Target IIT-JAM-2018

Test Series-3

ORGANIC CHEMISTRY **Booklet Code: C**

Duration: 3:00 Hours **CHEMISTRY-CY** **Date: 11-01-2018**

Maximum Marks: 100

Read the following instructions carefully:

1 Attempt all the questions.

2. **Section-A** contains **30** Multiple Choice Questions (MCQ). Each question has 4 choices (a), (b), (c) and (d), for its answer, out of which **ONLY ONE** is correct. From **Q.1 to Q.10** carries 1 Marks and **Q.11 to Q.3**0 carries 2 Marks each.

3. **Section-B** contains **10** Multiple Select Questions(MSQ). Each question has 4 choices (a), (b), (c) and (d) for its answer, out of which **ONE or MORE than ONE** is/are correct. For each correct answer you will be awarded **2 marks.**

4. Section-**C** contains **20** Numerical Answer Type (NAT) questions. From **Q.41 to Q.50** carries **1 Mark** each and **Q.51 to Q.60** carries **2 Marks** each. For each NAT type question, the value of answer in between 0 to 9.

5. In all sections, questions not attempted will result in zero mark. In Section–A (MCQ), wrong answer will result in negative marks. For all **1 mark** questions, **1/3 marks** will be deducted for each wrong answer. For all **2 marks** questions, **2/3 marks** will be deducted for each wrong answer. In Section–B (MSQ),there is no negative and no partial marking provision. There is no negative marking in Section –C (NAT) as well.

Regn. No. | | | | | | | | | | |

Name of Student .....Batch.....

College/University .....

CAREER ENDEAVOUR
Best Institute for IIT-JAM, NET & GATE

CORPORATE OFFICE :
33-35, Mall Road, G.T.B. Nagar,
Opp. G.T.B. Nagar Metro Station
Gate No. 3, Delhi-110 009
T : 011-65462244, 65662255

E : info@careerendeavour.in

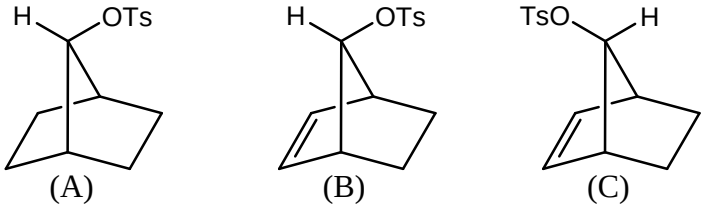
REGISTERED OFFICE :
28-A/11, Jia Sarai, Near-IIT,
Hauz Khas Metro Station
Delhi-110 016
T : 011-26851008, 26861009

w : www.careerendeavour.in

Section-A : Multiple Choice Questions (MCQ)

Q.1 to Q.10: Carry 1 Mark each.

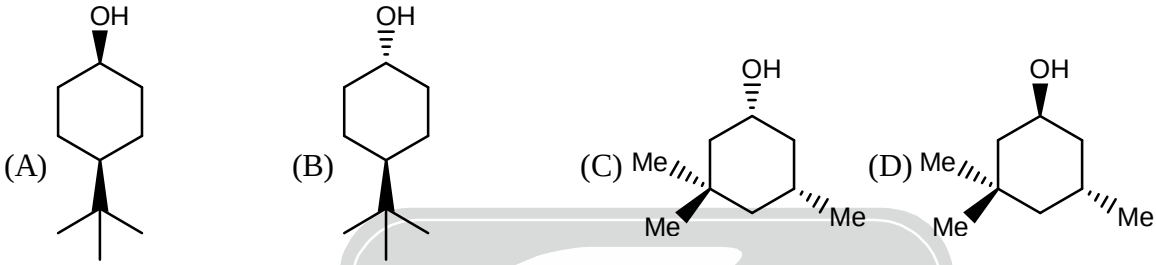
1. Arrange the relative rate of acetolysis of the following norborane derivatives



(A) (B) (C)

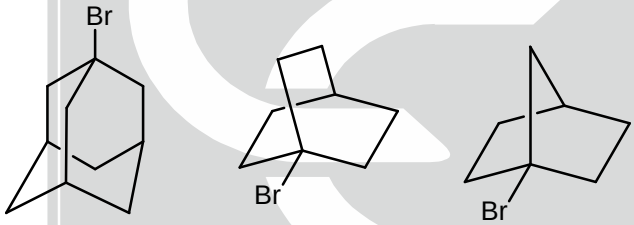
(a) A > B > C (b) C > B > A (c) B > C > A (d) A < B ~ C

2. Arrange the relative rates of oxidation of typical cyclohexanols



(a) D > A > C > B (b) B > C > A > D (c) C > A > B > D (d) A > B > C > D

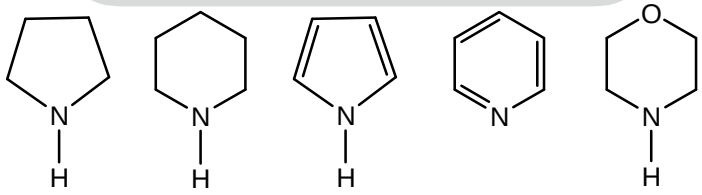
3. Arrange the rate of solvolysis of following compounds in 80% ethanol at 25ºC



(I) **(II)** **(III)**

(a) I > III > II (b) II > I > III (c) I > II > III (d) II > III > I

4. The reactivity of following compounds with proton will be in the order of

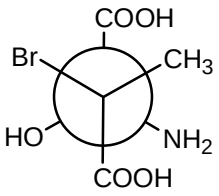


(I) **(II)** **(III)** **(IV)** **(V)**

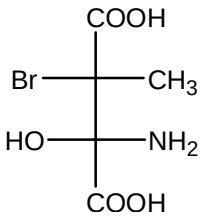
(a) I > II > V > IV > III (b) II > I > V > IV > III
(c) I > II > IV > V > III (d) III > IV > V > II > I

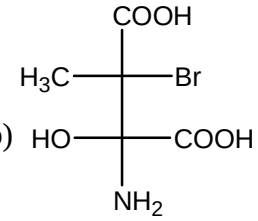
5. Number of ^1H NMR signal in paradichloro benzene and para-difluorobenzene is
(a) doublet and singlet (b) singlet and doublet
(c) singlet and multiplet (d) singlet and singlet

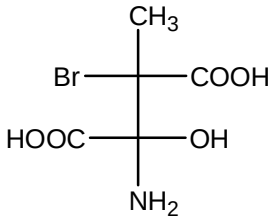
6. Correct Fischer projection representation of the following compound (A)

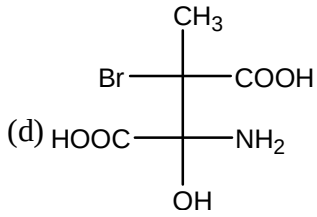


(A)

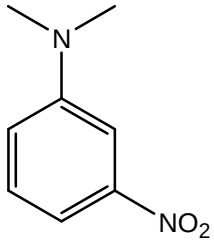
(a) 

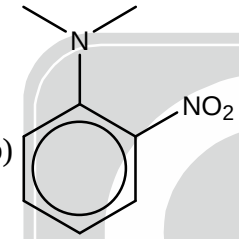
(b) 

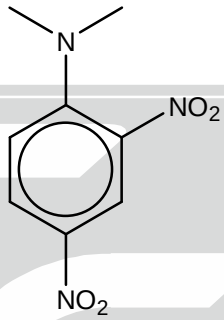
(c) 

