

أسئلة السنوات

لجنة طب الأسنان

FIRST YEAR - SECOND SEMESTER

Organic Chemistry First exam



Hayat Batch's Exams

First exam:

1. The most stable compound from the following is:

- A. cyclopropane
- B. cyclobutane
- C. cyclobentane
- D. cyclohexane
- E. cycloheptane

Answer : D

2. The compound with the highest angle strain is:

- A. cyclopropane
- B. cyclobutane
- C. cyclobentane
- D. cyclohexane
- E. cycloheptane

Answer : A

3. The compound with the lowest angle strain is:

- A. cyclopropane
- B. cyclobutane
- C. cyclobentane
- D. cyclohexane
- E. cycloheptane

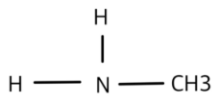
Answer : D

4. Branched alkanes have a ____ boiling point compared to linear alkanes. Branched alkanes have a ____ London dispersion link compared to linear alkanes.

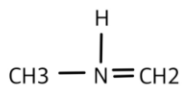
- A. Higher, stronger
- B. Higher, weaker
- C. Lower, stronger
- D. Lower, weaker
- E. Same, same

Answer : D

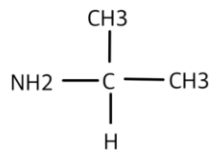
5. Which of the following structures contain a Nitrogen with a (+1) formal charge?



1



2

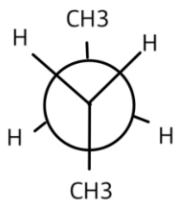


3

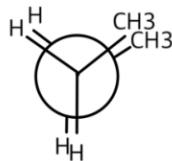
- A. 1
- B. 2
- C. 3
- D. 1+3

Answer : B

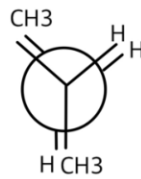
6. Which of the following structures is the weakest butane?



1



2

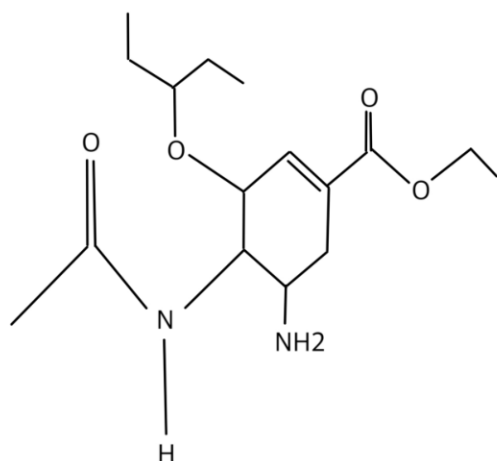


3

- A. 1
- B. 2
- C. 3

Answer : B

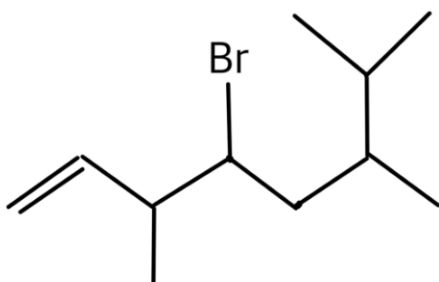
7. The following structure has all these functional groups except:



- A. Alcohol
- B. Ether
- C. Ester
- D. Amine
- E. Amide

Answer : A

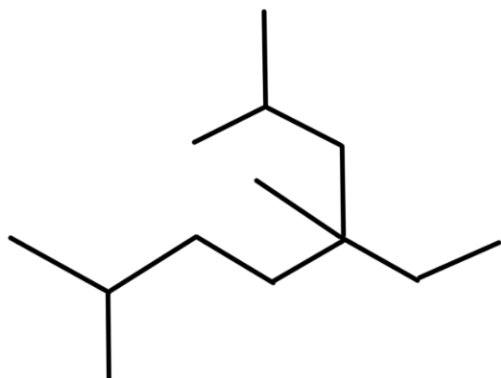
8. The correct IUPAC name for the following structure is :



- A. 4-Bromo-3,6,7-trimethyl-1-octane
- B. 4-Bromo-3,6,7-trimethyl-1-octene
- C. 5-Bromo-2,3,6-trimethyl-1-octane
- D. 5-Bromo-2,3,6-trimethyl-1-octene
- E. None of the above

