

CHE 504
M.Sc. Ist SEMESTER EXAMINATION, 2022-23
CHEMISTRY

(Organic Reaction Mechanism)

(4+0)

(CBCS MODE)



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Date (तिथि) : _____

Paper ID

(To be filled in the
OMR Sheet)

8498

अनुक्रमांक (अंकों में) :

Roll No. (In Figures)

अनुक्रमांक (शब्दों में) :

Roll No. (In Words) :

Time : 1 Hour

समय : 1 घण्टा

Max. Marks : 60

अधिकतम अंक : 60

नोट : पुस्तिका में 40 प्रश्न दिये गये हैं, सभी प्रश्न करने होंगे। प्रत्येक प्रश्न 1.5 अंक का होगा।

Important Instructions :

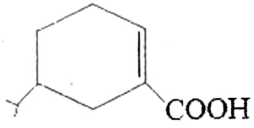
1. The candidate will write his/her Roll Number only at the places provided for, i.e. on the cover page and on the OMR answer sheet at the end and nowhere else.
2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy be obtained.

महत्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ०एम०आर० उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।
2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि इस पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिप्रेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

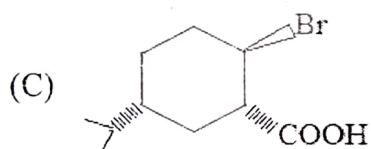
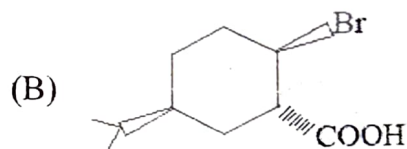
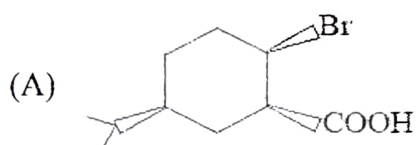
1. What does an activating substituent group activate ?

- (A) Ortho position
- (B) Meta position
- (C) Both ortho and para position
- (D) Para position

2. The product $P =$  is obtained by using which one of the

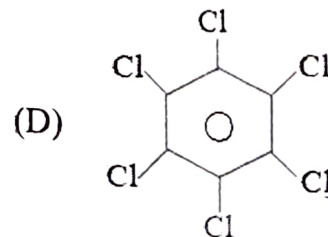
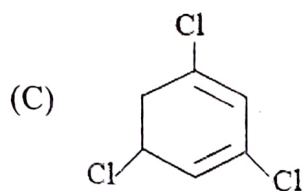
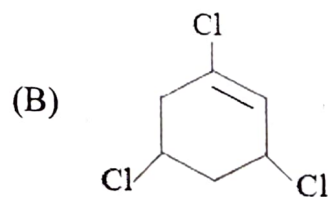
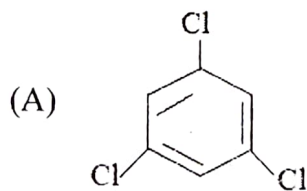
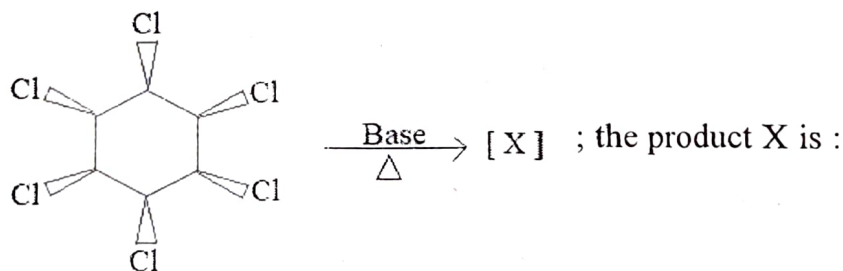
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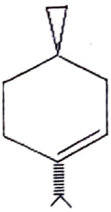
precursor :

