DBK-003-1015006 Seat No. _____

B. Sc. (Sem. V) (CBCS) (W.E.F. 2016) Examination

June - 2022

Chemistry : Paper - 502

(Organic Chemistry & Spectroscopy)

Faculty Code : 003

Subject Code : 1015006

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions :

(1) Answer any 5 out of 10 questions.

(2) All questions carry equal marks; figures given in right side are total marks of that question.

1 (a) Answer the following questions : **4**

(1) Write the structure of Phosphorous Trichloride.

(2) Write the structure of Phenyl acetylene.

(3) Complete the reaction : $CH_3I + AgNO_3 \longrightarrow$

(4) Write the structure of Nicotinic acid.

(b) Write the structure of conyrine with molecular formula. **2**

(c) Write two applications of Wolf Kishner Reaction. **3**

(d) Explain constitution of Papaverine. **5**

2 (a) Answer the following questions : **4**

(1) Complete the reaction : $R\text{-}OCH_3 + HI \longrightarrow$

(2) Write the structure of Triphenyl Phosphine.

(3) Write the structure of N-phenyl acetamide.

(4) Complete the reaction : $R\text{-}COOH + SOCl_2 \longrightarrow$

(b) Write the structure of α-Picoline with molecular formula. **2**

(c) Write two applications of Sodamide. **3**

(d) Explain Beckmann rearrangement with mechanism. **5**

3 (a) Answer the following questions : **4**

(1) How many chiral carbons present in a Fructose ?

(2) Define : Carbohydrate.

(3) Write the structure of Glucoxime.

(4) Write the structure of Auramine-O.

(b) Give the synthesis of P-Anisyl Urea. **2**

(c) Explain step-down reaction (Ruff's method) **3**

(d) Explain Epimerisation of D (+) mannose from D (+) Glucose. **5**

4 (a) Answer the following questions : **4**

(1) Write the molecular formula of starch.

(2) Define : Polysaccharides.

(3) Write the structure of Fructoxime.

(4) Write the structure of Dulcin.

(b) Give the method of preparation of Fehling-A solution. **2**

(c) Give the synthesis of Adrenaline. **3**

(d) Give the synthesis and uses of (i) Saccharine **5**
(ii) Crysodine-G.

5 (a) Answer the following questions : **4**

(1) What is the molecular formula of Isoxazole ?

(2) The sample tube is made-up of _____ or _____.

(3) Write the structure of Ethylene glycol.

(4) Write Beer's Law.

(b) What is Bathochromic Shift ? **2**

(c) Give the synthesis of Pyridazine. **3**

(d) Write a note on "Frank-condon principle." **5**

6 (a) Answer the following questions : **4**

(1) What is the molecular formula of Thiazole ?

(2) What is the wavelength range corresponding to UV–visible region ?

(3) Write the structure of 3,5-Dimethyl–I–Phenyl Pyrazole.

(4) _____ lamp and _____ lamp is used in UV spectrophotometer.

(b) Define : Transmittance. **2**

(c) Write short note on Auxochrome. **3**

(d) Give the synthesis of (i) Thio morpholine (ii) Imidazole. **5**

7 (a) Answer the following questions : **4**

(1) The CO_2 molecule is _____ and its point group is _____.

(2) Define : Improper rotation.

(3) Draw diagonal plane in $[PtCl_4]^{-2}$.

(4) What is the point group of cyclohexane ?

(b) What is symmetry element and symmetry operation ? **2**

(c) Find out point group of following compounds : (1) BF_3 **3**
(2) H_3BO_3.

(d) Discuss multiplication table for C_3V point group. **5**

8 (a) Answer the following questions : **4**

(1) The point group of water molecule is _____.

(2) Find out point group of PCl_5.

(3) What is the point group of benzene ?

(4) What is Inversion centre ?

(b) Explain law of multiplication. **2**

(c) Write differences between C_n and S_n. **3**

(d) Construct multiplication table for C_2V point group with operation. **5**

9 (a) Answer the following questions : **4**

(1) Write the expected IR frequency (peak) in Benzaldehyde.

(2) Which source of radiation is used for IR spectroscopy ?

(3) A characteristic IR absorption peak of nitriles is in ____ cm^{-1} range.

(4) Give stretching bending and total number of vibrations in Aniline.

(b) Define IR Spectroscopy. **2**

(c) Define : Fermi resonance. **3**

(d) Explain : Overton and Finger print region. **5**

10 (a) Answer the following questions : **4**

(1) Why methanol is not good solvent for IR ?

(2) Write the expected IR frequency (peak) in Ethyl ester.

(3) Which material is used for prism in IR spectra ?

(4) Give equation for double bond equivalent.

(b) Define : Selection rule in short. **2**

(c) Discuss various types of stretching and bending vibrations which arise in aromatic. **3**

(d) Assign the structure to a compound from the following spectral result. **5**

M.F. = $C_8H_8O_2$

IR : 3030 (m), 2980 (m), 2750 & 2680 (sh), 1690 (s), 1600, 1580 (m), 1220 (m) and 830 (m) cm^{-1}.
