Roll No. .....

Question Booklet Number

O. M. R. Serial No.

M. Sc. (Fourth Semester)
(NEP) EXAMINATION, 2025-26
CHEMISTRY
(Organic Synthesis)

Paper Code							
B	0	2	1	0	0	1	T

Questions Booklet Series
D

Time : 1:30 Hours] [*Maximum Marks : 75*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.

2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.

3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।

2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।

3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page) **(शेष निर्देश अन्तिम पृष्ठ पर)**

(Only for Rough Work)

1. Oxidative cleavage of vicinal diols using $Pb(OAc)_4$ produces :

(A) Alkenes

(B) Carbonyl compounds

(C) Carboxylic acids

(D) Epoxides

2. Tertiary alcohols are generally resistant to oxidation because :

(A) they lack α-hydrogen

(B) they are unstable

(C) they are volatile

(D) they form radicals

3. Dissolving metal reduction involves :

(A) Single electron transfer mechanism

(B) Carbocation intermediate

(C) Radical chain polymerization

(D) Pericyclic pathway

4. In pinacol rearrangement, migration occurs with :

(A) Retention of configuration

(B) Inversion

(C) Racemization

(D) No stereochemical control

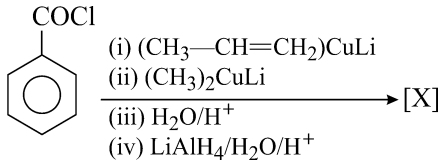
5. In Hoffmann rearrangement product has how many carbon atoms compared to starting amide ?

(A) 1 more

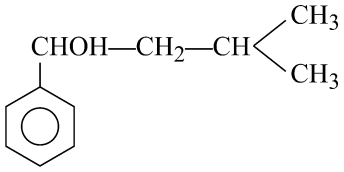
(B) 1 less

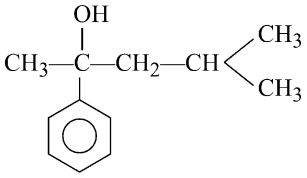
(C) same

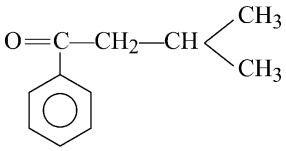
(D) 2 less

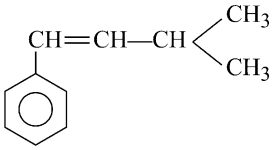
6. 

[X] will be :

(A) 

(B) 

(C) 

(D) 

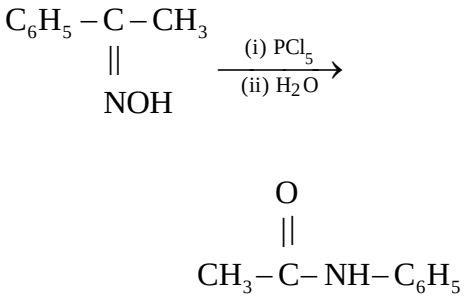
7. Treatment of a substituted cyclobutanol under acidic conditions gives a cyclopentyl derivative. This transformation proceeds via :

(A) Demjanov rearrangement

(B) Wagner-Meerwein rearrangement

(C) Beckmann rearrangement

(D) Pinacol rearrangement

8. 

Name the reaction.

(A) Curtius

(B) Lossen

(C) Beckmann

(D) Hofmann

9. Which among the following reagents gives sharpless epoxidation ?

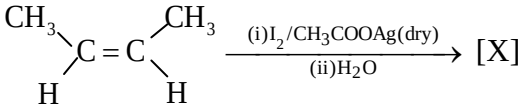
(A) $O_2/Ag/\Delta$

(B) *m*-bromo perbenzoic acid

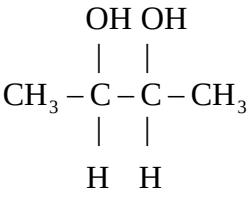
(C) $H_2O_2/FeSO_4$

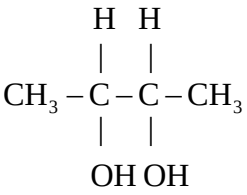
(D) Tert-butyl hydroperoxide

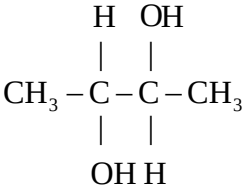
10. In the reaction sequence :



