

Roll No.

(07/22-II)

5230

B. Sc. EXAMINATION

(For Batch 2013 & Onwards)

(Fourth Semester)

CHEMISTRY

Paper-XIII (CH-206)

Organic Chemistry

Time : Three Hours

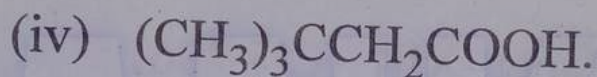
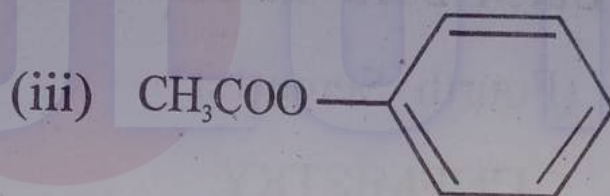
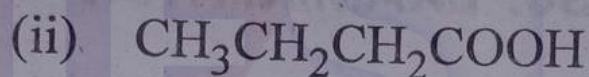
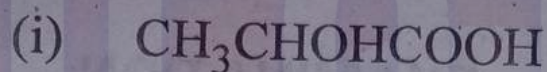
Maximum Marks : 27

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. 1 is compulsory.

1. (a) Discuss the number of fundamental vibrations possible in CO_2 .
- (b) Which peaks in the IR spectrum could be used to distinguish between a ketone and a carboxylic acid ?

(c) Give selection rules for IR spectroscopy.

(d) Write the IUPAC names of the following compounds :



(e) Arrange the following acids in decreasing order of their acidic strength :

(i) *p*-Toluic acid

(ii) *p*-Bromo benzoic acid

(iii) *m*-Bromo benzoic acid

(iv) *m*-Nitro benzoic acid.

(f) Write equations showing how benzoic acid can be prepared from bromobenzene ?

(g) Which of the compounds in each of the following pairs would undergo nucleophilic substitution more easily ?

(i) Acetyl chloride and Acetic anhydride

(ii) Acetamid and Ethyl acetate. $7 \times 1 = 7$

Section A

2. (a) Discuss the structure of carboxylate ion. 1
- (b) Explain, why carboxylic acids exhibit considerable acidic character ? 2
- (c) Write *two* chemical tests to detect carboxylic acids. Also write the chemical equations involved. 2
3. (a) Write general methods of preparation of acid anhydride and carboxylic acids (two each). 3
- (b) Give the mechanism of alkaline hydrolysis of esters. 2
4. (a) Write the reaction of trans-esterification. 1
- (b) Why trimethyl acetic acid is a weaker acid than acetic acid ? 2

- (c) Compare the boiling points of all the acid derivatives along with carboxylic acids. 2

Section B

5. (a) A compound having molecular formula $C_4H_{10}O$ shows no IR bands above 1500 cm^{-1} except a sharp band at about 2900 cm^{-1} . Give all the possible structures that it can have. 3
- (b) What is meant by stretching vibrations? How many types of stretching vibrations a water molecule can have? Explain. 2
6. (a) Describe the instrumentation and mechanics of recording the IR spectra. 3
- (b) How would the IR spectra of the following compounds differ? 2
- Acetone and Ethanol
 - Acetic acid and Methanol.

7. (a) How many fundamental vibrations can each of the following molecules have ? 3

(i) Benzene

(ii) Acetylene

(iii) Methanol.

(b) Discuss the applications of IR spectroscopy. 2