Answer: B

9. The correct IUPAC name for the following structure is :



- A. 4-ethyl-2,4,7,7-tetra methyl-hexane
- B. 4-ethyl-2,4,7-trimethyl-octane
- C. 5-ethyl-2,5,7-trimethyl-octane
- D. None of the above

Answer: B

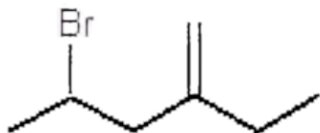
10. The carbon carbon bonds in benzene are:

- A. of equal length and are shorter than the double bond of ethene
- B. of equal length and are intermediate between a double bond and a single bond.
- C. of unequal length and are alternately short and long around the ring.
- D. due only to p-orbital overlap.
- E. of equal length and intermediate between the carbon-carbon bond lengths in ethene and ethyne.

Answer: B

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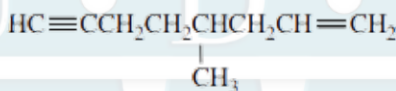
11. The IUPAC naming for the given picture:



- A. 2-(2-bromopropyl)-1-butene.
- B. 2--4-ethyl-1-pentene.
- C. 4-bromo-2-ethyl-1-pentene.
- D. 2-bromo-4-methylenehexane.

Answer: C

12. The correct name of the molecule below is:



- A. 5-methyl-7-octen-1-yne.
- B. 4-methyl-1-octen-7-yne.
- C. 4-methyl-1-octyn-7-ene.
- D. 5-methyl-1-octen-7-yne.
- E. None of these is correct.

Answer: B

13. The double bond in ethene is made up of:

- A. A pi bond and a sigma bond formed by lateral overlap of two p orbitals.
- B. A sigma bond formed by overlap of two s orbitals and a pi bond formed by lateral overlap of two p orbitals.
- C. A pi bond formed by end-on overlap of two sp² orbitals and a sigma bond formed by overlap of two s orbitals.
- D. A sigma bond formed by end-on overlap of two sp² orbitals and a pi bond formed by lateral overlap of two p orbitals.
- E. A pi bond formed by lateral overlap of two sp² orbitals and a sigma bond formed by end-on overlap of two sp² orbitals.

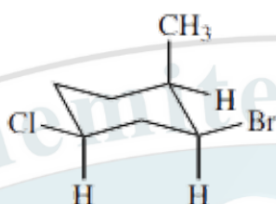
Answer: D

14. Which of the following statements is FALSE relative to alkenes?

- A. The C of the carbon-carbon double bond is sp² hybridized.
- B. The bond angles are approximately 120° around the carbon-carbon double bond.
- C. There is the possibility of cis/trans isomerism.
- D. They are less reactive than alkanes.
- E. The bond length of the carbon-carbon double bond is shorter than that of the carbon-carbon single bond.

Answer: D

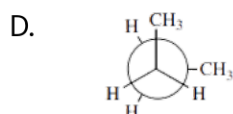
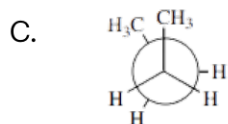
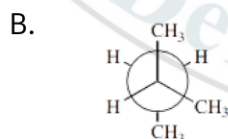
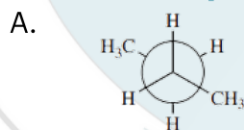
15. Consider this chair conformation:



- A. The methyl and bromine are cis and the chlorine and bromine are cis.
- B. The methyl and bromine are trans and the chlorine and bromine are cis.
- C. The methyl and chlorine are trans and the methyl and bromine are cis.
- D. The methyl and chlorine are trans and the methyl and bromine are trans.
- E. The methyl and chlorine are trans and the bromine and chlorine are cis.

Answer: A

16. The least stable conformation of butane is given by which of the following Newman projections?



Answer: C

17. The boiling points of normal alkanes:

- A. Rise as the length of the carbon chain increases.
- B. Rise as the length of the carbon chain decreases.
- C. Are higher than the boiling points of branched alkanes with the same molecular formula.
- D. A and C.
- E. B and C.

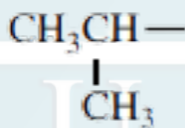
Answer: D

18. The correct IUPAC name for $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)(\text{CH}_2)_3\text{CH}(\text{CH}_3)_2$ is:

- A. Diisopropylpentane.
- B. 1,1,2,6,6-pentamethylhexane.
- C. 2,5-diisopropylpentane.
- D. 2,3,7-trimethyloctane.
- E. 1,4-diisopropylpentane.