(d) 

7. The major prouct formed on nitration of N, N–dimethyl aniline with conc. H_2SO_4 and conc. HNO_3?

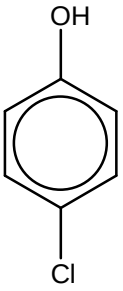
(a) 

(b) 

(c) 

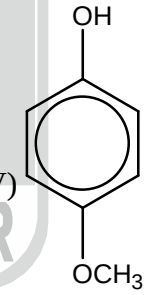
(d) 

8. Arrange the following compounds in order of decreasing acidity?

(I) 

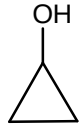
(II) 

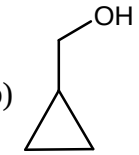
(III) 

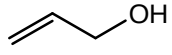
(IV) 

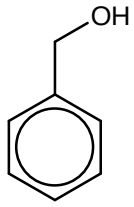
(a) I > II > III > IV (b) III > I > II > IV (c) IV > III > I > II (d) II > IV > I > III

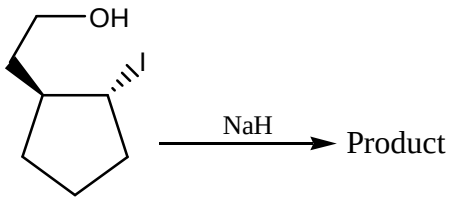
9. Which of the following alcohol shows fastest reaction with HI?

(a) 

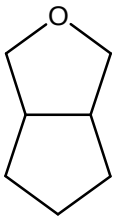
(b) 

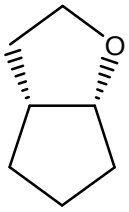
(c) 

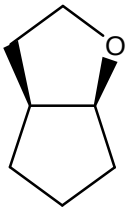
(d) 

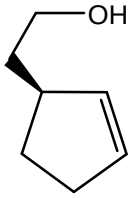
10. 

The product will be

(a) 

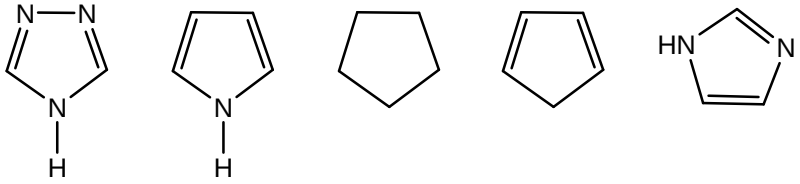
(b) 

(c) 

(d) 

Q.11 to Q.30: Carry 2 Marks each.

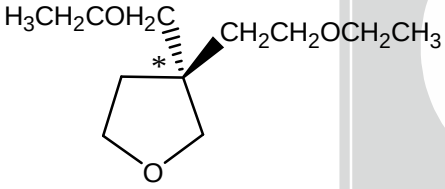
11. Correct decreasing order of pK_a value of the following compounds is



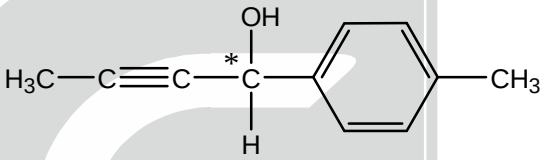
(A) **(B)** **(C)** **(D)** **(E)**

(a) A > B > C > D > E
(b) C > B > D > A > E
(c) E > A > D > B > C
(d) C > B > E > D > A

12. Find out the absolute configuration of the astericked chiral centres of each of the following compounds (A and B) are, respectively

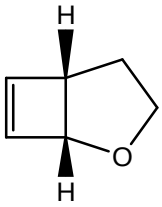


(A)



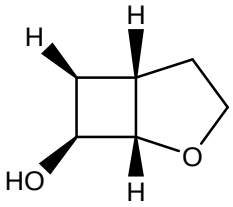
(B)

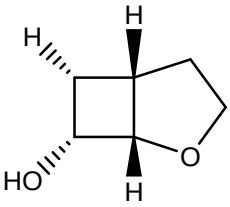
(a) R, R (b) R, S (c) S, S (d) S, R

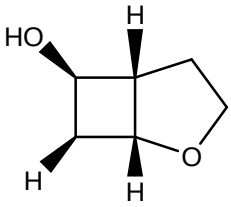
13. 

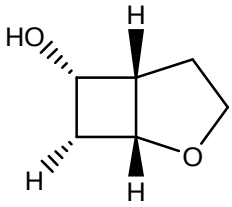
(i) BH_3, THF
(ii) NaOH, H_2O_2

(P)
Major product

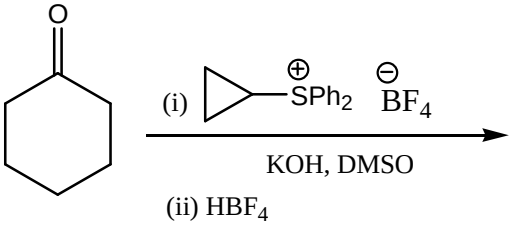
(a) 

(b) 

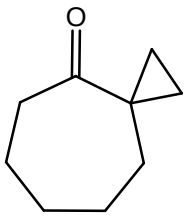
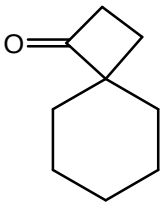
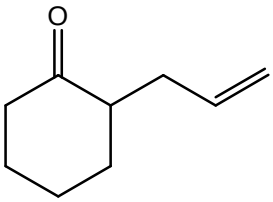
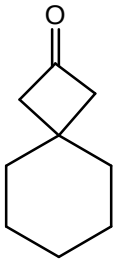
(c) 

(d) 

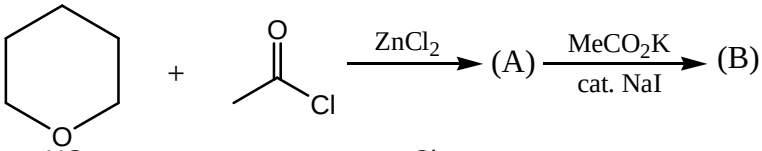
14. The major product (P) is

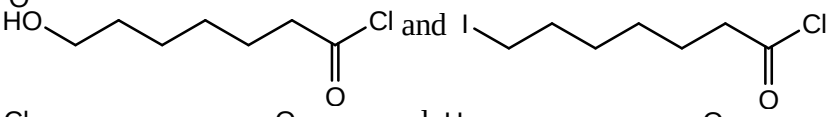


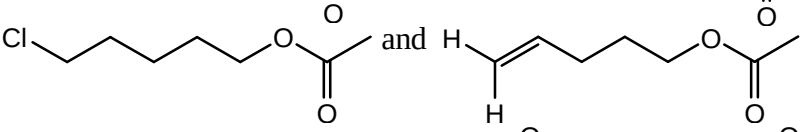
(P)
Major products

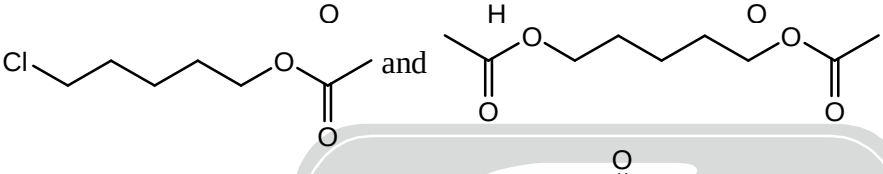
(a) 
(b) 
(c) 
(d) 

