

CSM – 17/16
Chemistry
Paper – II

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

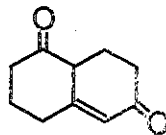
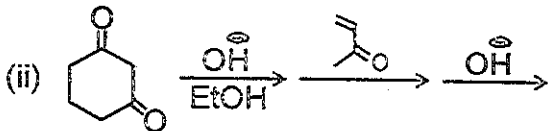
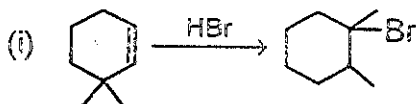
Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory and three of the remaining questions, selecting at least one from each Section.

SECTION – A

1. Answer any three of the following questions :

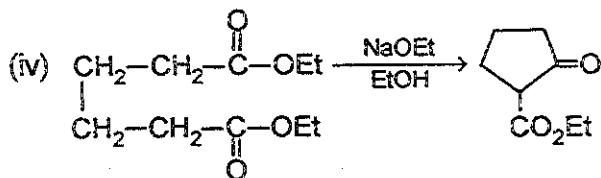
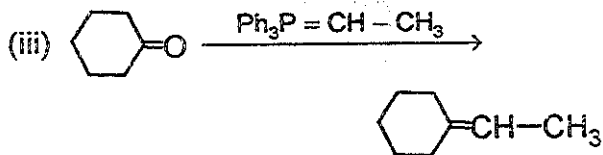
20×3 = 60

(a) Outline the mechanism of the following conversions :

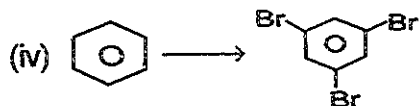
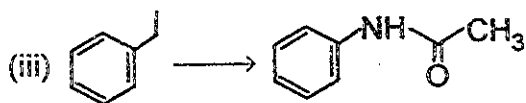
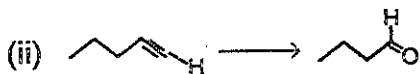
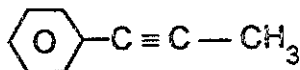
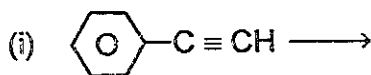


WG – 17/4

(Turn over)

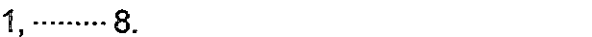
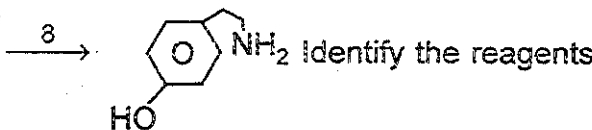
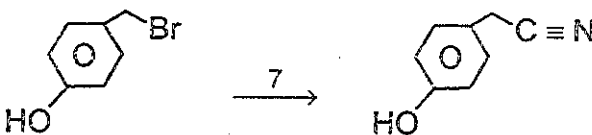
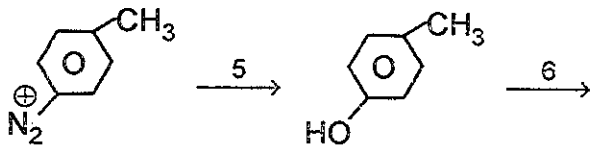
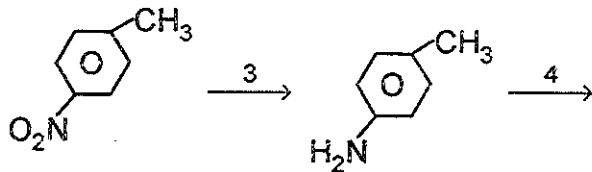


(b) How will you carry out the following conversions ?



(c) Provide the missing reagents in the following synthetic scheme :

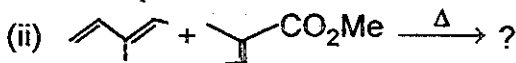
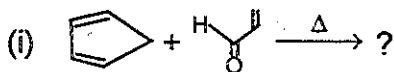


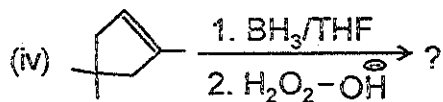
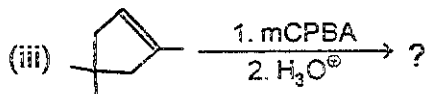


Identify the reagents

1, 8.