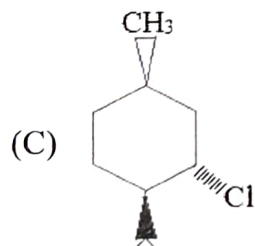
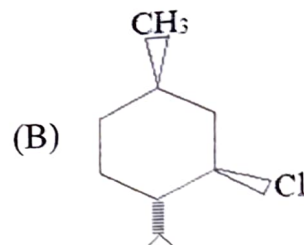
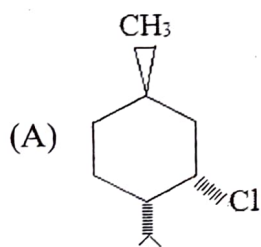


(D) None of these

3. In following reaction scheme



4. The compound P=  is formed by using which one of the following precursor :

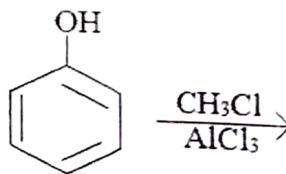


(D) None of these

5. What is the electrophile in the acylation of benzene ?

- (A) $AlCl_3$
 (B) CO^+
 (C) Cl^+
 (D) $R - CO^+$

6. What will be the product in the given reaction ?

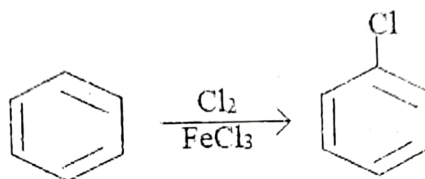


- (A) m-chlorophenol
 (B) o-chlorophenol and p-chlorophenol
 (C) o-hydroxytoluene and p-hydroxytoluene
 (D) m-hydroxytoluene

7. Which of the following aromatic compounds undergo Friedel-Crafts alkylation with methyl chloride and aluminium chloride?

- (A) Benzoic Acid
- (B) Nitrobenzene
- (C) Toluene
- (D) Aniline

8. What will be the attaching electrophile in this reaction?



- (A) Carbanion
- (B) Halonium
- (C) Radical
- (D) Transition state

9. Which of the following compound is formed by the reaction of 2S,3S-2 bromo 3-phenyl butane with methoxide ion at high temperature?

- (A) E (3) phenyl 2 butene
- (B) E (2) phenyl 2 butene
- (C) z (2) phenyl 2 butene
- (D) z (2) phenyl butane

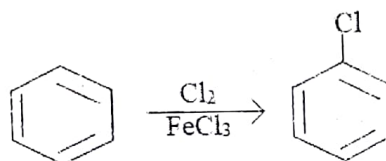
10. What is the electrophile in the electrophilic substitution reaction of benzene using oleum and conc. H_2SO_4 ?

- (A) SO_3
- (B) NO_3
- (C) NO_2^+
- (D) NO^+

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- (A) SO_3
 - (B) NO_3
 - (C) NO_2^+
 - (D) NO^+

11. Which among the following reagents gives syn-addition with alkenes:

1. Br_2
2. $Dil. KMNO_4 / \overset{\ominus}{OH}$
3. $OSO_4 | NaSO_3H | HOH$
4. $H_2 | Ni | \Delta$

Select the correct answer from the codes given below :

- (A) Only 1
- (B) 2 & 3
- (C) 2, 3 and 4
- (D) Only 4

12. In the given reaction $CH_3 - CH = CH_2 \xrightarrow[HOH]{Hg(OAc)_2} [X]$
 [X] will be :

- (A) $CH_3 - CH_2 - CH_2OH$
- (B) $CH_3 - \overset{\overset{OH}{|}}{CH} - CH_3$
- (C) $CH_3 - \overset{\overset{OH}{|}}{CH} - CH_2HgOAc$
- (D) $CH_3 - CH_2 - CH_2HgOAc$

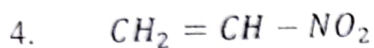
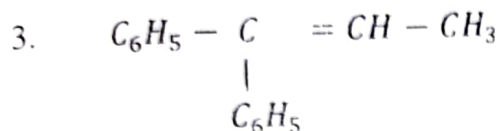
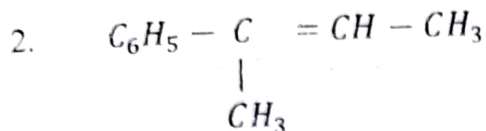
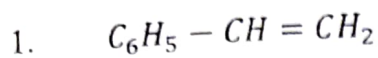
13. Which compounds will form meso-product with Br_2 / CCl_4 ?