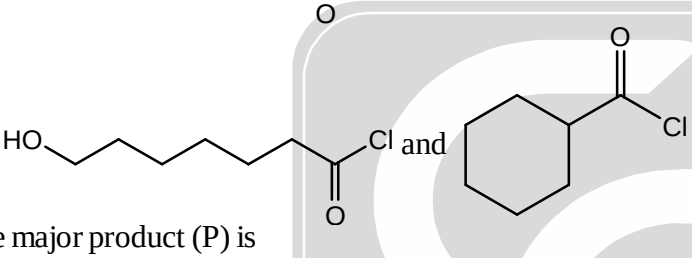
15. The major product formed (A) and (B) are, respectively



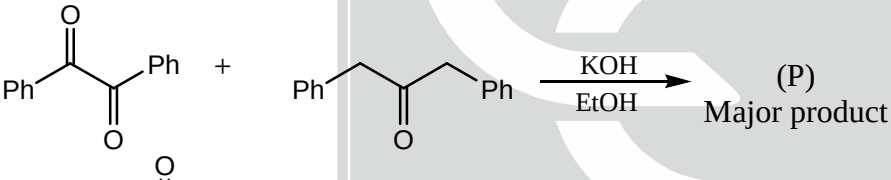
(a) 

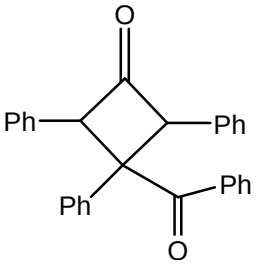
(b) 

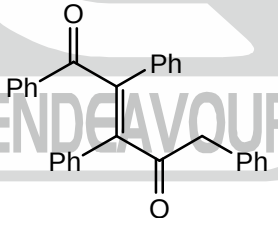
(c) 

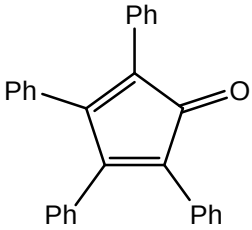
(d) 

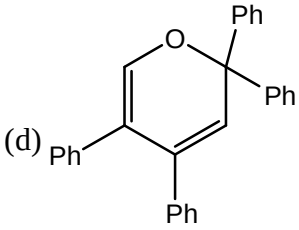
16. The major product (P) is

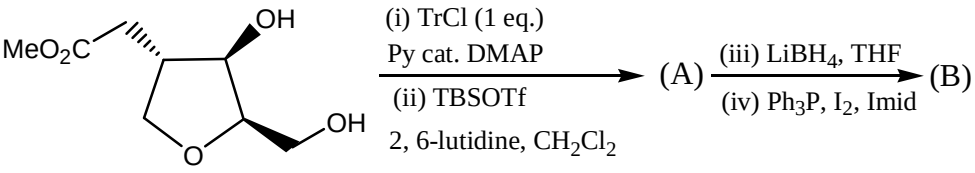


(a) 

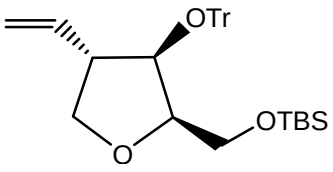
(b) 

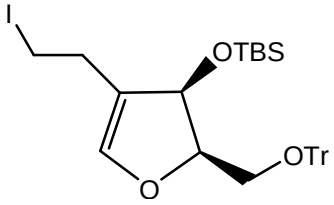
(c) 

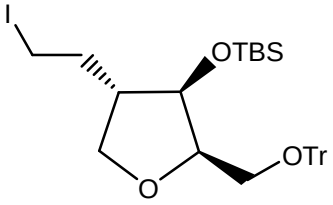
(d) 

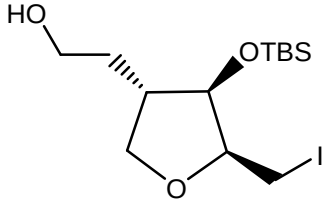
17. 

The major product (B) is

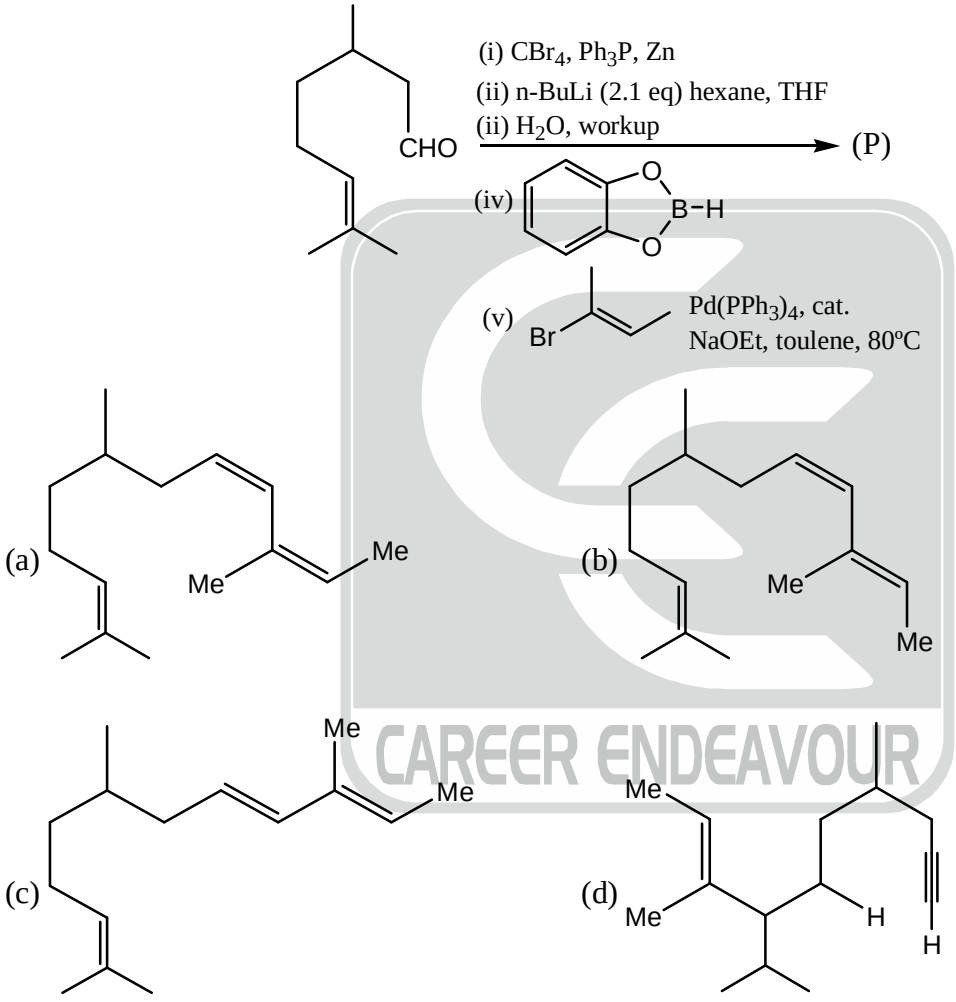
(a) 

(b) 

