Q.P. Code :04002

[Time: $2\frac{1}{2}$ Hours] **[Marks:75]**

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks
3. Use of log table / Non programmable calculator is allowed.

Q.1 A) Answer **any three** of the following. **05**

What is the use of SeO_2 in organic synthesis? What is the action of SeO_2 on?

i) Acetaldehyde
ii) Acetone
iii) Cyclohexanone

B) a)Describe the Hantzsch synthesis for the preparation of pyridine **03**

b) Write the resonating structures of furan. **02**

C) a) Explain briefly the basicity of pyrrole. Why pyrrole is a weak base compared to piperidine? **03**

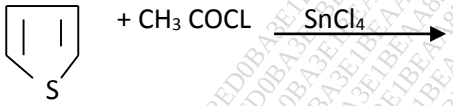
b) what is the action of following reagents on Furan? **02**

1) CH_3COONO_2 2) pyridine $+SO_3$

D) a) 'Electrophilic substitution reaction in furan takes place at position 2 and 5' explain **03**

b) Complete the following reactions. **02**

i)



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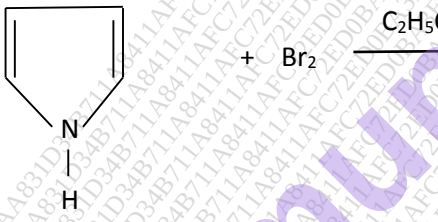


E) a) Give the preparation of Raney Nickel .Explain its use in the reduction of **03**

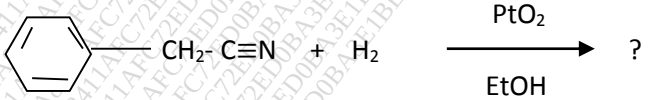
i) Olefinic double bonds
ii) Nitriles

b) Explain, 'Vilsmier – Haack reaction' of furan. **02**

F) Complete the following reactions. **05**

i)

ii)



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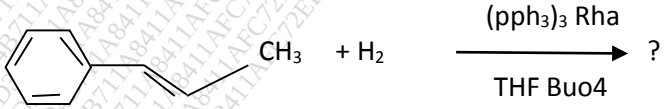


iv) $C_6H_5CH=CH-CHO \xrightarrow{?} C_6H_5CH=CH-CH_2OH$

v) $CH_3CN \xrightarrow{?} CH_3CH_2NH_2$

Q.2 Answer **any three** of the following

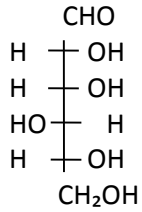
A) Write appropriate reactions for : **05**

a) Conversion of D-arabinose to D-mannose

b) Acetylation of ∝–D-glucopyranose

B) a) Convert the following Fischer projections to Haworth formula (∝ pyranose forms) **03**

1)



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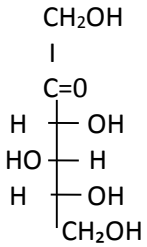
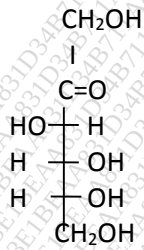


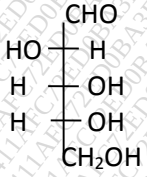
b) Write the reactions for oxidation of D-glucose using (1) bromine water (2) conc HNO_3 **02**

C) a) Convert the following Fischer projections to Haworth formulae (B-furanose forms) **03**

1)



2)



b) Write the reactions for fiormation of osazone from D-glucose in a stepwise manner **02**

D) a) Write the reactions for complete methylation of B-D- fructopyranose in a stepwise manner **03**

b) Draw chair conformations of ∝ and B forms of D-glucopyranose. **02**

E) Name the bases present in DNA molecule and discuss its double helical structure **05**

F) a) What are polypeptides? How do they differ from proteins? Give the structure of Gly-Ala-Gly. **03**

b) Explain the term iso-electric point with reference to α - amino acids. **02**

Q.3 Answer **any three** of the following.

A) What is an auxochrome? Give any two examples of auxochromes in organic molecules. With the help of a suitable example, explain hoiw chromophore- auxochrome interactions bring about bathochromic shift of U.V. absorption band. **05**

B) An organic compound has molecular formula C_7H_8O. Determine the index of its hydrogen deficiency and deduce its structural formula from the following spectral data. Also write name of the compound. **05**
IR(cm^{-1}):3325, 3065, 2875, 1470, 1018, 736, 698.
IPMR δ(ppm):2.5(1H) broad singlet, 4.6 (2H) singlet, 7.3 (5H) multiplet.

C) a) Organic molecules having symmetrical structures produce very few i. r. absorption bands as compared to those which have unsymmetric structures. Explain this with suitable examples. **03**

b) Explain with a suitable example how i. r. spectroscopy is used to follow the course of a chemical reaction. **02**

D) a) Explain the mass spectral fragmentation pattern of butanone. **03**

b) What is a molecular ion peak? Explain its importance. **02**

E) a) State the number of signals and splitting pattern in pmr spectra of the following compounds. **03**

i) 1,2-Diiodopropane

ii) 2-chloropropane

b) Explain anisotropic deshielding of aldehydic proton. **02**

F) An organic compound has molecular formula C_6H_7N. Determine the index of its hydrogen deficiency and deduce its structural formula from the following data. Also write name of the compound. **05**
IR(cm^{-1}):3430,3350,3030,1500,1280,750,700
PMRδ(ppm):3.6(2H)singlet,6.7-7.3(5H)multiplet.