[X] will be :

(A) 

(B) 

(C) 

(D) None of the above

11. Baeyer-Villiger oxidation inserts oxygen between :

(A) Carbonyl carbon and migrating group

(B) C–C bond

(C) C–H bond

(D) C–O bond

12. Selective reduction of ester to aldehyde is achieved by :

(A) $LiAlH_4$

(B) $NaBH_4$

(C) DIBAL-H (low temp.)

(D) H_2/Pd

13. Oxidation of secondary alcohol with Jones reagent gives :

(A) Aldehyde

(B) Ester

(C) Carboxylic acid

(D) Ketone

14. In Heck reaction, the alkene insertion step occurs after :

(A) Reductive elimination

(B) Oxidative addition

(C) Ligand dissociation

(D) Proton abstraction

15. Oxidation of Sulfide to Sulfone requires :

(A) One equivalent oxidant

(B) Two step oxidation

(C) Reducing agent

(D) Base catalyst

16. RuO_4 is particularly effective for :

(A) Mild oxidation of alcohol

(B) Oxidative cleavage of C–C bonds

(C) Selective reduction

(D) Hydroboration

17. Birch reduction converts benzene into :

(A) Cyclohexane

(B) Phenol

(C) 1, 4 cyclohexadiene

(D) Toluene

18. Reduction of oxime under acidic conditions produces :

(A) Amide

(B) Amine

(C) Alcohol

(D) Alkane

19. Wagner-Meerwein rearrangement increases stability by forming :

(A) Less stable carbocation

(B) More stable carbocation

(C) Radical intermediate

(D) Carbanion

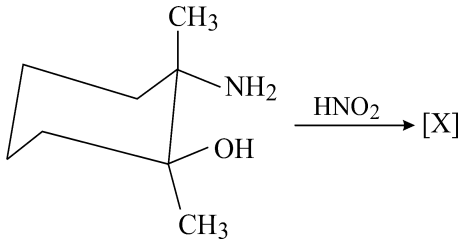
20. Migratory aptitude in rearrangements generally follows :

(A) Me > 1° > 2° > 3°

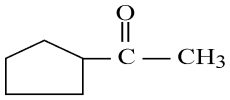
(B) 3° > 2° > 1° > Me

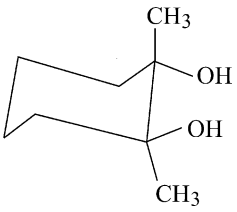
(C) H > 3° > 2° > 1°

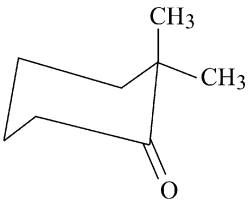
(D) 1° > Me > 3°

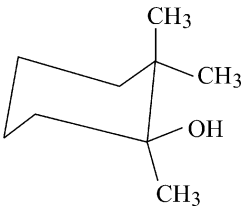
21. 

[X] will be :

(A) 

(B) 

(C) 

(D) 

22. Demjanov rearrangement involves :

(A) Diazotization of amines followed by nitrogen loss

(B) Base induced rearrangement of Diketones

(C) Oxidative cleavage

(D) Hydride abstraction

23. Which reagent selectively oxidizes 1° alcohol to aldehyde ?

(A) $KMnO_4$

(B) PCC (Pyridinium chloro-chromate)

(C) Jones reagent

(D) Conc. HNO_3

24. The reduction of $\diagdown C = O \diagup$ to —CH_2 using hydrazine and $NaOC_2H_5$ is known as :

(A) Clemmensen's reduction

(B) Rosenmund reduction

(C) Wolf-Kishner reduction

(D) M-P-V reduction

25. In the reaction sequence :

$$CH \equiv CH \xrightarrow{SeO_2} [X]$$

[X] will be :

(A) $CH_2OH–CH_2OH$

(B) CHO–CHO

(C) COOH–COOH

(D) $CH_2OH–CHO$

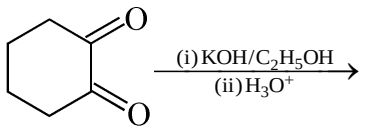
26. Which reagent gives syn dihydroxylation of alkenes ?