Answer: D

19. The name of the alkyl group below is:



- A. Ethyl.
- B. Propyl.
- C. Isopropyl.
- D. Butyl.
- E. Isobutyl.

Answer: C

20. The name of the alkyl group that contains two carbons is:

- A. Methyl.
- B. Ethyl.
- C. Propyl.
- D. Isopropyl.
- E. None of these.

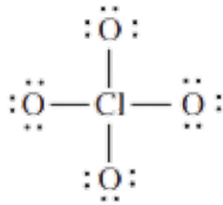
Answer: B

21. $\text{C}_{14}\text{H}_{28}$:

- A. $\text{C}_{14}\text{H}_{30}$.
- B. $\text{C}_{14}\text{H}_{32}$.
- C. $\text{C}_{14}\text{H}_{34}$.
- D. $\text{C}_{14}\text{H}_{26}$.

Answer: B

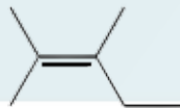
22. The formal charges in the perchlorate ion are:



- A. -1 on each O and +3 on the Cl.
- B. 0 on each O and -1 on the Cl.
- C. -1 on each O and +4 on the Cl.
- D. -1/4 on each O and 0 on the Cl.
- E. +1 on each O and -1 on the Cl.

Answer: A

23. The structural formula:



- A. C7H16.
- B. C6H14.
- C. C7H14.
- D. C6H12.
- E. C7H12.

Answer: C

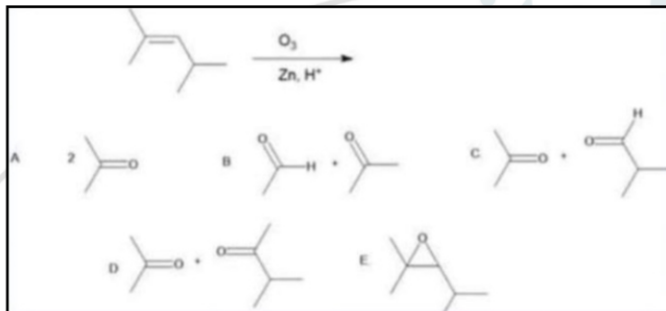
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24. Which one of the molecules shown below has a net molecular dipole moment?

- A. CCl_4 .
- B. $\text{H}_2\text{C}=\text{CH}_2$.
- C. CF_4 .
- D. CH_2Cl_2 .

Answer : D

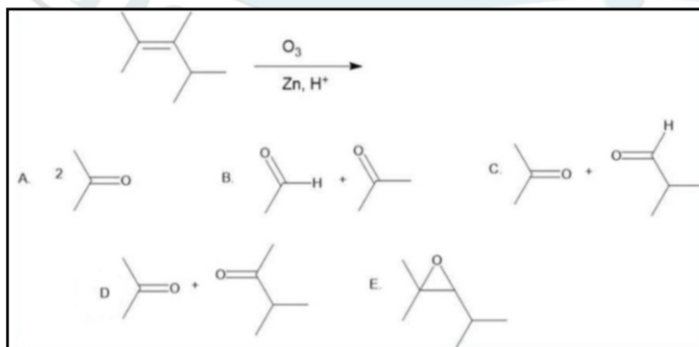
25. What are the products of the following reaction sequence?



- A. A.
- B. B.
- C. C.
- D. D.
- E. E.

Answer : C

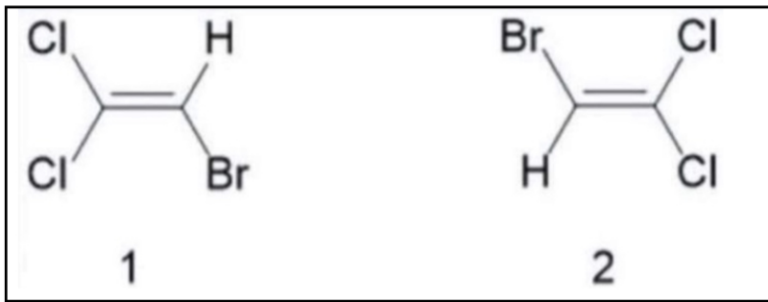
26. What are the products of the following reaction sequence?



- A. A.
- B. B.
- C. C.
- D. D.
- E. E.