1. trans-2-butene
2. trans-2-pentene
3. cis-2-butene
4. trans-3-hexene

Select the correct answer from the codes are given below codes :

- (A) Only 3
- (B) 1, 2 and 3
- (C) 2 and 3
- (D) 1 and 4

14. Arrange reactivity of given compounds in decreasing order for electrophilic addition reaction with HX :



Select the answer from codes given below :

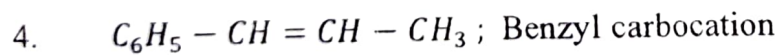
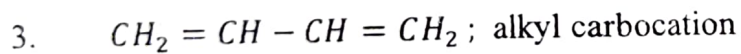
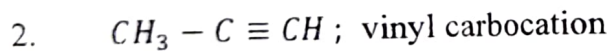
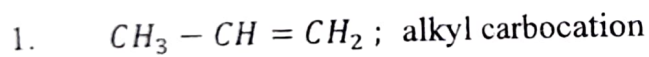
(A) 4, 1, 2, 3

(B) 3, 2, 1, 4

(C) 2, 3, 1, 4

(D) 1, 3, 4, 2

15. For electrophilic addition with HX which pair is correctly matched -



Select the correct answer :

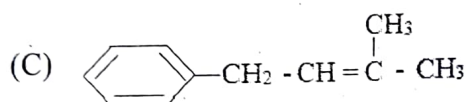
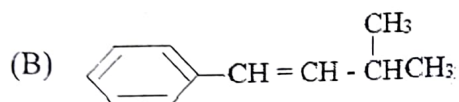
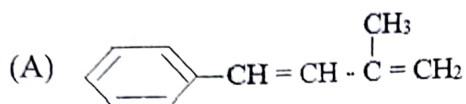
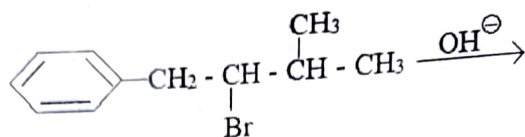
(A) 1 and 4

(B) 1, 2 and 4

(C) 2, 3 and 4

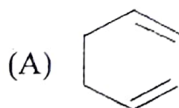
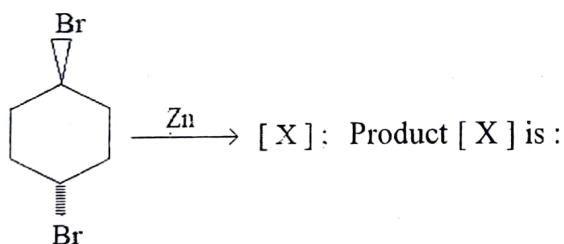
(D) 1, 3 and 4

16. Major product of the following reaction is :



(D) None of these

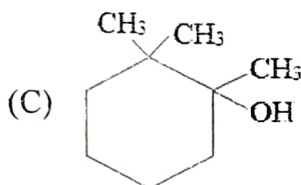
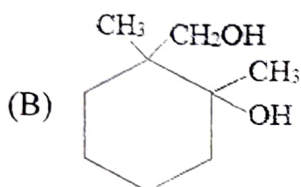
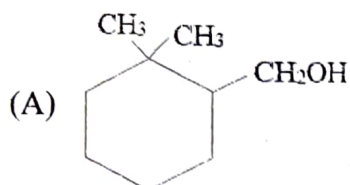
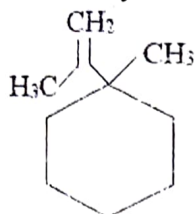
17. In the following reaction :



(C) Both (A) and (B)