(A) OsO_4

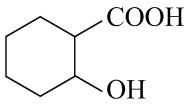
(B) $KMnO_4$ (hot)

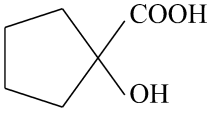
(C) Br_2

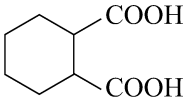
(D) *m*CPBA

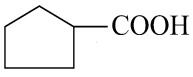
27.  product.

The product is :

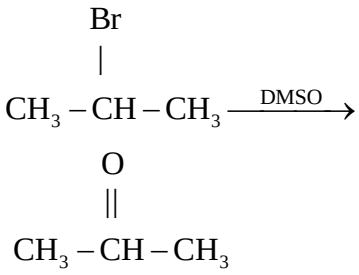
(A) 

(B) 

(C) 

(D) 

28. The given reaction :



is known as :

(A) Oppenaeur oxidation

(B) Baeyer oxidation

(C) Swern oxidation

(D) Per-iodate oxidation

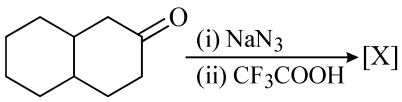
29. Ozonolysis of 1-methyl cyclohexene followed by Zn/H_2O gives :

(A) Cyclohexanone + formaldehyde

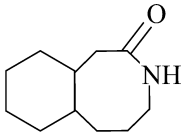
(B) Cyclohexanone + acetaldehyde

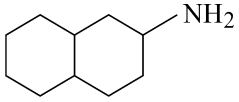
(C) Cyclopentanone + formic acid

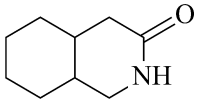
(D) Benzaldehyde

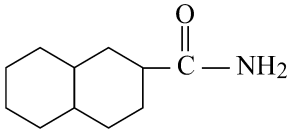
30. 

[X] will be :

(A) 

(B) 

(C) 

(D) 

31. Which rearrangement proceeds via formation of nitrene intermediate ?

(A) Curtius

(B) Beckmann

(C) Fries

(D) Claisen

32. Rearrangement of cyclic ketone oxime using acid gives :

(A) Cyclic ketone

(B) Amide

(C) Lactam

(D) Ester

33. Which among the following compounds will give trans alkene with $Na/NH_3(l)$?

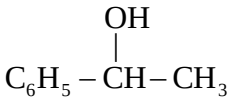
(A) $C_6H_5–C \equiv C–H$

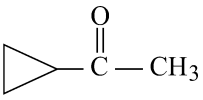
(B) $CH_3–C \equiv C–H$

(C) $CH_3–CH_2–CH = CH_2$

(D) $CH_3–C \equiv C–CH_3$

34. Which among the following compounds will give haloform with X_2/OH^- ?

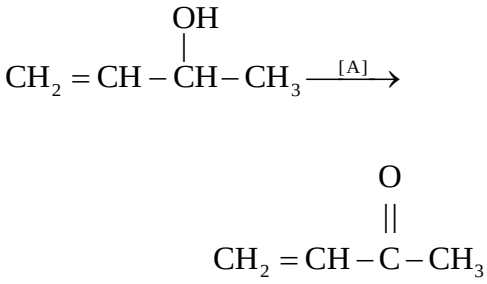
(A) 

(B) 

(C) $CH_3–CH_2–OH$

(D) All of the above

35. In the reaction sequence



[A] will be :