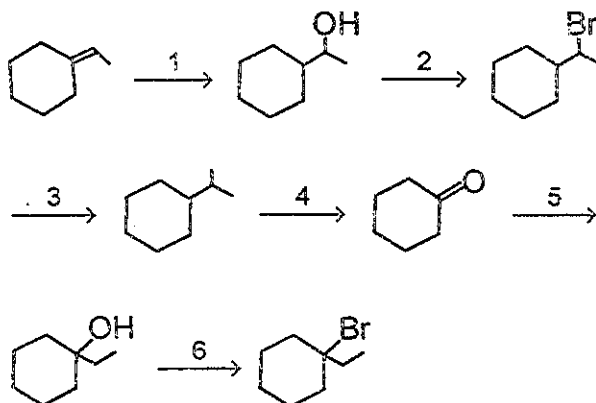
(d) Predict the products and write down the stereochemistry wherever applicable :





2. Answer the following :

(a) Provide reagents for each of the following transformations : 15



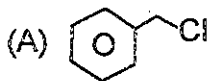
Identify the reagents from 1 to 6.

(b) Starting with ethane and using a Grignard reagent in your synthetic design, provide a synthetic scheme for 2-bromo-2-methylbutane. 10

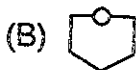
(c) Match the following structures from Column – I with their IR absorption in Column – II: 15

Column – I

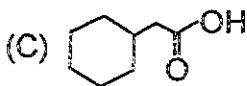
Column – II



(i) IR abs at 3300 and 2150 cm^{-1}



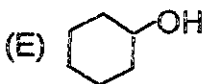
(ii) Strong IR abs. at 1715 cm^{-1}



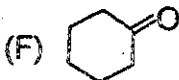
(iii) Strong IR abs. at 1710 cm^{-1} and broad abs. between 3400-2500 cm^{-1}

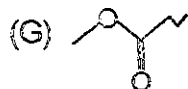


(iv) Strong IR abs. at 1740 cm^{-1}

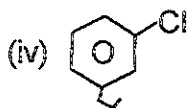
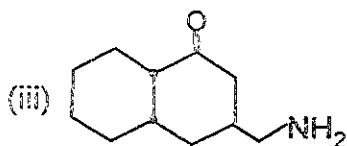
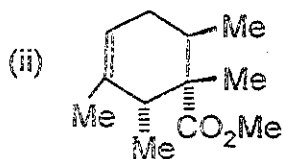
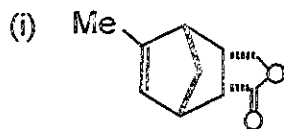


(v) Strong IR abs. at 3400 cm^{-1} (broad)





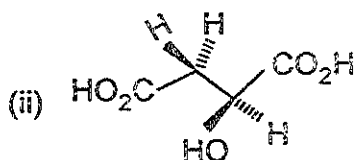
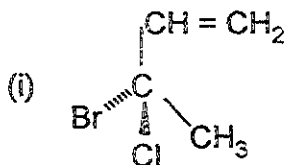
(c) Provide synthetic routes to the following molecules : 4×5 = 20



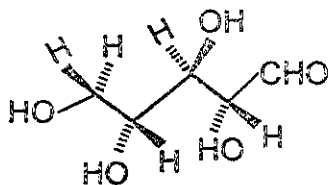
3. Answer the following : 15×4 = 60

(a) Draw Fischer projection for (2R, 3S)-2-bromo-3-methyl pentane.