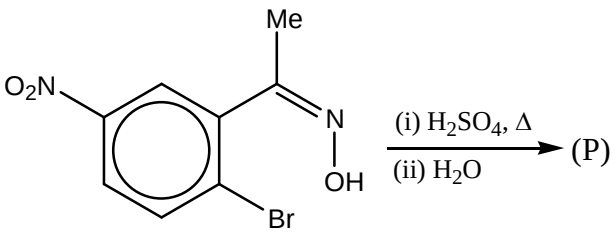
(c) 

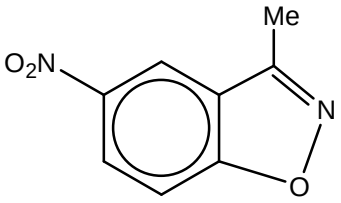
(d) 

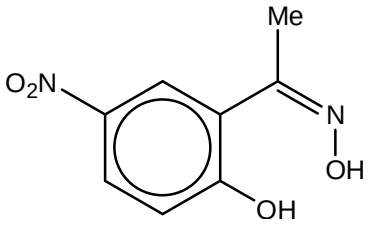
18. The major product (P)

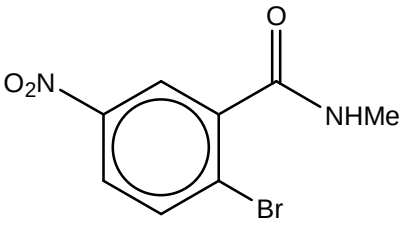


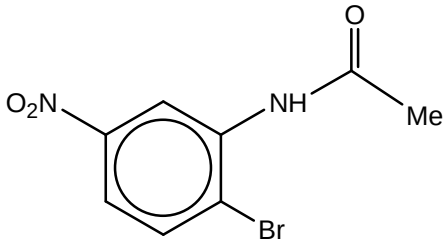
19. The major product (P) is



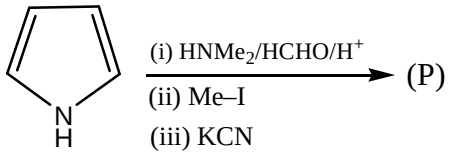
(a) 

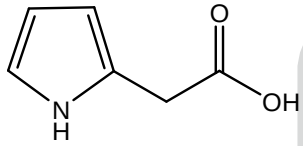
(b) 

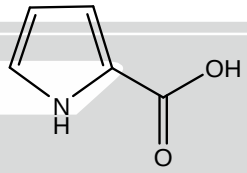
(c) 

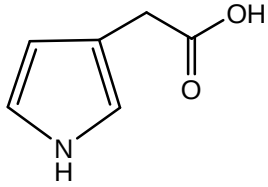
(d) 

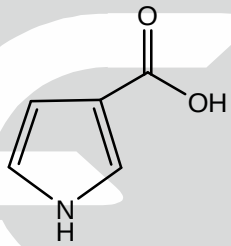
20. The major product (P) is



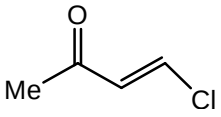
(a) 

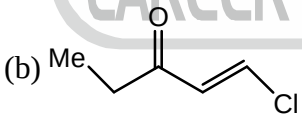
(b) 

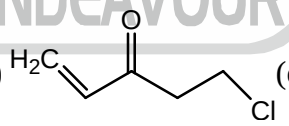
(c) 

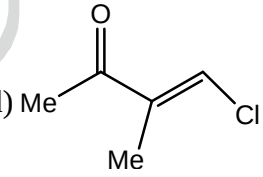
(d) 

21. Propionyl chloride is reacted with acetylene gas in presence of $AlCl_3$ an obtained compound A. The NMR data of compound A are given, identify it.
A: ^1H NMR: 0.96 (t, J 7.0 Hz, 3H), 2.40 (q, J 7.0 Hz, 2H), 6.31 (d, J 14.0 Hz, 1H), 7.11 (d, J 14.0 Hz, 1H).

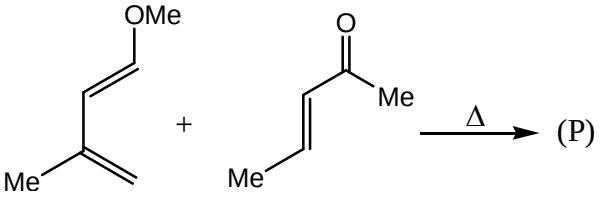
(a) 

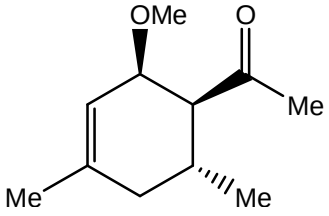
(b) 

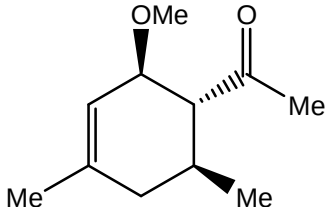
(c) 

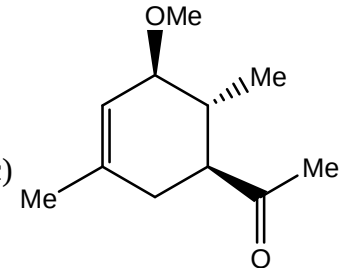
(d) 

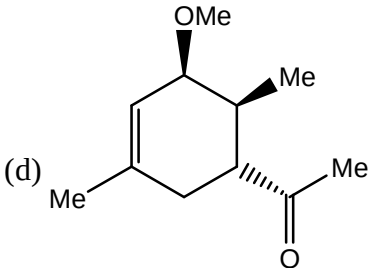
22. The product (P) is



(a) 

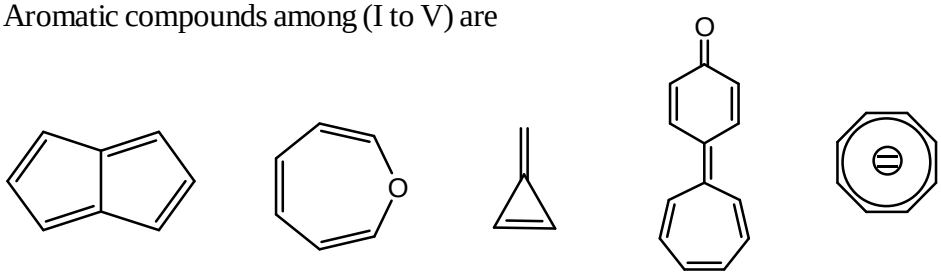
(b) 

(c) 

(d) 

23. Which of the following of molecule can not give conformational isomers?
(a) Methylcyclopentane (b) Cis-decalin
(c) Cyclohexane (d) Bicyclo[2.2.1]heptane

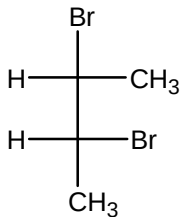
24. Aromatic compounds among (I to V) are

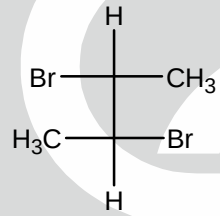


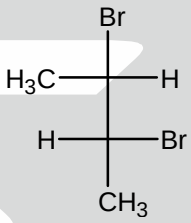
(I) **(II)** **(III)** **(IV)** **(V)**

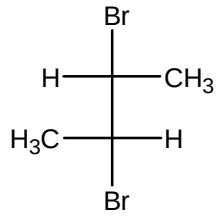
(a) I, III and IV (b) I, II and IV (c) III and IV (d) III, IV and V