(A) Jones Reagent

(B) Sarret Reagent

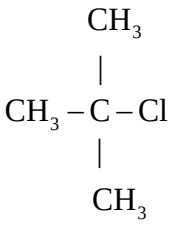
(C) Aluminium ter-butoxide

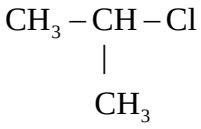
(D) Br_2

36. Which among the following compounds will not give carbonyl compound on oxidation with DMSO ?

(A) $CH_3–CH_2–Br$

(B) $C_6H_5–CH_2–Cl$

(C) 

(D) 

37. In the Benzilic acid rearrangement :

(A) Benzaldehyde is converted to Benzoin

(B) Benzoin is converted to Benzilic acid

(C) Benzilic acid is converted to Benzil

(D) Benzil is converted to Benzilic acid

38. The compound obtained by reduction of propionaldehyde by Zn/Hg and concentrated HCl is :

(A) Propanol

(B) Propane

(C) Propene

(D) None of the above

39. A Beckmann reagent is affected by :

(A) Sulfuric acid

(B) PCl_5

(C) Polyphosphoric acid

(D) Any of the above

40. Oppenauer oxidation is the reverse process of :

(A) Wolf-Kishner reduction

(B) Rosenmund reduction

(C) Clemmensen's reduction

(D) Meerwein Pondorf-Verley reduction

41. The reduction of CH_3CN to $CH_3CH_2NH_2$ is called :

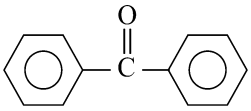
(A) Rosenmund reduction

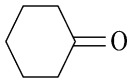
(B) Clemmensen's reduction

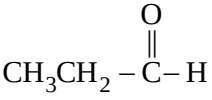
(C) Mendius reduction

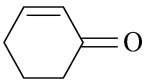
(D) Hoffmann's reduction

42. Which of the following will react to Tollen's reagent ?

(A) 

(B) 

(C) 

(D) 

43. Cinnamic acid undergoes oxidation with hot acidic $KMnO_4$ to give :

(A) Malonic acid

(B) Phenyl acetic acid

(C) Benzoic acid

(D) Mandelic acid

44. Ortho-Nitrobenzoic acid on reduction with Sn/HCl gives :

(A) Phthalimide

(B) Anthranilic acid

(C) Salicylic acid

(D) Acetyl salicylic acid

45. Mendius method of preparation of amines consists of :

(A) Reduction of alkyl cyanides with Na/alcohol

(B) Reduction of amide with $LiAlH_4$

(C) Reduction of nitroparaffin with Sn/HCl

(D) Reduction of oximes with Na/C_2H_5OH

46. Oxidation of *o*-xylene with pottasium permanganate gives :

(A) Benzoic acid

(B) Isophthalic acid

(C) Terephthalic acid

(D) Phthalic acid

47. Benzaldehyde reacts with methyl magnesium iodide followed by hydrolysis to form :

(A) 1-phenyl ethanol

(B) Acetophenone

(C) 2 phenyl ethanol

(D) Benzophenone

48. Grignard reagent does not show any reaction with :

(A) Alkoxy alkanes

(B) Alkanones

(C) Alkyl alkanoates

(D) Acyl halides

49. In Beckmann rearrangement the group that generally migrates is :

(A) Syn to hydroxyl

(B) Anti to hydroxyl

(C) Adjacent to hydroxyl

(D) None of the above

50. Correct migratory aptitude in Baeyer Villiger rearrangement is :

(A) $CH_3 > H > Ph$

(B) $Ph > H > CH_3$

(C) $H > Ph > CH_3$

(D) $H > CH_3 > Ph$

51. Benzilic acid rearrangement is driven by :

(A) Carbocation stability

(B) Carbanion stability

(C) Radical stability

(D) Proton transfer

52. Ozonolysis of cyclic alkene under reductive workup gives :

(A) Two separate molecules

(B) Alcohol

(C) Dialdehyde/diketone

(D) Ester

53. Hydroboration of terminal alkyne followed by oxidation gives :

(A) Ketone

(B) Aldehyde

(C) Alcohol

(D) Acid

54. $C_6H_5COCl \xrightarrow{(CH_3)_2CuLi} [X]$.