(D) None of these

18. The compound P= is obtained by the dehydration of which product :



(D) None of these

19. Choose the correct statement for Pyrolytic syn elimination reaction :

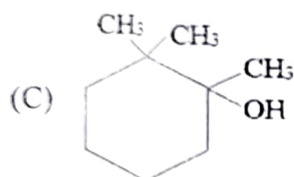
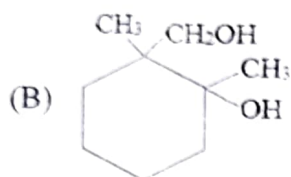
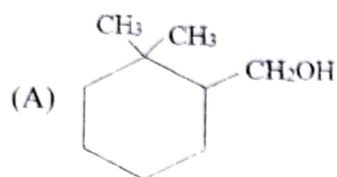
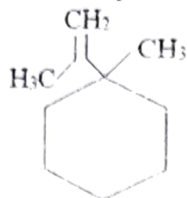
- (A) It is a pericyclic elimination reaction
- (B) It is a stereospecific reaction
- (C) It is an intramolecular reaction
- (D) All of the above

20. In the following reaction scheme $\text{BrCH}_2 - \text{C} \equiv \text{C} - \text{CH}_2\text{Br} + \text{Zn} \rightarrow \text{A} + \text{B}$. The product A and B is :

- (A) $\text{A} \Rightarrow \text{CH}_2 = \text{C} = \text{C} = \text{CH}_2$; $\text{B} \Rightarrow \text{ZnBr}$
- (B) $\text{A} \Rightarrow \text{CH}_2 = \text{C} = \text{C} = \text{CH}_2$; $\text{B} \Rightarrow \text{ZnBr}_2$
- (C) $\text{A} \Rightarrow \text{CH}_2 = \text{C} = \underset{\text{Br}}{\text{C}} - \text{CH}_3$; $\text{B} \Rightarrow \text{ZnBr}_2$

(D) None of these

18. The compound P= is obtained by the dehydration of which product :



(D) None of these

19. Choose the correct statement for Pyrolytic syn elimination reaction :

(A) It is a pericyclic elimination reaction

(B) It is a stereospecific reaction

(C) It is an intramolecular reaction

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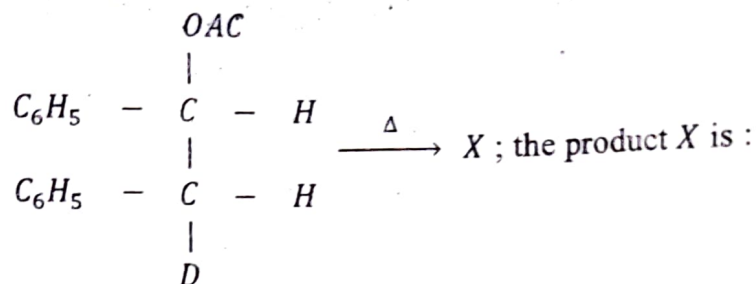
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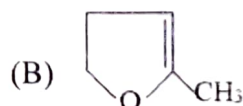
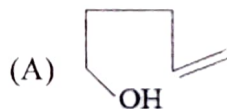
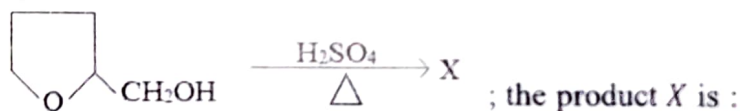
(D) None of these

