

Total No. of Printed Pages—8

6 SEM TDC CHMH (CBCS) C 14

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(June/July)

CHEMISTRY

(Core)

Paper : C-14

(Organic Chemistry)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Select the correct answer from the following :

1×5=5.

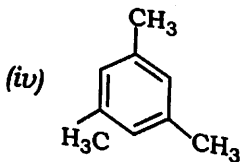
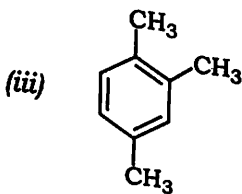
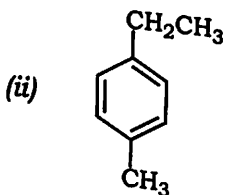
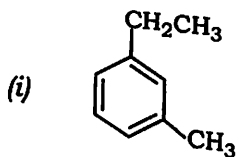
(a) When the λ_{\max} of a compound shifts to a shorter wavelength on certain treatment, the compound is said to have undergone

- (i) bathochromic shift
- (ii) hypochromic effect
- (iii) hyperchromic shift
- (iv) hypsochromic shift

(b) Dyes which can be applied directly to cotton from water solution are called

- (i) mordant dyes
- (ii) vat dyes
- (iii) sustentive dyes
- (iv) dispersive dyes

(c) The NMR spectrum of the compound C_9H_{12} shows two signals at $\tau 3.22$ (s, 3H) and 7.75 (s, 9H). Which of the following structures is in conformity with the data?



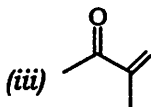
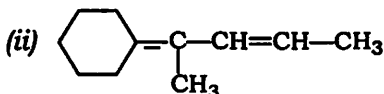
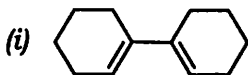
(3)

- (d) The monomers of Buna-S rubber are
- (i) isoprene and butadiene
 - (ii) styrene and butadiene
 - (iii) adipic acid and hexamethylene diamine
 - (iv) chloroprene
- (e) Epimeric carbohydrates differ in their
- (i) configuration at α -C atom
 - (ii) number of —OH groups
 - (iii) ring size
 - (iv) None of the above

UNIT—I

2. Answer the following questions :

- (a) Calculate λ_{max} in UV spectrum for the following : 1×3=3



(b) Account for the following observations : 2×2=4

(i) Ethylene is colourless, but a polyene, e.g., $\text{CH}_3(\text{CH}=\text{CH})_6\text{CH}_3$ is yellow.

(ii) 1,4-pentadiene does not absorb light above 200 nm.

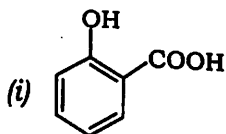
(c) Pent-1-ene absorbs at 176 nm. The absorption data, λ_{max} for three isomeric dienes A, B and C of molecular formula C_5H_8 is 178 nm, 211 nm and 215 nm respectively. Write down the structures of A, B and C with proper reasoning. 2

Or

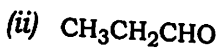
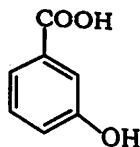
Using MO theory, account for the following trends in λ_{max} (nm) :

Ethylene (175), 1,3-butadiene (217)
and 1,3,5,-hexatriene (250)

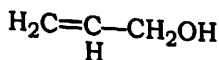
(d) How will you differentiate between the following pairs of compounds using IR spectra? 1½×2=3



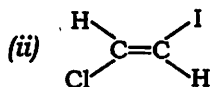
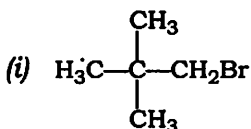
and



and



- (e) What will be the multiplicity of each kind of proton in the following molecules? 2



- (f) A compound, $\text{C}_9\text{H}_{10}\text{O}_2$, shows the following signals in ^1H NMR spectrum :

- (i) $\delta 2.3$ (3H, singlet)
- (ii) $\delta 3.6$ (3H, singlet)
- (iii) $\delta 6.4-7.5$ (4H, a pair of doublets
 $J = 8 \text{ Hz}$)

Assign a structure to the compound. 3

- (g) Identify the compound by analyzing the following data : 2

IR $\nu(\text{cm}^{-1})$: 1600, 1715, 3000

Mass (m/e) : 43, 91, 134 (M^+)

NMR δ value : 2.1 (s, 3H), 3.6 (s, 2H),
7.3 (m, 5H)

- (h) Explain the effect of polar solvent on $\pi-\pi^*$ and $n-\pi^*$ transitions. 2

Or

Why is TMS used as a reference in NMR spectroscopy?

- (b) How will you synthesize fluorescein?
- (c) How would you prepare Congo red from naphthionic acid? Discuss its use as acid-base indicator.
- (d) What are the chromophores and auxochromes present in the following dyes?
- (i) Alizarin
- (ii) Methyl orange
- (e) Give one example of a xanthene dye and mordant azo dye. Also write their structures.

UNIT—IV

5. Answer the following questions :

- (a) What is Ziegler-Natta catalyst? Discuss their importance in the formation of addition polymer. 2
- (b) What type of alkenes prefer to undergo cationic polymerization? Discuss the role of electron donating groups in cationic polymerization. 1+2=3

Or

Discuss the mechanism of a peroxide-initiated chain growth polymerization involving any vinyl monomer. 3

(8)

(c) What do you understand by the term 'biodegradable polymers'? Give two examples. 1+1=2

(d) How would you prepare the following (any one)? 2

(i) Neoprene

(ii) Nylon-6