Identify [X] :

(A) C_6H_5CHO

(B) $C_6H_5COCH_3$

(C) $C_6H_5CH_2CH_3$

(D) C_6H_5COOH

55. MCPBA converts alkene to :

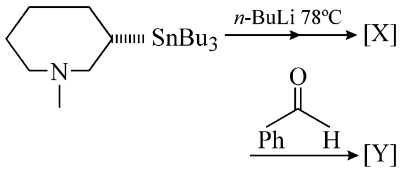
(A) Glycol

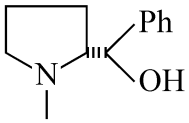
(B) Acid

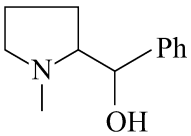
(C) Epoxide

(D) Ketone

56. The major product formed in the following reaction is :



(A) 

(B) 

(C) Both (A) and (B)

(D) None of the above

57. $CH_3COOH \xrightarrow{LiAlH_4} (A) \xrightarrow{PCl_5} (B) \xrightarrow{alc.KOH} (C)$.

The product (C) is :

(A) acetyl chloride

(B) acetaldehyde

(C) acetylene

(D) ethylene

58. Match the reactions given in column I with the suitable reagents given in column II :

Column I (Reactions)	**Column II (Reagents)**
(i) Benzophenone → Diphenyl methane	(a) $LiAlH_4$
(ii) Benzaldehyde → 1-phenyl ethanol	(b) DIBAL-H
(iii) Cyclohexanone → Cyclo-hexanol	(c) Zn(Hg)/Conc. HCl
(iv) Phenyl benzoate → Benzalde-hyde	(d) CH_3MgBr

Code :

(A) (i)–(c), (ii)–(d), (iii)–(a), (iv)–(b)

(B) (i)–(c), (ii)–(b), (iii)–(a), (iv)–(d)

(C) (i)–(b), (ii)–(c), (iii)–(a), (iv)–(d)

(D) (i)–(b), (ii)–(c), (iii)–(d), (iv)–(a)

59. Peterson olefination under basic conditions gives alkene via:

(A) Syn elimination

(B) Radical Elimination

(C) Anti Elimination

(D) Carbocation Shift

60. RuO_4 cleaves double bonds via :

(A) Radical Pathway

(B) Carbocation

(C) S_N^1

(D) Cyclic ester intermediate

61. In Pinacol rearrangement, OH group that leaves is :

(A) Always primary

(B) Random

(C) Less substituted

(D) One that forms more stable carbocation

62. Birch reduction gives non-conjugated diene because :

(A) Carbocation formation

(B) Radical intermediate rearranges

(C) Protonation occurs at specific positions

(D) Pericyclic shift

63. $LiAlH_4$ cannot reduce :