25. Which compound is the (2S, 3S)-2, 3-dibromobutane isomer?

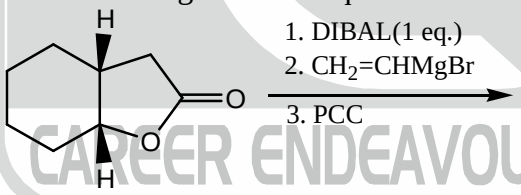
(a) 

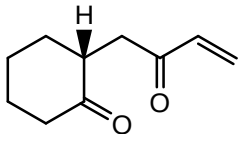
(b) 

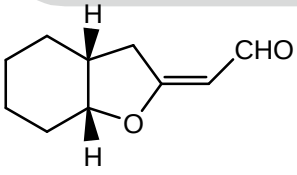
(c) 

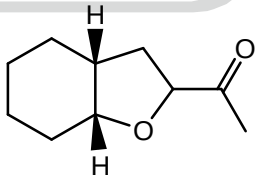
(d) 

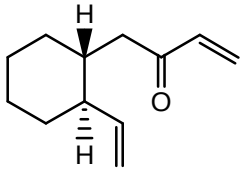
26. The major product formed in the following reaction sequence is:

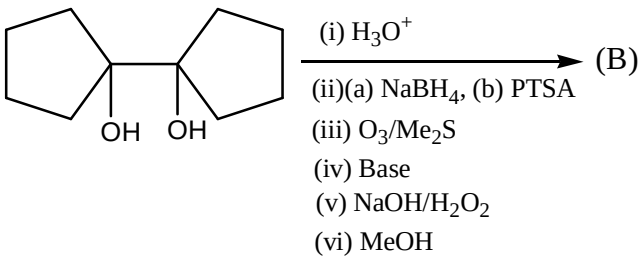


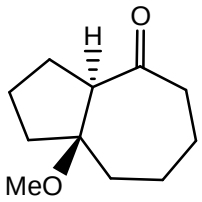
(a) 

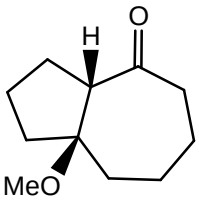
(b) 

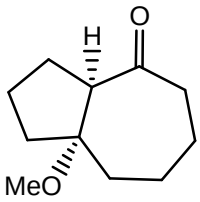
(c) 

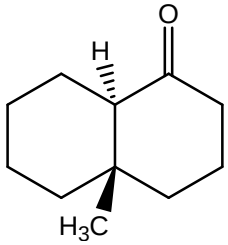
(d) 

27. 

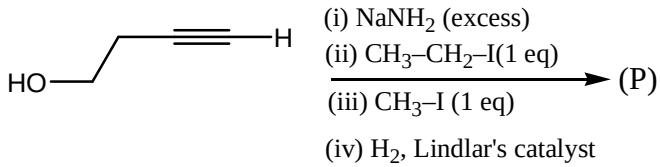
(a) 

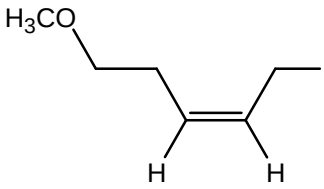
(b) 

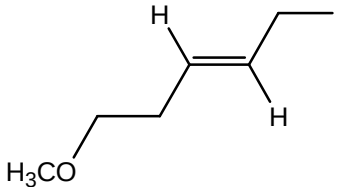
(c) 

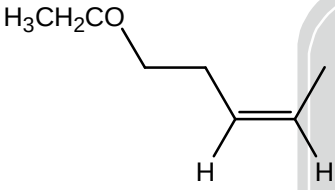
(d) 

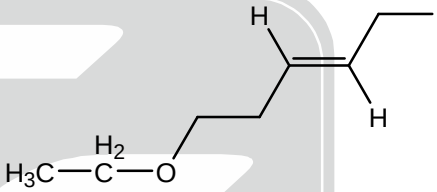
28. The major product (P) is

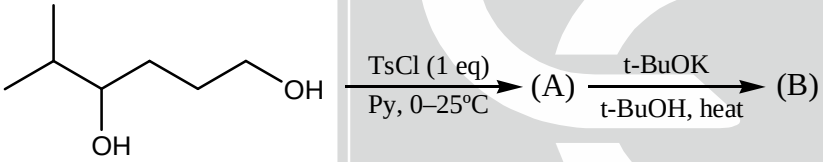


(a) 

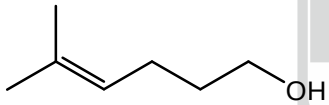
(b) 

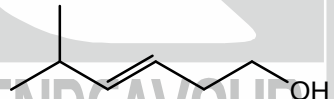
(c) 

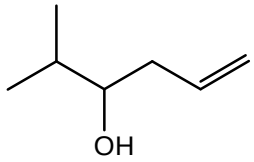
(d) 

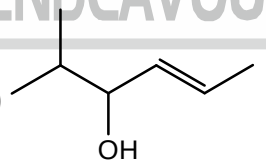
29. 

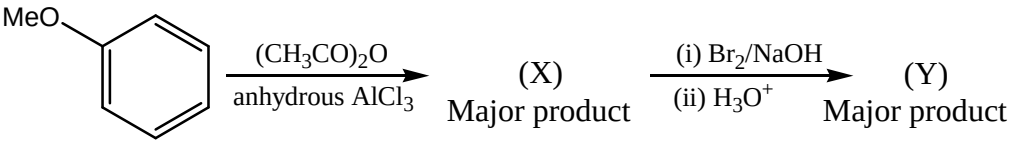
The major product (B) is

(a) 

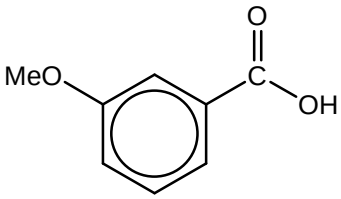
(b) 

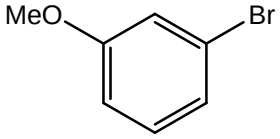
(c) 

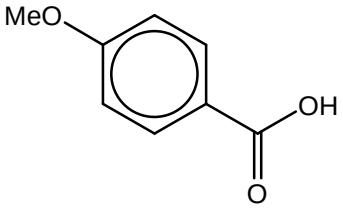
(d) 

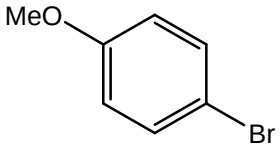
30. 

The structure of Y in above reaction is

(a) 

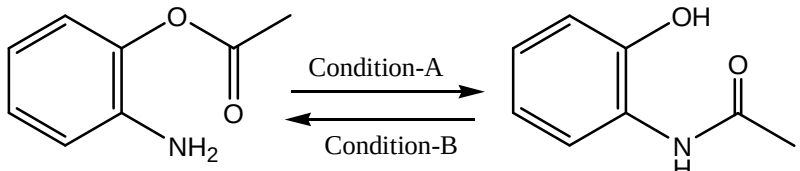
(b) 

(c) 

(d) 

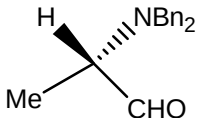
Section-B : Multiple Select Questions (MSQ)

Q.31 to Q.40: Carry 2 Marks each.