- (b) Determine the abs. configuration(s) of the Chirality Centres in each of the following molecules :



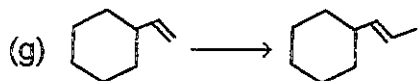
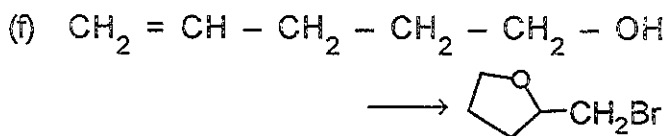
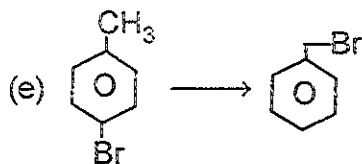
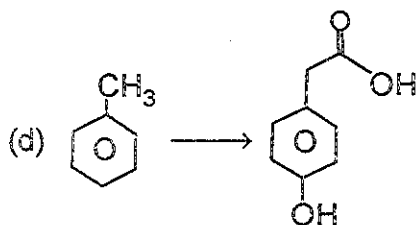
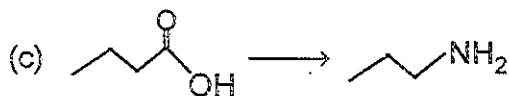
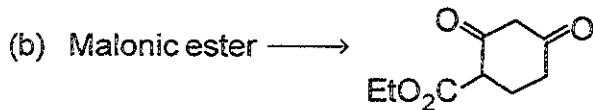
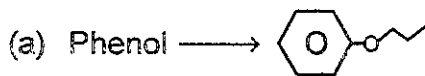
- (c) How many Chirality Centres (Stereogenic Centres) are present in the following molecule ? What is/are the hybridisation of the Chirality Carbons ? Determine the abs configuration (R/S) of the Chirality Centres :




- (d) What do you mean by Prochiral molecules and Prochirality Carbons ? What are Re-face and Si-face ? Illustrate with examples.

OR


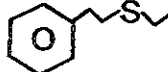
Suggest reagents/conditions for the following conversions (any ten): 6×10 = 60



(h) Acetylene \rightarrow 2-dodecanone

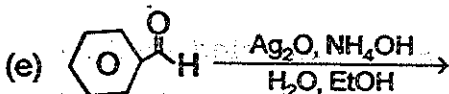
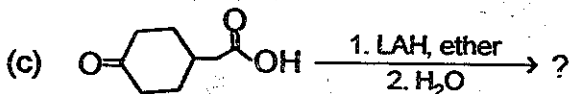
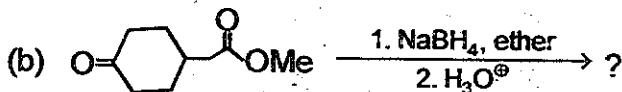
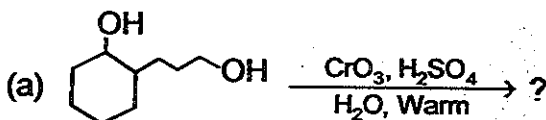
(i)  \rightarrow 1-bromo-2-chloro-4-propyl

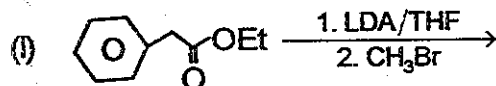
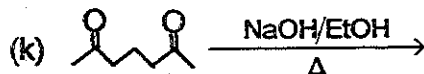
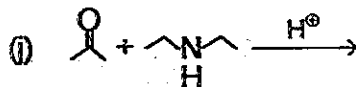
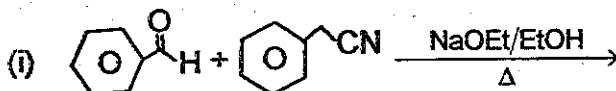
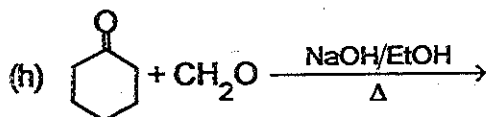
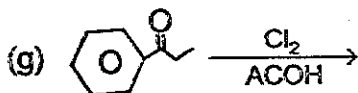
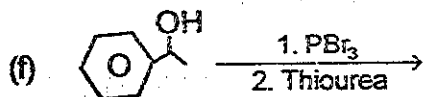
benzene