21. In the following reaction –



- (A) trans stilbene
- (B) trans styrene
- (C) z- styrene
- (D) z-stilbene

22. In the following reaction

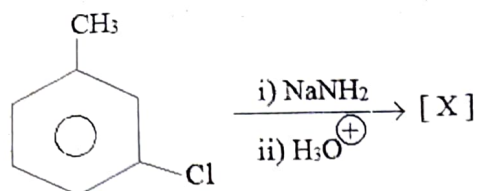


- (C) Both (A) and (B)
- (D) None of these

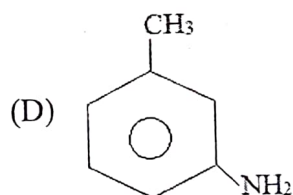
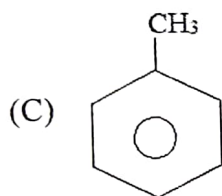
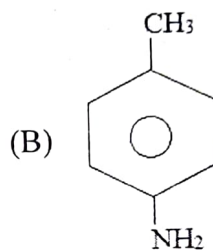
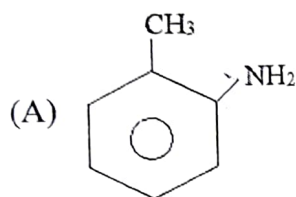
23. Which of the following pyrolytic reaction is known as chugaev reaction ?

- (A) Pyrolysis of xanthates
- (B) Pyrolysis of amine oxides
- (C) Pyrolysis of esters
- (D) None of these

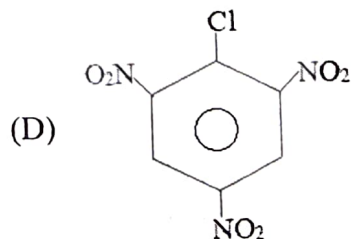
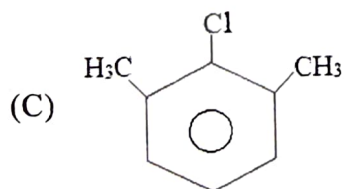
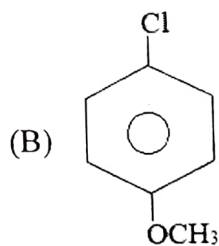
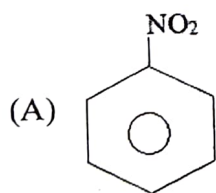
24. Consider the following reaction



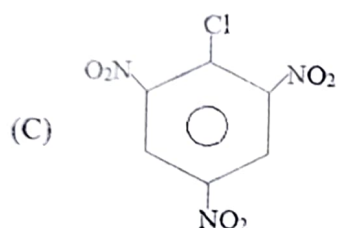
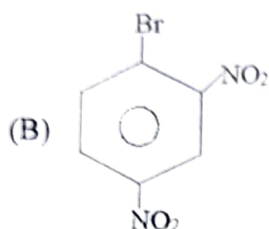
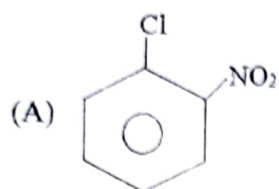
[X] will be :



25. Which of the following compounds will undergo aromatic nucleophilic substitution through benzyne intermediate ?



26. Which among the following compounds will undergo $ArSN_2$ reaction ?



(D) All of these

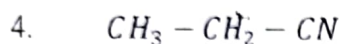
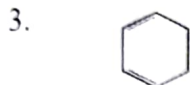
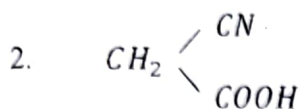
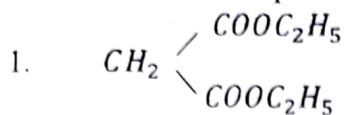
27. Which of the following reactions can be used for the preparation of C – C bond in organic synthesis ?

1. Reformatsky reaction
2. Claisen-ester condensation
3. Wittig Reaction
4. Knoevenagel reaction

Select correct answer from the codes are given below :

- (A) Only 4
(B) 2, 3 & 4
(C) 1, 2 & 3
(D) 1, 2, 3 & 4

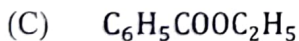
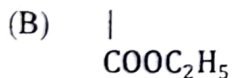
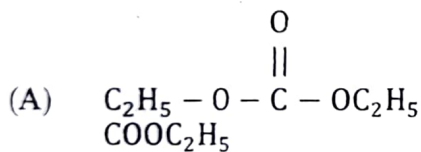
28. Anion of which compounds can give knoevenagel reaction with aromatic aldehyde –