(A) Ester

(B) Amide

(C) Acid chloride

(D) Alkene

64. TEMPO oxidation requires co-oxidant because :

(A) TEMPO is consumed

(B) TEMPO is reduced and must be regenerated

(C) Reaction is radical

(D) TEMPO is base

65. Oxidative cleavage of glycol with HIO_4 fails if :

(A) Vicinal OH groups are present

(B) One OH is tertiary

(C) No vicinal diol exists

(D) Acidic medium is absent

66. Which of the following products is formed when alkyl sulfide oxidises with H_2O_2 ?

(A) Sulphonic acid

(B) Thio-alcohol

(C) Thionic acid

(D) Sulphoxide

67. Vinyl Grignard reagent reacts with carbonyl compound to give :

(A) Allylic alcohol

(B) Saturated alcohol

(C) Ketone

(D) Acid

68. Rearrangements proceeding via carbocation intermediates are sensitive to :

(A) Solvent Polarity

(B) Light

(C) Oxygen

(D) Metal Catalyst

69. Migration in Baeyer-Villiger is favored when migrating group is :

(A) Electron withdrawing

(B) Neutral

(C) Radical Stabilizing

(D) Electron donating

70. Hydrogenolysis requires :

(A) Radical initiator

(B) Metal catalyst and hydrogen

(C) Base only

(D) Light

71. In Suzuki coupling, absence of base results in :

(A) Faster reaction

(B) No transmetalation

(C) Over-oxidation

(D) Radical pathway

72. Why are organocuprates less reactive than organolithium reagents ?

(A) Stronger C–Cu bond covalency

(B) Higher ionic character

(C) Carbocation formation

(D) Radical Instability

73. The conversion of hydroxamine acid and other O-acyl derivative to form isocyanate. This rearrangement is known as :

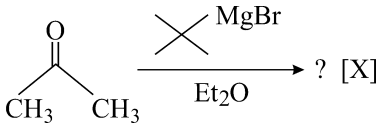
(A) Curtius rearrangement

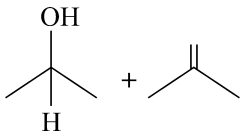
(B) Lossen rearrangement

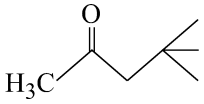
(C) Beckmann rearrangement

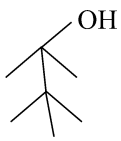
(D) None of the above

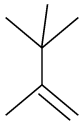
74. The product [X] formed in the following reaction is :



(A) 

(B) 

(C) 

(D) 

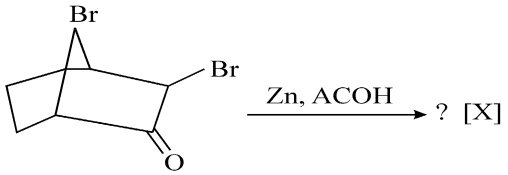
75. Correct combination of reagent which can carry out the following conversion is :

(A) (i) $NaBH_4.CuCl_3$ then $H^{\oplus}$
(ii) MnO_2 (iii) CH_3–Li

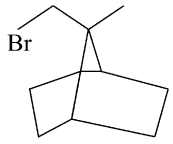
(B) (i) CH_3–Li then H^+ (ii) PCC/Heat

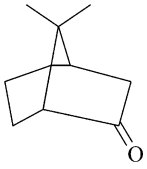
(C) (i) CH_3MgBr then H^+
(ii) H_2SO_4/Heat
(iii) NH_2–NH_2/KOH

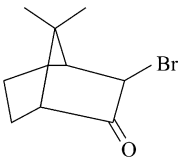
(D) (i) $(CH_3)_2CuLi$ then H^+
(ii) $NaBH_4$.EtOH (iii) H_2SO_4/heat

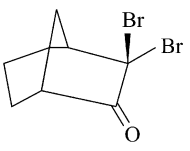
76. 

The major product [X] formed in the above reaction is :

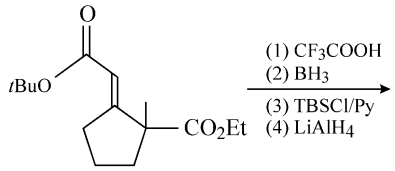
(A) 

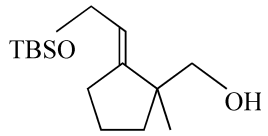
(B) 

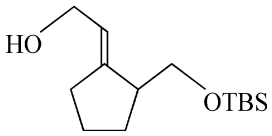
(C) 

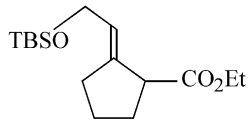
(D) 

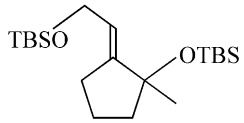
77. The major product formed in the following reaction is :



(A) 

(B) 

(C) 

(D) 

78. Preparation of cis-alkene from non-terminal alkynes can be achieved by :

(A) $Na/NH_3(l)$

(B) H_2/Ni

(C) Lindlar's catalyst

(D) None of the above

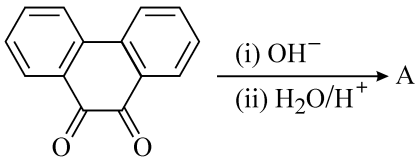
79. Which of the following reagents is used to convert ketone into pinacol in the presence of aprotic solvent followed by acidification ?