(j)  \rightarrow 

(k)  \rightarrow 

4. Predict the product(s) on any ten of the following reactions : 6 \times 10 = 60





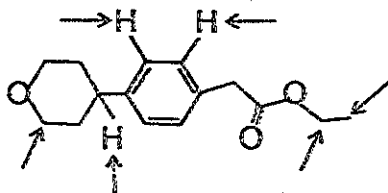
SECTION - B

5. Answer any three of the following questions :

20×3 = 60

(a) What is the expected multiplicity for proton resonance indicated in the following

molecule ? Explain the reason for your answer :



(b) The mass spectral data $\left(\frac{m}{z}\right)$ are $120 \left(\frac{+}{M}\right)$,

105, 77, 43. Suggest a structure consistent with the spectral data.

(c) Propose a structure consistent with the following NMR data of the two molecules given below :

(A) M. F. C₇H₁₂O₃

PMR: δ 2.11 ppm, s, 3H

2.82 ppm, t, 2H

3.00 ppm, t, 2H

4.00 ppm, q, 2H

1.22 ppm, t, 3H

(B) M. F. C₃H₆O₃

PMR: δ 5.5 ppm, s, 6H

What are (A) and (B) and explain the spectral observations ?

(d) Propose structure for the following compounds :

(i) $C_5H_{10}O$ with only two PMR signals

(ii) $C_{12}H_{18}O$ with only one PMR signal

(iii) C_3H_6O with only a triplet and a quintet in the PMR signal

(iv) $C_7H_{14}O$ with three singlets in PMR

6. Write short notes on any five of the following :

12×5 = 60

(a) McLafferty rearrangement

(b) Norrish-Type II reaction

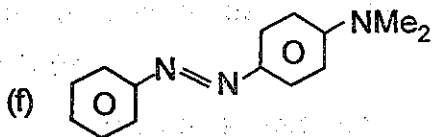
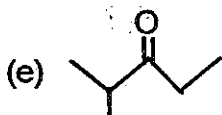
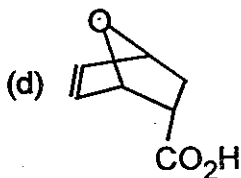
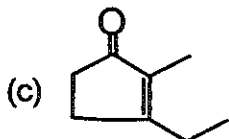
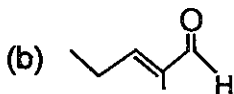
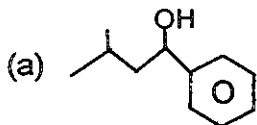
(c) di- π -Methane rearrangement

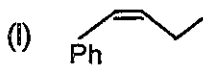
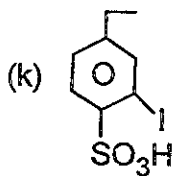
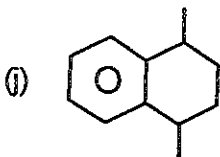
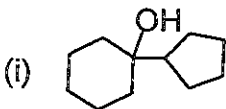
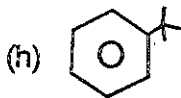
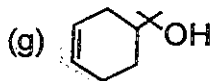
(d) Silicones

(e) Bischler-Napieralski reaction

(f) Borazine

7. Suggest Synthetic Schemes for any ten of the following molecules : 6×10 = 60





8. Write short notes on any **six** of the following :

10×6 = 60

(a) End group analysis of a polymer

- (b) Teflon
- (c) Inorganic polymer
- (d) Fisher Indole Synthesis
- (e) Von-Richter reaction
- (f) Number Average mol.wt. of polymer
- (g) ESR spectra for methyl radical



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations.

In the second section, the author provides a detailed breakdown of the monthly budget. It includes categories for housing, utilities, food, and entertainment. The goal is to identify areas where spending can be reduced without affecting the quality of life.

The third part of the document focuses on investment strategies. It suggests diversifying the portfolio to include stocks, bonds, and real estate. The author also mentions the importance of regular reviews and adjustments to the investment plan based on market conditions.

Finally, the document concludes with a summary of key takeaways. It reiterates the need for discipline and consistency in financial planning. The author encourages readers to take control of their finances and work towards their long-term goals.