31. 

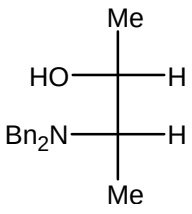
(A) (B)

Correct option(s) regarding to the conversion of product (A & B)
(a) Product A convert into product B by acid as a condition A
(b) Product B convert into product A by base as a condition B
(c) In the formation of product B from product A and product A from B, same intermediate is formed
(d) Different intermediate is formed in the conversion of A to B and B to A.

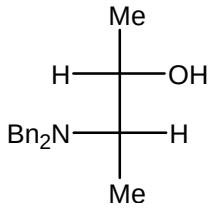
32. 

+ MeLi ⟶ Products (A + B)

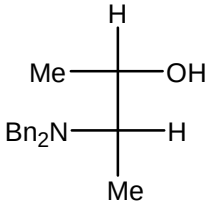
Correct option regarding product (A and B) with appropriate statement

(a) 

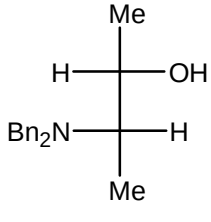
is major product, according to Cram's rule

(b) 

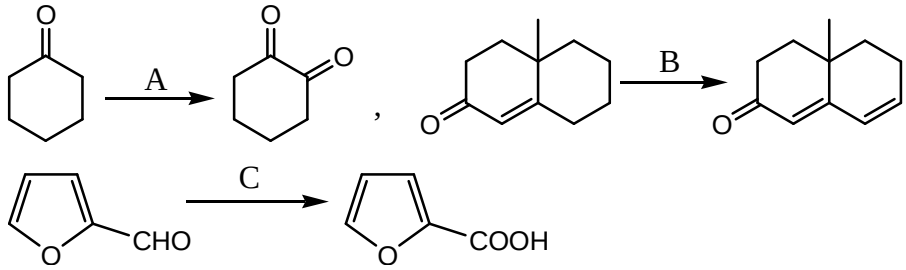
is major product, according to Cram's rule

(c) 

is major product, according to Cram's rule

(d) 

is minor product, according to Cram's rule

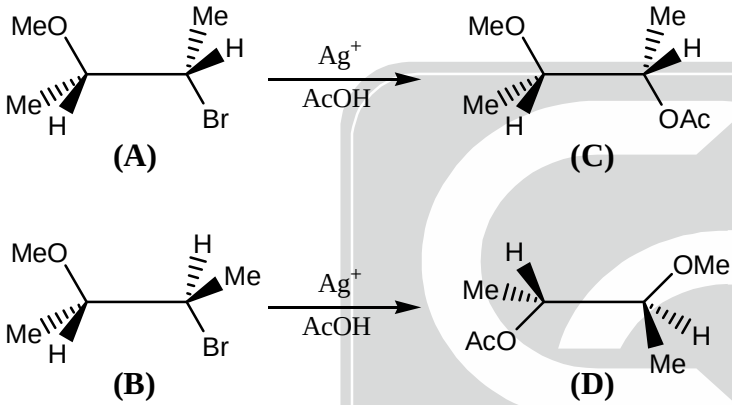
33. 

Choose the *incorrect* statement regarding A, B and C

	A	B	C
(a)	SeO_2	DDQ	Ag_2O
(b)	PCC	DDQ	Ag_2O
(c)	SeO_2	Pd/C	Alk. $KMnO_4$
(d)	PCC	DDQ	Alk. $KMnO_4$

34. Among the following statements, the correct is/are

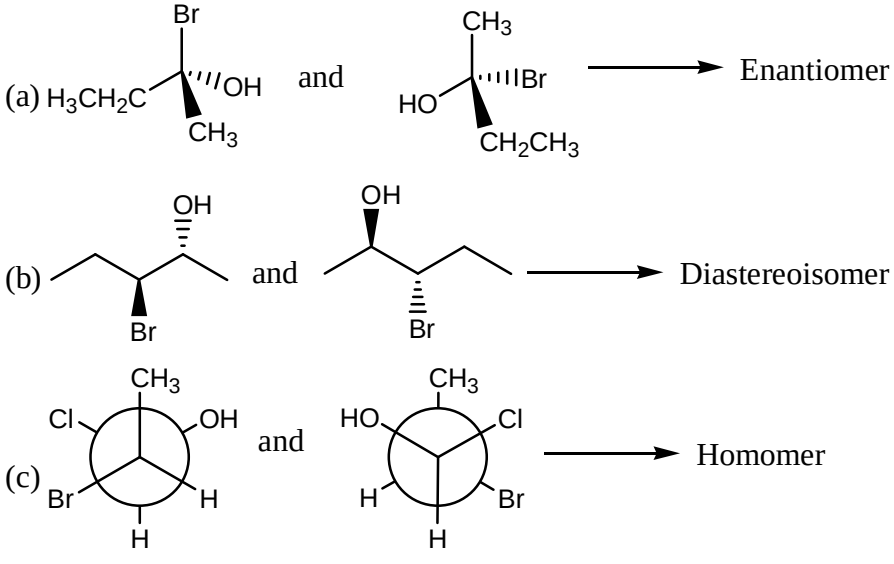
(a) Tyr is a neutral amino acid
(b) Trp has an aromatic side chain
(c) Asp is an acidic amino acid
(d) All the amino acids except cys has s-configuration

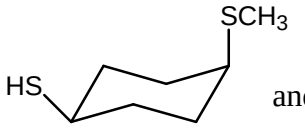
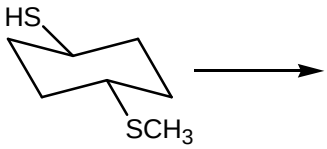
35. 

Optically pure isomer (A) and (B) were treated with silver acetate in acetic acid. The ***incorrect*** statement from the following is

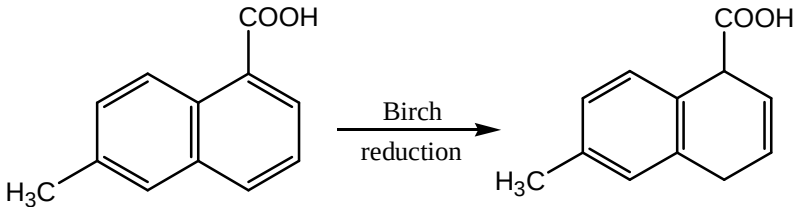
(a) (A) gives optically pure (C)
(b) (A) gives optically pure (C) and (B) give optically pure (D)
(c) (A) gives racemic mixture of (C) and (B) gives optically pure (D)
(d) (B) gives racemic mixture of (D)

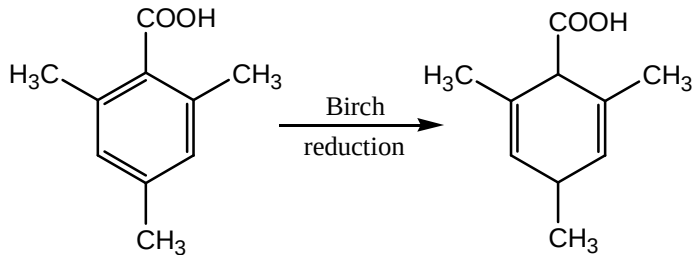
36. Match the correct relationship with appropriate statement