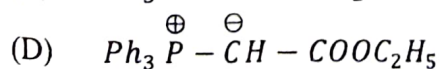
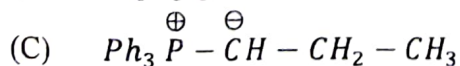
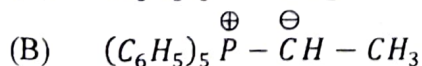
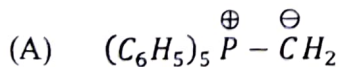
Select the correct answer from the codes are given below :

- (A) Only 1 & 2
(B) 1, 2 & 4
(C) 1, 2 & 3
(D) 1, 2, 3 & 4

29. Which one of the following esters is most reactive for crossed Claisen ester condensation ?



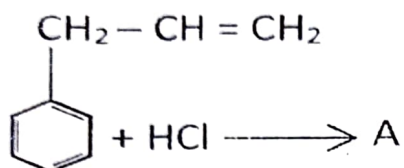
30. Which of the following ylides will be most stable and least reactive for nucleophilic addition reaction with aldehydes or ketones ?



31. Claisen-Schmidt reaction takes place between :

- (A) Aldehyde and Aldehyde
- (B) Aromatic aldehyde and Ketone
- (C) Ketone and Ketone
- (D) Aromatic aldehyde and compound having active methylene group

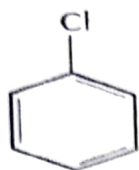
32. What is 'A' in the following reaction ?



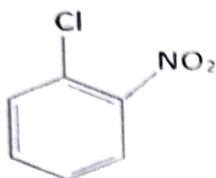
- (A) $\begin{array}{c} \text{CH}_2 - \text{CH} = \text{CH}_2 \\ | \\ \text{Cl} - \text{C}_6\text{H}_4 \end{array}$
- (B) $\begin{array}{c} \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{Cl} \\ | \\ \text{C}_6\text{H}_5 \end{array}$
- (C) $\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{C}_6\text{H}_5 \quad \text{Cl} \end{array}$
- (D) $\begin{array}{c} \text{Cl} \\ | \\ \text{CH} - \text{CH}_2 - \text{CH}_3 \\ | \\ \text{C}_6\text{H}_5 \end{array}$

33. In the question arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution :

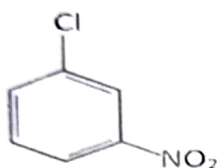
(a)



(b)



(c)



(A) $a < b < c$

(B) $c < b < a$

(C) $a < c < b$

(D) $c < a < b$

34. Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. Which of the following species attacks the benzene ring in this reaction ?

(A) Cl^-

(B) Cl^+

(C) $AlCl_3$

(D) $[AlCl_4]^-$

35. The position of $-Br$ in the compound in $CH_3CH=CHC(Br)(CH_3)$ can be classified as :

(A) Allyl

(B) Aryl

(C) Vinyl

(D) Secondary

36. Which of the following is an example of vic-dihalide ?
- (A) Dichloromethane
 - (B) 1, 2-Dichloromethane
 - (C) Ethylidene chloride
 - (D) Allyl chloride
37. Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is :
- (A) Electrophilic elimination reaction
 - (B) Electrophilic substitution reaction
 - (C) Free radical addition reaction
 - (D) Nucleophilic substitution reaction
38. HBr reacts fastest with which of the following ?
- (A) Propan-2-ol
 - (B) Propan-1-ol
 - (C) 2-methylpropan-1-ol
 - (D) 2-methylpropan-2-ol
39. In Cannizzaro reaction, two molecules of aldehydes are reacted to produce which of the following ?
- (A) Alcohol only
 - (B) Carboxylic acid only
 - (C) Alcohol, carboxylic acid and Ketone
 - (D) Alcohol and carboxylic acid
40. The rate determining step in electrophilic substitution reaction is :
- (A) Generation of electrophile
 - (B) Formation of product
 - (C) Attack by an electrophilic reagent on benzene ring
 - (D) All of the mentioned