(A) Mg/Hg

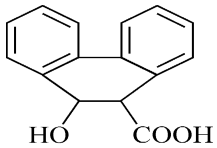
(B) $LiAlH_4$

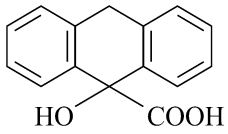
(C) BH_3

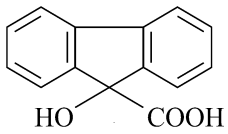
(D) $NaBH_4$

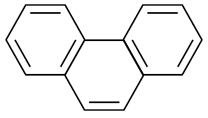
80. 

Product A is :

(A) 

(B) 

(C) 

(D) 

81. Baeyer-Villiger rearrangement is very useful reaction of ketone because :

(A) Ketones do not react with most oxidising agent

(B) Ketones react with oxidising agents easily

(C) Ketone easily reduces

(D) All of the above

82. Which of the following is not correctly matched ?

(A) $>C=O \xrightarrow[\text{reduction}]{\text{Clemmenson's}} >CH_2$

(B) $>C=O \xrightarrow[\text{Reduction}]{\text{Wolf Kishner}} >CHOH$

(C) $-COCl \xrightarrow[\text{Reduction}]{\text{Rosenmund's}} -CHO$

(D) $-C\equiv N \xrightarrow[\text{Reduction}]{\text{Stephen's}} -CHO$

83. Reduction of aromatic nitro compounds using Fe and HCl gives ..... .

(A) aromatic oxime

(B) aromatic hydrocarbon

(C) aromatic amide

(D) aromatic primary amine

84. The major product of the following reaction is :

$C_2H_5COOC_2H_5 \xrightarrow[\text{Hydrolysis}]{C_2H_5MgBr(\text{excess})} ?$

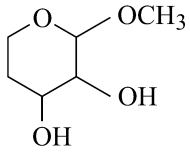
(A) HCOOH

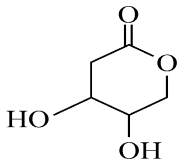
(B) $(C_2H_5)_3COH$

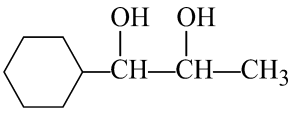
(C) $C_2H_5COC_2H_5$

(D) $(CH_3)_3COH$

85. Which of the following compounds undergo periodate oxidation ?

(A) 

(B) 

(C) 

(D) All of the above

86. Peterson olefination involves the reaction of :

(A) Organosilicon compound with carbonyl compound

(B) Organoboron with alkene

(C) Grignard with nitrile

(D) Sulfur ylide with ketone

87. Reduction of nitrile with $LiAlH_4$ gives :

(A) Aldehyde

(B) Primary amine

(C) Secondary amine

(D) Hydrazine

88. Which reagent is most suitable for converting acid chloride to ketone without over addition ?

(A) RMgBr

(B) RLi

(C) R_2CuLi

(D) $NaBH_4$

89. Organonickel intermediates are particularly important in :

(A) Wurtz reaction

(B) Kumada coupling

(C) Cannizzaro reaction

(D) Reimer-Tieman reaction

90. Epoxidation of alkene using peracid proceeds via :

(A) Carbocation Intermediate

(B) Radical Pathway

(C) Concerted Pericyclic Mechanism

(D) S_N^1 mechanism

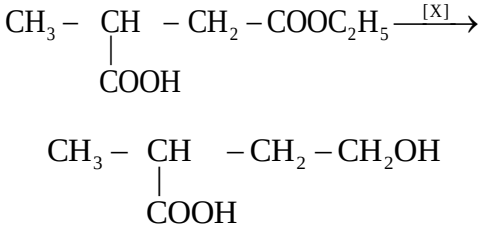
91. When a 1, 2 migration is initiated through formation of carbocation by diazotisation of a primary amine, the reaction is known as :