Answer : D

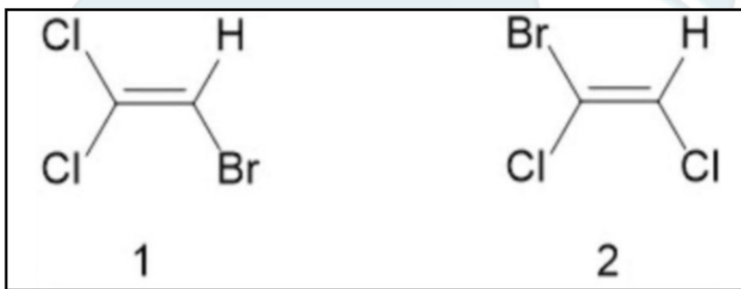
27. The compounds represented by the structures below are:



- A. Cis-trans isomers.
- B. Constitutional isomers.
- C. Same compounds.
- D. Enantiomers.

Answer : C

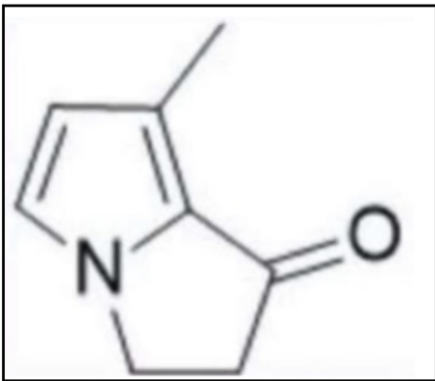
28. The compounds represented by the structures below are:



- A. Cis-trans isomers.
- B. Constitutional isomers.
- C. Same compounds.
- D. Enantiomers.

Answer : B

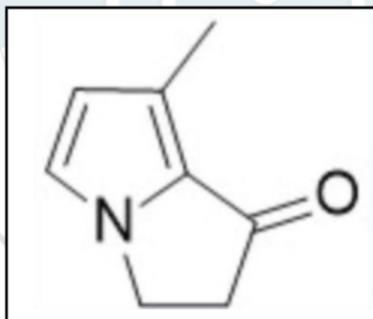
29. Shown below is one of the sex pheromones from the butterfly family. How many sp^2 hybridized carbon atoms are present?



- A. 1.
- B. 2.
- C. 3.
- D. 4.
- E. 5.

Answer : E

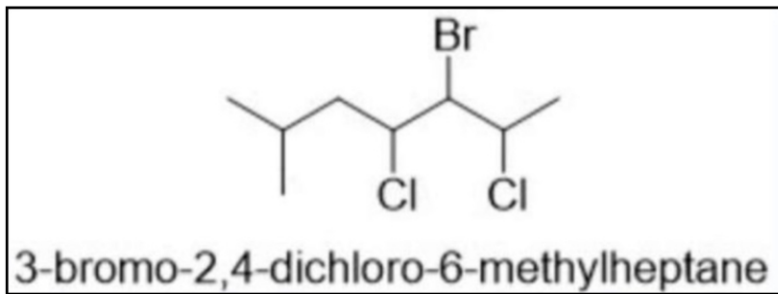
30. Shown below is one of the sex pheromones from the butterfly family. How many sp^3 hybridized carbon atoms are present?



- A. 1.
- B. 2.
- C. 3.
- D. 4.
- E. 5.

Answer : C

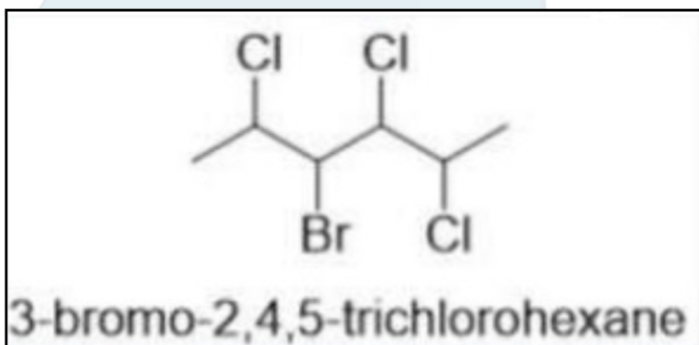
31. Identify the number of maximum stereoisomers for (3-bromo-2,4-dichloro-6-methylheptane).



- A. 6 stereoisomers.
- B. 8 stereoisomers.
- C. 10 stereoisomers.
- D. 16 stereoisomers.
- E. 24 stereoisomers.

