



**SB-3502**

**M. Sc. (Part - II) Examination**  
**March / April - 2011**  
**Industrial Chemicals & Industrial Analysis**

Time : Hours]

[Total Marks : 70

**Instructions :**

(1)

नीचे दशांशके निशानीवाणी विगतो उत्तरवही पर अवश्य लिखनी.  
Fillup strictly the details of signs on your answer book.

Name of the Examination :  
M. SC. (PART - 2)

Name of the Subject :  
INDUSTRIAL CHEMICALS & INDUSTRIAL ANALYSIS

Subject Code No. : 3 5 0 2 Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

- (2) Answer to the two sections should be written in separate answer books.
- (3) Figures to the right indicate full marks of the question.

**SECTION - I**

- 1 (a) What is unit process ? What is nitration ? State the nitrating agents used for nitration. Discuss industrially important chemicals obtained from benzene by nitration. 12
- (b) What are unit operations ? Discuss industrially important chemicals obtained by alkylation process.
- (c) How is animation carried out ? Discuss industrially important chemicals obtained by ammonolysis.

**OR**

- 1 (a) What are halogenations ? List different halogenating agents and discuss industrially important chemicals obtained from benzene by chlorination. 12
- (b) What are sulphonation and sulphation ? Discuss industrially important chemicals obtained from naphthalene by sulphonation process.
- (c) What is nitration ? Give the reaction mechanism of nitration process. Discuss industrially important compounds obtained from naphthalene and anthracene by nitration process.

- 2 (a) Discuss industrially important chemicals obtained from  $C_2$  - cuts. 12  
 (b) Give a brief account of techniques of polymerisation.  
 (c) Write note on Copolymers.

OR

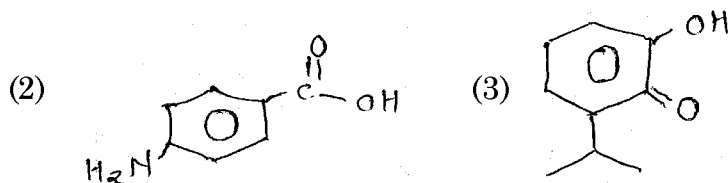
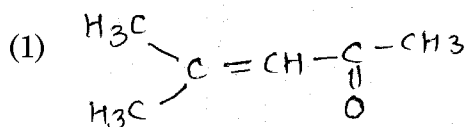
- 2 (a) What are petrochemicals ? Discuss industrially important chemicals obtained from  $C_1$  and  $C_4$ -cuts. 12  
 (b) Discuss the industrial manufacture and uses of elastomers and PVC.  
 (c) Write notes on :  
 (i) Polyvinyl plastics  
 (ii) Vulcanization.
- 3 (a) What do you mean by pesticides ? Enlist different pesticides. Give the manufacture and uses of malathion and parathion. 11  
 (b) What are explosives ? Give the manufacture and uses of cyclonite and PETN.  
 (c) What is meant by perfume ? Give the synthesis of vanillin and civetone.

OR

- 3 (a) Give manufacture and uses of cationic detergents. 11  
 (b) Give the manufacture method of vitamin-C by fermentation process.  
 (c) Give the constituents of perfume.

## SECTION - II

- 4 (a) (i) Explain McLafferty rearrangements. 12  
 (ii) Explain the importance of coupling constants in the interpretation of NMR spectra.  
 (b) (i) Calculate the  $\pi_{max}$  values for the following :



- (ii) What are advantages of FTIR spectro-photometer over conventional method ?

(c) Deduce the structure of compound using following spectral data :

MF :  $C_4H_8O$

UV :  $\pi_{max}$  274 nm

IR : 2941 - 2857 (m); 1715 (s); 1460(m) and 1370(m)  $cm^{-1}$

NMR : Quartet  $\delta = 2.48$  (2H)

Triplet  $\delta = 1.07$  (3H)

Singlet  $\delta = 2.12$  (3H)

OR

4 (a) (i) Explain the terms :

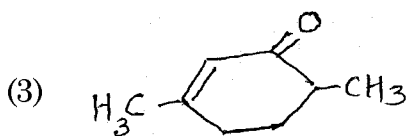
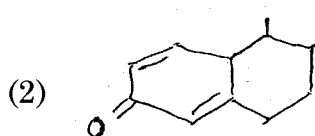
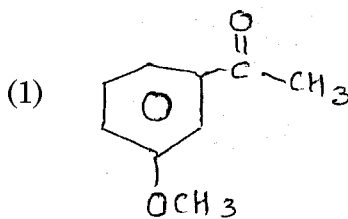
12

(1) Base peak

(2) Parent peak

(3) Metastable ion in mass spectroscopy.

(ii) Calculate  $\pi_{max}$  values for following :



(b) (i) Explain the use of TMS and DSS as the reference compounds in NMR spectroscopy.

(ii) Why is KBR used as mulling agent in IR ? How will you distinguish following pairs of compounds by technique as shown with each pairs.

(1)  $CH_3CH_2CHO$  and  $CH_2 = CH_2OH \rightarrow$  IR spectra

(2) Neopentone and 2-methylbutane  $\rightarrow$  NMR

(c) Deduce the structure of compound using following spectral data :

M.F. :  $C_3H_6O_2$

UV :  $\lambda_{max} < 220 \text{ nm}$

IR : 3485 (vw), 3005 – 2855 (m); 1745 (s);  
1245 (s); 1043 (s)  $\text{cm}^{-1}$

NMR : (a) singlet:  $\delta = 1.98$   
(b) singlet:  $\delta = 3.6$  } 1:1

- 5 (a) State the limitations of GC. Why LC did not become popular in early days ? How it becomes superior to GC in modern times ? Compare GC with LC. 12
- (b) Explain the difference between WCOT and SCOT. Give advantages and disadvantages of capillary column.
- (c) Discuss the stationary phase including bounded phase used in LSC.

OR

- 5 (a) Discuss the selection of stationary phase in GLC and GSC. 12
- (b) Compare UV-absorption, RI and fluorescence detector used in HPLC. Explain derivatisation in HPLC with two illustrations.
- (c) Explain the working of FID and compare with TCD.
- 6 (a) Describe the method of estimation of dissolved oxygen (DO) demand. 11
- (b) How is effluent water of pharmaceutical industries treated ?
- (c) Discuss chemical and photo-chemical reactions in smog formation.

OR

- 6 (a) Discuss the significance of BOD of water sample and give the importance and their elimination. 11
- (b) Explain oxides of N and C and the effect in atmosphere.
- (c) Write a note on industrial pollution of sugar industries.