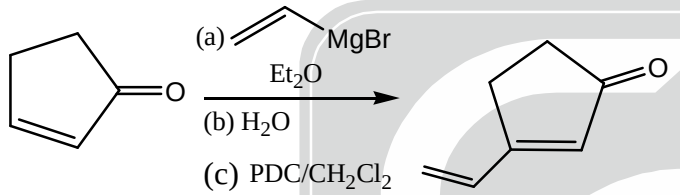


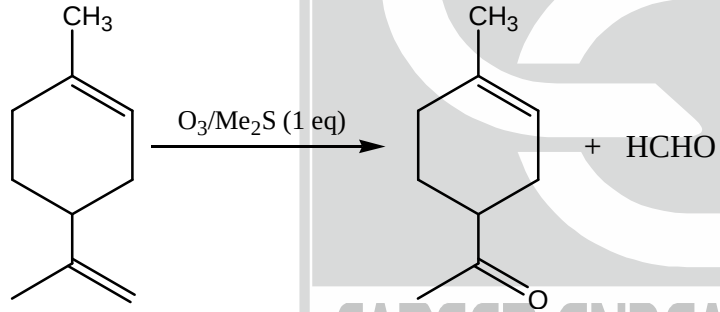
(d)  and  Diastereoisomer

37. Which of the following conversion is/are correct?

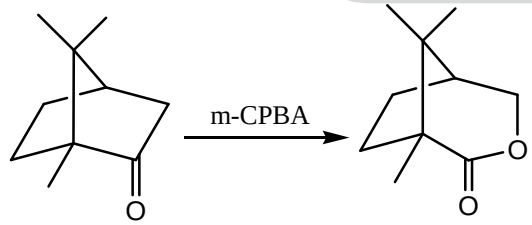
(a) 

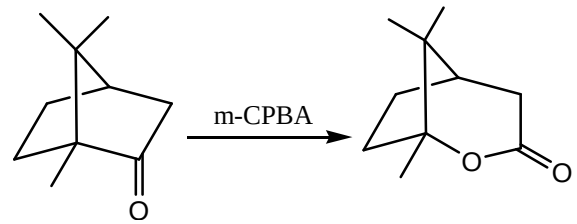
(b) 

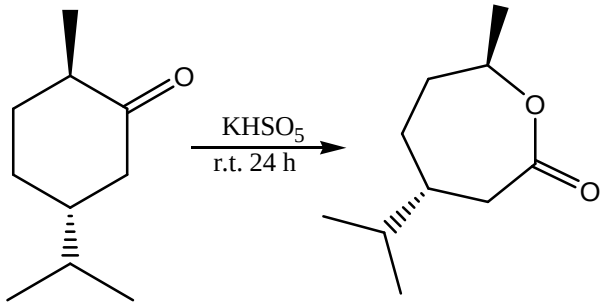
(c) 

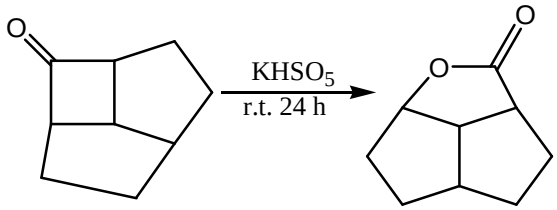
(d) 

38. Which of the following conversion are correct?

(a) 

(b) 

(c) 

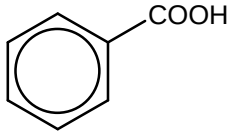
(d) 

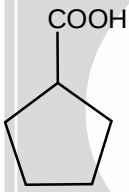
39. Which of the following compound will give acitic acid with $KMnO_4/H^+$?

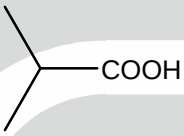
(a) H_3C-CHO (b) $H_3C-\underset{H}{C}=CH-CH_3$

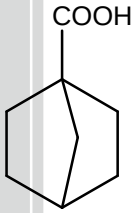
(c) $H_3C-C\equiv C-CH_3$ (d) $H_3C-\overset{H_2}{C}-OH$

40. Which of the following compounds will give HVZ reaction

(a) 

(b) 

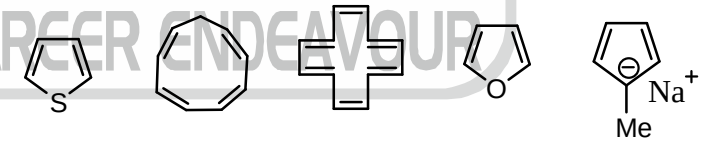
(c) 

(d) 

Section-C : Numerical Answer Type (NAT)

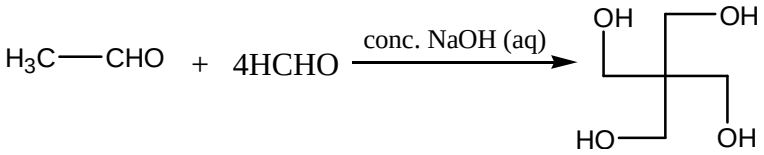
Q.41 to Q.50: Carry 1 Mark each.

41. Total number of aromatic compound in the following



(i) (ii) (iii) (iv) (v)

42. The number of Aldol reaction(s) that occurs in given transformation is _____



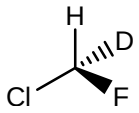
43. The nitration on indole occurs at which position _____

44. Among the following enzymes how many used for the hydrolysis of peptide chain from c-terminal side _____

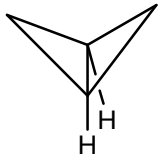
(1) Trypsin (2) Carboxypeptidase (3) Pepsin
(4) Chymotrypsin (5) Papain (6) Leucine

45. The total number of Alkene possible by dehydrobromination of 3-bromo-3-cyclopentylhexane using alcoholic KOH is _____

46. The total number of lines expected (due to spin-spin coupling of proton with fluorine and deuterium nuclei) in the ^{1}H NMR spectrum of the following compound is _____.



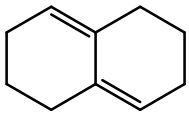
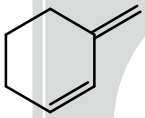
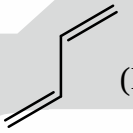
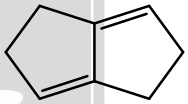
47. The sum of ^{1}H NMR and ^{13}C NMR signals in the following compound is _____



48. In the UV spectrum of cyclohexenone. The $\pi \rightarrow \pi^{*}$ transition absorb wavelength at is _____nm.

49. ^{1}H NMR spectrum of an organic compound recorded on a 400 MHz spectrometer should a quartet with line positions at 1760, 1750, 1740, 1730 Hz. The chemical shift of quartet is _____ppm.

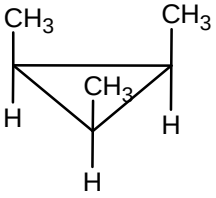
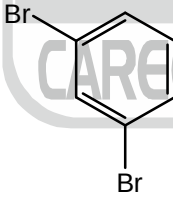
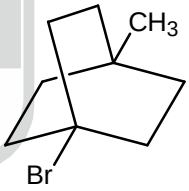
50. The number of diene will not be reactive towards Diels-Alder reaction is / are .....

