

CSM – 17/16

Chemistry

Paper – II

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

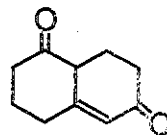
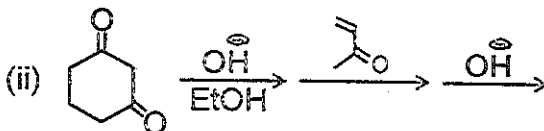
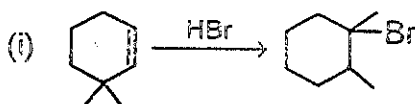
Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory and three of the remaining questions, selecting at least one from each Section.

SECTION – A

1. Answer any three of the following questions :

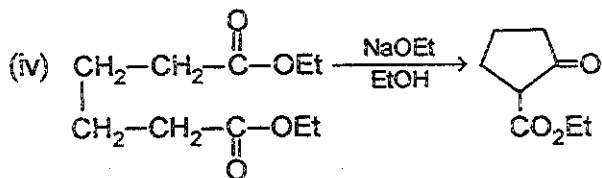
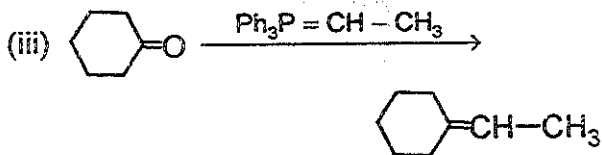
20×3 = 60

(a) Outline the mechanism of the following conversions :

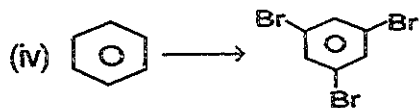
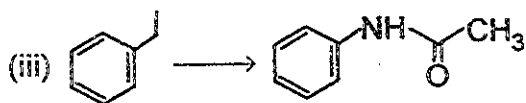
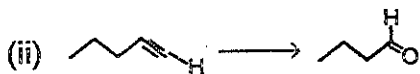
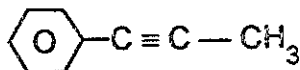
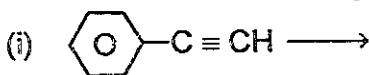


WG – 17/4

(Turn over)

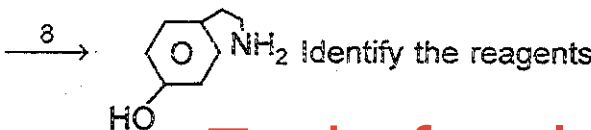
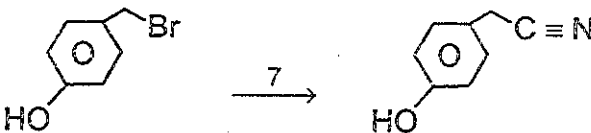
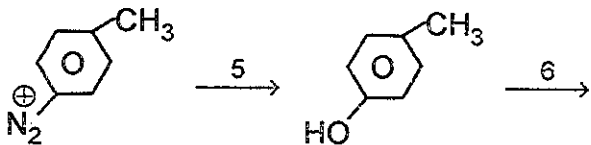
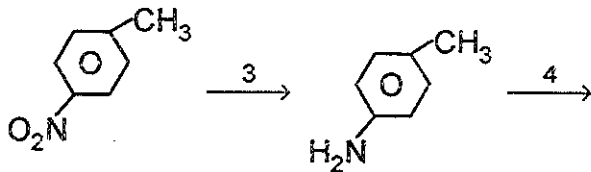


(b) How will you carry out the following conversions? Techofworld.In



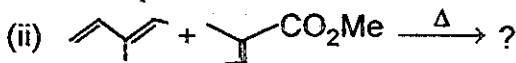
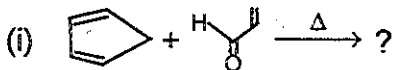
(c) Provide the missing reagents in the following synthetic scheme :

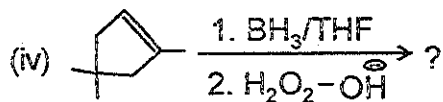
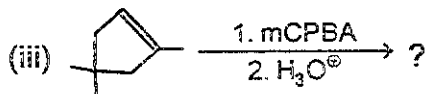




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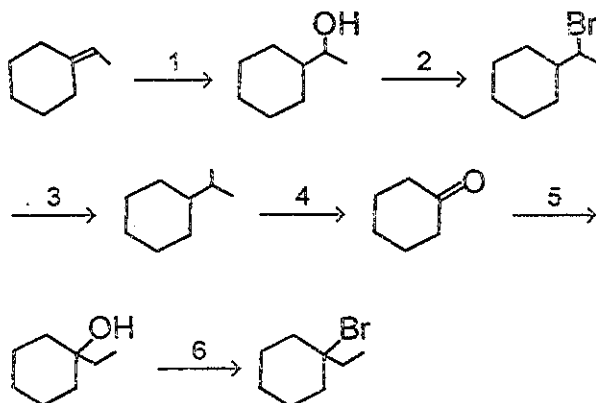
(d) Predict the products and write down the stereochemistry wherever applicable :





2. Answer the following: **Techofworld.In**

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



Identify the reagents from 1 to 6.