(A) Schmidt rearrangement

(B) Lossen rearrangement

(C) Demjanov rearrangement

(D) Wolf rearrangement

92. In 

[X] is :

(A) DIBAL

(B) Na/liq. NH_3

(C) $NaBH_4/BF_3$

(D) $LiAlH_4$

93. Dilute aqueous solution of $NaIO_4$ and $KMnO_4$ is known as :

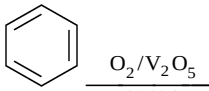
(A) Lemieux reagent

(B) Swern reagent

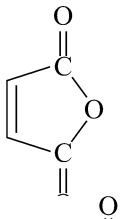
(C) Jones reagent

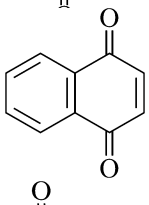
(D) Fenton's reagent

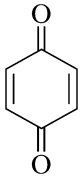
94. In the reaction sequence

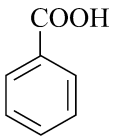


The product [X] will be :

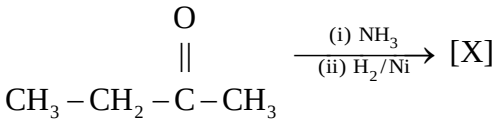
(A) 

(B) 

(C) 

(D) 

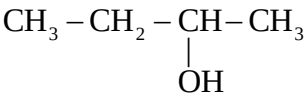
95. In the reaction sequence :

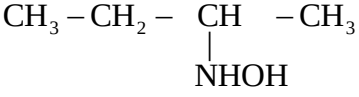


[X] will be :

(A) $CH_3–CH_2–CH_2–CH_3$

(B) 

(C) 

(D) 

96. A reaction in which a leaving group is replaced by a nucleophile in one step is called :

(A) Electrophilic substitution

(B) E_1 reaction

(C) S_N^2 reaction

(D) rearrangement reaction

97. Which reagent selectively oxidizes a primary alcohol to aldehyde without further oxidation ?

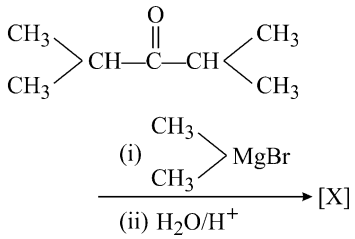
(A) Acidified $KMnO_4$

(B) PCC in CH_2Cl_2

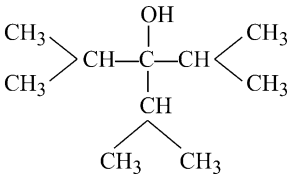
(C) $K_2Cr_2O_7/H_2SO_4$

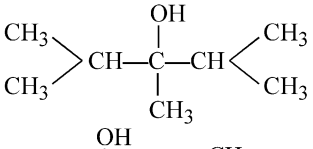
(D) Hot alkaline $KMnO_4$

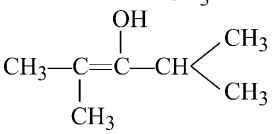
98. In the reaction sequence :



[X] will be :

(A) 

(B) 

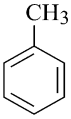
(C) 

(D) All of the above

99. Which among the following compounds will be reduced by Na/NH_3 (l) ?

(A) $CH_3–C\equiv C–CH_3$

(B) $CH_2=CH–CH=CH_2$

(C) 

(D) All of the above

100. Thioethers are oxidised to sulfoxides using :

(A) $LiAlH_4$

(B) *m-c*PBA

(C) $NaBH_4$

(D) H_2/Pd

(Only for Rough Work)

(Only for Rough Work)

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।