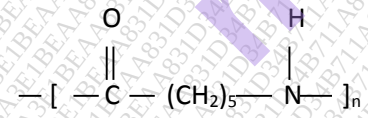
Q.4 Answer **any three** of the following

A) a) What are Ziegler Natta catalysts? Explain their role in the stereospecific synthesis of polypropylene. **03**

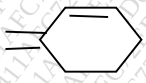
b) Identify the monomers in the following polymers:- **02**

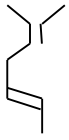
i) $[- CH_2 - CH = CH - CH_2 -]_n$

ii)



B) a) Write the products of ozonolysis of **03**

i) 

ii) 

b) Explain special isoprene role in terpenoids write an example. **02**

C) a) Give the preparation, properties and uses of Teflon. **03**

b) What are biodegradable polymers? Give an example with structure. **02**

D) a) How is $\propto$ - pinene converted to camphor? **03**

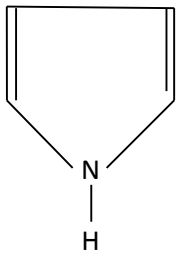
b) Give the classification of alkaloids on the basis of the heterocyclic ring system. **02**

E) a) Explain the following terms in Polymer chemistry. **03**
i) Stabilizers ii) Resins iii) Co-polymers

b) Give the structures of : **02**
i) α-Terpineol ii) Vitamin A

F) a) What is condensation polymerization? Give the reaction involved in the preparation of polyurethane. Mention its applications. **03**

b) Write the products of Hofmann exhaustive methylation and degradation of **02**



Q.5 A) Choose the right answer from the alternatives given below each and rewrite the completed statements **04**

a) Wilkinson's catalyst consists of transition metal ___(Ruthenium, Rhodium, Rhenium)

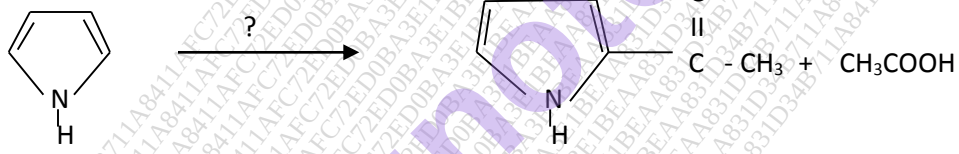
b) Esters on reduction with $LiAlH_4$ give____(secondary alcohol, primary alcohol , tertiary alcohol)

c) _____ on reduction with $NaBH_4$ gives Benzyl amine (Benzaldehyde, Benzamide,Benzoylchloride)

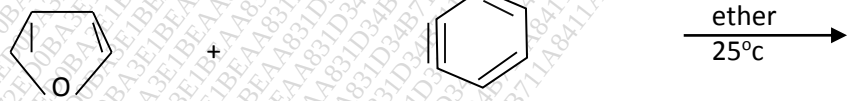
d) _____ is a reagent which causes epoxidation of olefinic double bonds.(SeO_2, m-CPBA, NBS)

OR

A) Complete the following reactions: **04**

p) 

q) 

r) 

s) 

B) File is the blanks by choosing the correct options **04**

a) _____ are hydrolyzable lipids.
(fat soluble vitamins, True waxes, steroids)

b) The base present in both RNA and DNA is _____
(Thymine, uracil, cytosine)

c) ___ is a neutral α-amino acid
(cysteine, Leucine, serine)

d) The coiling and folding of a protein molecule describes its _____ structure.
(primary , secondary, tertiary)

OR

B) Match the columns. **04**

p) Ribose	i) aldohexose
q) Mannose	ii) aldopentose
r) Fructose	iii) Trisaccharide
s) Sucrose	iv) ketohexose
	v) disaccharide
	vi) aldotetrose

C) Fill the blanks with appropriate choice. **04**

a) _____ transitions require maximum amount of energy
$(\sigma \rightarrow \sigma^* / \ n \rightarrow \sigma^* \ / \pi \rightarrow \pi^* / n \rightarrow \pi^*)$

b) Vibrations which bring about change in _____ of a molecule cause I.R. absorption.
(density / refractive index / polarizability / dipole moment)

c) Spacing between peaks of a multiplet is called _____ constant.
(universal / coupling / gravitational/planck's)

d) Magnetic anisotropy brings about _____ of aldehydic proton.
(addition / elimination/shielding/ deshielding)

OR

C) State **true or false**.
p) If a compound is transparent in the range 250-400 nm, it does not contain any unsaturated group. **04**
q) Nujol is used as a mulling agent in I.R. spectroscopy.
r) PMR- signal of –OH proton normally appears as a doublet.
s) Mass spectrometry involves interaction of electromagnetic radiation with the sample

D) Match the columns: **03**

A	**B**
a) Polystyrene	i) synthetic rubber
b) Z- polyisoprene	ii) natural rubber
c) Terylene	iii) thermoplastic
	iv) Thermoset
	v) Condensation polymer

OR

D) State whether the following one **true/ false**. **03**
p) All natural products are secondary metabolites.
q) Citral is an acylic diterpenoid
r) Adrenaline is a steroidal hormone