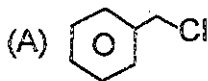
(b) Starting with ethane and using a Grignard reagent in your synthetic design, provide a synthetic scheme for 2-bromo-2-methylbutane. 10

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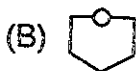
(c) Match the following structures from Column – I with their IR absorption in Column – II: 15

Column – I

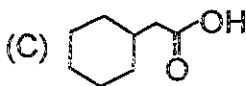
Column – II



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



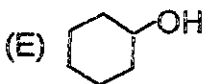
(ii) Strong IR abs. at 1715 cm^{-1}



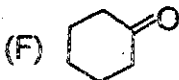
(iii) Strong IR abs. at 1710 cm^{-1} and broad abs. between 3400-2500 cm^{-1}

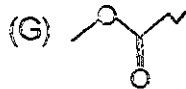


(iv) Strong IR abs. at 1740 cm^{-1}

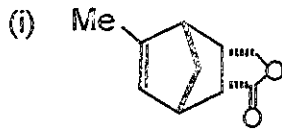


(v) Strong IR abs. at 3400 cm^{-1} (broad)

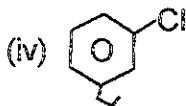
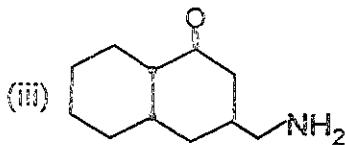
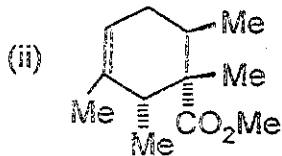




(c) Provide synthetic routes to the following molecules : 4×5 = 20



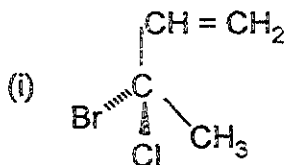
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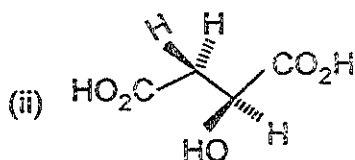
3. Answer the following : 15×4 = 60

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

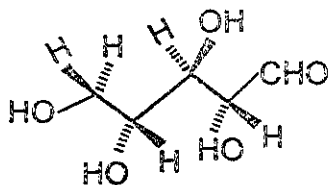
- (b) Determine the abs. configuration(s) of the Chirality Centres in each of the following molecules :



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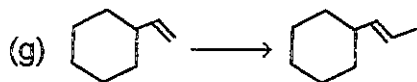
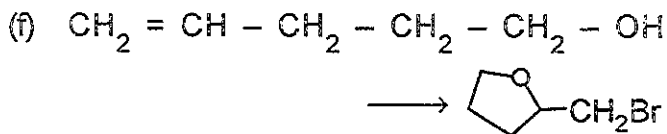
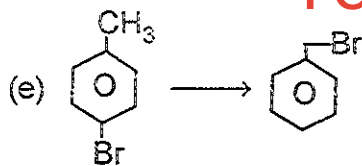
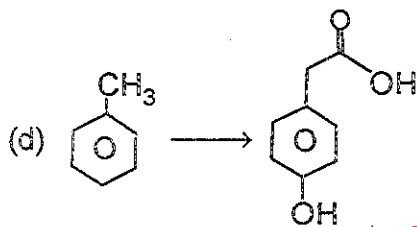
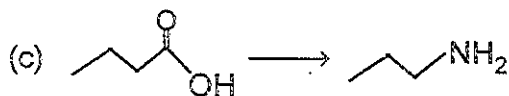
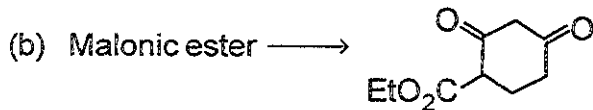
- (c) How many Chirality Centres (Stereogenic Centres) are present in the following molecule ? What is/are the hybridisation of the Chirality Carbons ? Determine the abs configuration (R/S) of the Chirality Centres :



- (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): $6 \times 10 = 60$


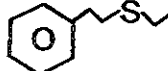


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(h) Acetylene \rightarrow 2-dodecanone

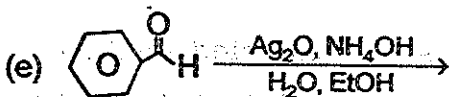
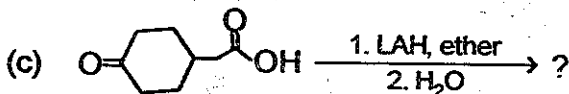
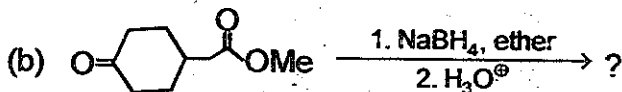
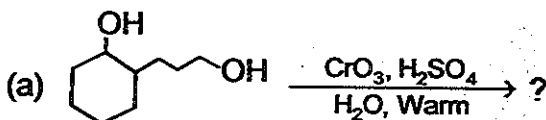
(i)  \rightarrow 1-bromo-2-chloro-4-propyl