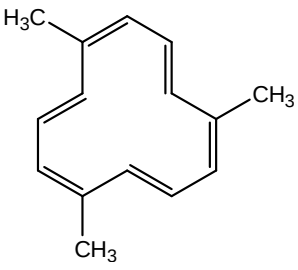
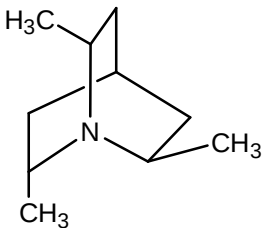
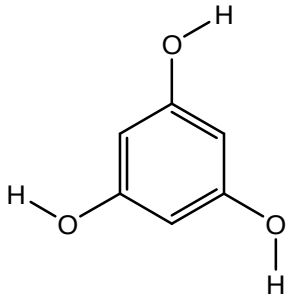
(A)  (B)  (C)  (D)  (E) 

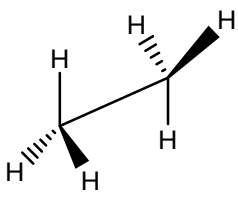
Q.51 to Q.60: Carry 2 Marks each.

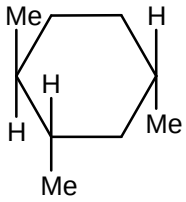
51. The ^{1}H NMR frequency at 1.0 T is 72.4 MHz. If the gyromagnetic ratios of ^{1}H and ^{13}C are 24×10^{7} and 6×10^{7} $T^{1}s^{-1}$, respectively. The ^{13}C frequency at 1.0 T is _____MHz.

52. In the following compound, how many compound having C_3 axis.

(A)  (B)  (C)  (D) 

(E)  (F)  (G) 

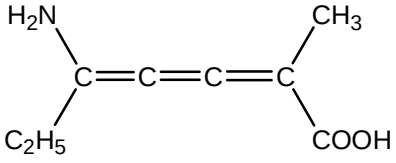
(H) 

(I) 

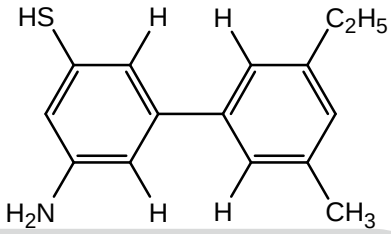
53. Calculate $[\alpha]_D$ of a 1M solution of 2-chloropentane in a 10 cm cell when the observed rotation is +3.64°.

54. Predict the specific rotation of a mixture of 30% (–)–2-bromobutane and 70% (+) enantiomer. $[\alpha]_D$ of pure enantiomer is (–)-23.13°.

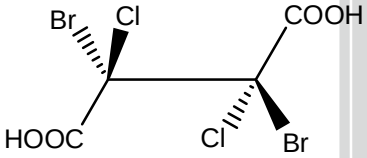
55. In the following compound, total number of optically active compound



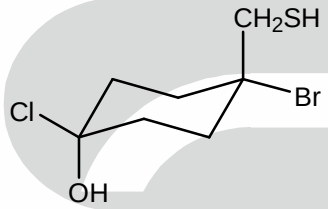
(A)



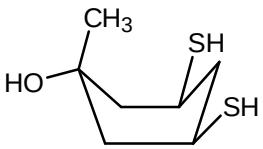
(B)



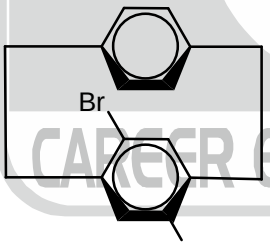
(C)



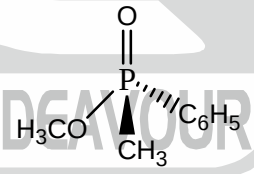
(D)



(E)

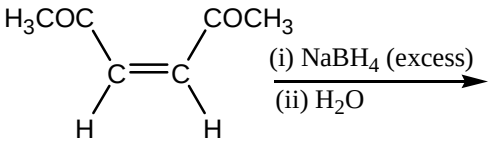


(F)



(G)

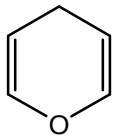
56. In the following reaction, how many different diols would be formed?

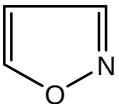


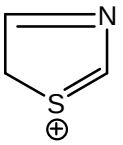
57. A new carbon-carbon bond formation is possible in the given named reactions _____

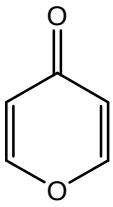
(A) Cannizzaro's reaction
(B) Baeyer villiger oxidation
(C) Friedel craft reaction
(D) Nef reaction
(E) Clemmension reduction
(F) Reimer-Tiemann reaction
(G) Aldol condensation

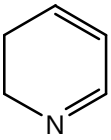
58. Among the following, how many are aromatic in nature?

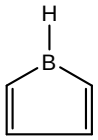
(A) 

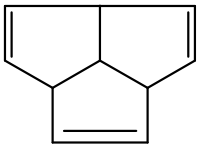
(B) 

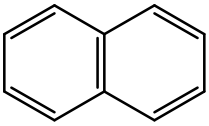
(C) 

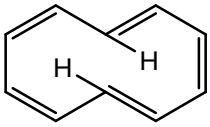
(D) 

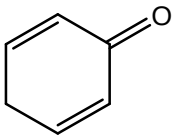
(E) 

(F) 

(G) 

(H) 

(I) 

(J) 

59. The uncertainty in the NMR frequency of a compound in liquid state (relaxation time = 2s) is 0.002 Hz. The uncertainty in the frequency (in Hz) of a same compound in solid state (relaxation time = 10^{-6} s) is _____

60. How many processes given below are the characteristics of carbene .....

(a) Insertion in O–H bond
(b) Insertion in C–H bond
(c) Insertion in π – bond
(d) Wolf rearrangement
(e) Curtius rearrangement
(f) Smith rearrangement
(g) Lossen rearrangement

******* END OF QUESTION PAPER *******

Space for Rough Work

IIT-JAM CHEMISTRY-CY

TEST SERIES - 3
(Organic Chemistry)

Date : 11-01-2018

Booklet : A

ANSWER KEY

Section-A : Multiple Choice Questions (MCQ)

1. (c)	**2.** (a)	**3.** (c)	**4.** (a)	**5.** (c)
6. (c)	**7.** (a)	**8.** (b)	**9.** (c)	**10.** (c)
11. (b)	**12.** (c)	**13.** (a)	**14.** (b)	**15.** (c)
16. (c)	**17.** (c)	**18.** (c)	**19.** (c)	**20.** (a)
21. (b)	**22.** (d)	**23.** (d)	**24.** (d)	**25.** (b)
26. (a)	**27.** (a)	**28.** (a)	**29.** (c)	**30.** (c)

Section-B : Multiple Select Questions (MSQ)

31. (a),(b), (c)	**32.** (a),(c),(d)	**33.** (a)	**34.** (a),(b),(c),(d)
35. (a),(b),(d)	**36.** (a),(c),(d)	**37.** (a),(b),(c)	**38.** (a),(c),(d)
39. (a), (b), (c),(d)	**40.** (b), (c)		

Section-C : Numerical Answer Type (NAT)

41. (3)	**42.** (3)	**43.** (3)	**44.** (4)
45. (5)	**46.** (9)	**47.** (5)	**48.** (205 to 220)
49. (4.30 to 4.40)	**50.** (3)	**51.** (17.9 to 18.2)	**52.** (8)
53. (33.0 to 36.0)	**54.** (7.5 to 10.0)	**55.** (2)	**56.** (3)
57. (3)	**58.** (3)	**59.** (4000)	**60.** (5)