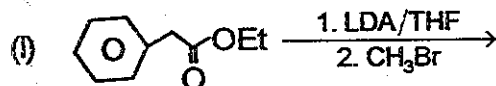
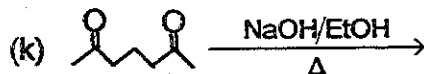
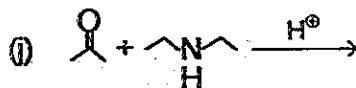
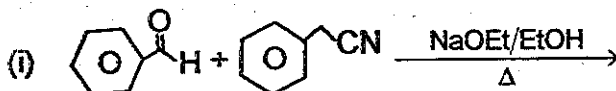
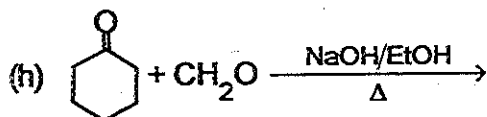
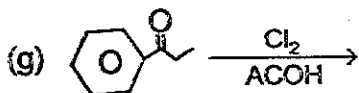
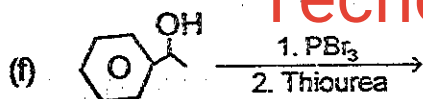
benzene

(j)  \rightarrow 

(k)  \rightarrow 

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





SECTION - B

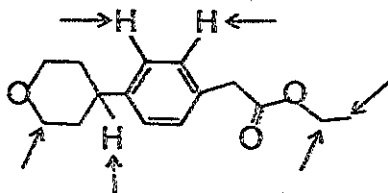
5. Answer any three of the following questions :

20×3 = 60

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

molecule ? Explain the reason for your answer :

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(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 ?

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(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

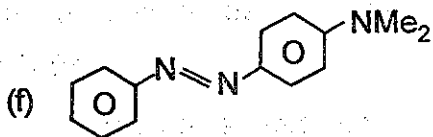
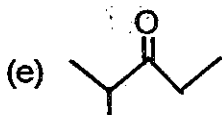
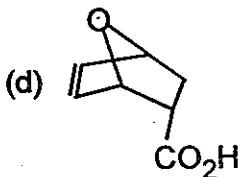
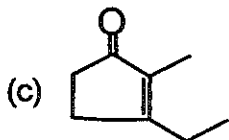
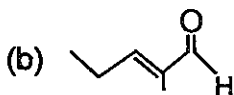
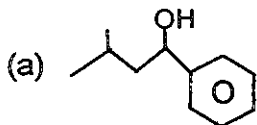
(c) di- π -Methane rearrangement

(d) Silicones

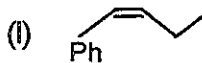
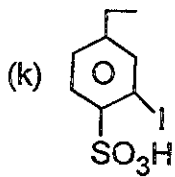
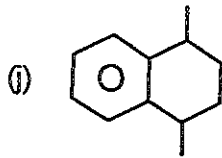
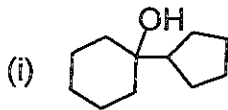
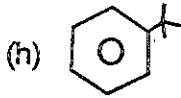
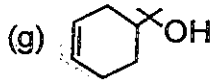
(e) Bischler-Napieralski reaction

(f) Borazine

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



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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

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1. The first part of the document discusses the importance of maintaining accurate records for the company's financial performance. It highlights the need for regular audits and the role of the accounting department in ensuring compliance with tax regulations.

2. The second part of the document focuses on the company's strategic goals for the next five years. It outlines the key areas of growth, including market expansion and product development, and provides a detailed analysis of the risks and opportunities associated with these initiatives.

3. The third part of the document provides a comprehensive overview of the company's current operations. It details the production process, the distribution network, and the customer service strategy. It also includes a comparison of the company's performance against its competitors in the market.

4. The fourth part of the document discusses the company's human resources management. It covers the recruitment process, employee training, and the implementation of performance management systems. It also addresses the challenges of retaining top talent in a competitive market.

5. The fifth part of the document provides a detailed financial analysis of the company's performance over the last year. It includes a breakdown of revenue, expenses, and profits, and a comparison of the company's financial ratios with industry benchmarks.

6. The sixth part of the document discusses the company's environmental and social responsibility initiatives. It outlines the company's commitment to sustainable practices and its efforts to reduce its carbon footprint and improve its social impact.

7. The seventh part of the document provides a summary of the company's key findings and recommendations. It identifies the areas where the company is performing well and the areas where it needs to improve. It also provides a clear action plan for the company to achieve its strategic goals.