Answer : B

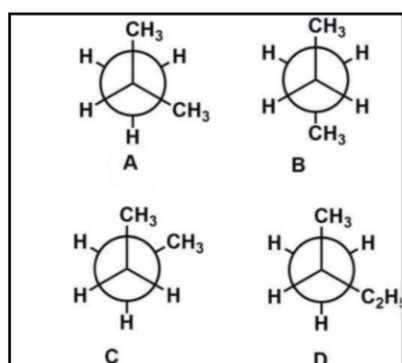
32. Identify the number of maximum stereoisomers for (3-bromo-2,4,5-trichlorohexane).



- A. 6 stereoisomers.
- B. 8 stereoisomers.
- C. 10 stereoisomers.
- D. 16 stereoisomers.
- E. 24 stereoisomers.

Answer : D

33. Which of the following is the most stable conformation of 2-methylpropane (looking at C2- C3)



- A. A.
B. B.
C. C.
D. D.

Answer : B

34. Which of the following statements represent the least stable chair conformer of trans-1- (tert-butyl)-3- methylcyclohexane

- A. (tert-butyl group on axial), (methyl group on equatorial).
B. (tert-butyl group on equatorial), (methyl group on axial).
C. Both groups are on equatorial.
D. Both groups are on axial.
E. None of above.

Answer : A

35. Which of the following statements represent the most stable chair conformer of trans-1- (tert-butyl)-3-methylcyclohexane

- A. (tert-butyl group on axial), (methyl group on equatorial).
B. (tert-butyl group on equatorial), (methyl group on axial).
C. Both groups are on equatorial.
D. Both groups are on axial.
E. None of above.

Answer : B

36. Consider the three isomeric alkanes n-hexane, 2,3-dimethylbutane, and 2-methylpentane. Which of the following correctly lists these compounds in order of increasing boiling point? #1 is the highest

- A. 2-methylpentane (3) < n-hexane (2) < 2,3-dimethylbutane (1).
B. 2-methylpentane(3) < 2,3-dimethylbutane(2) < n-hexane(1).
C. n-hexane(3) < 2-methylpentane (2) < 2,3-dimethylbutane(1).
D. n-hexane (3) < 2,3-dimethylbutane(2) < 2-methylpentane(1).
E. 2,3-dimethylbutane(3) < 2-methylpentane(2) < n-hexane(1).

Answer : E

37. Predict the major product of the reaction of 1-methylcyclohexene + HI.

- A. 1-iodo-2-methylcyclohexene.
- B. 2-iodo-1-methylcyclohexane.
- C. iodocyclohexane.
- D. 1-iodo-1-methylcyclohexane.
- E. methylcyclohexane.

Answer : D

38. Predict the major product of the reaction of 1-methylcyclohexene + HBr.

- A. 1-bromo-2-methylcyclohexene.
- B. 1-bromo-1-methylcyclohexane.
- C. 2-bromo-1-methylcyclohexane.
- D. bromocyclohexane.
- E. methylcyclohexane.

Answer : B

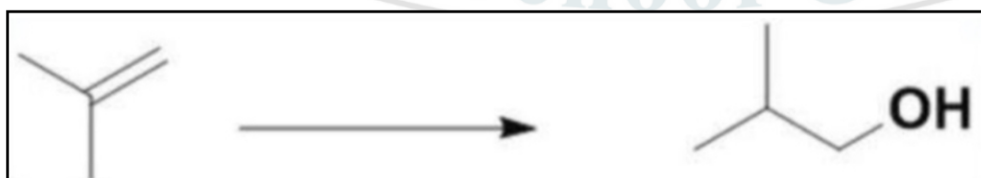
39. Which set of reagents would be the best choice to accomplish the transformation shown below?



- A. H₂O, H₂SO₄.
- B. CH₃OH, H₂SO₄.
- C. H₂O/H₂O₂/NaOH.
- D. 1. BH₃/THF 2. HO⁻, H₂O₂, H₂O.
- E. 1. NaBH₄ 2. H₃O⁺.

Answer : A

40. Which set of reagents would be the best choice to accomplish the transformation shown below?



- A. H₂O, H₂SO₄.
- B. CH₃OH, H₂SO₄.
- C. H₂O/H₂O₂/NAOH.
- D. 1. BH₃/THF 2. HO⁻, H₂O₂, H₂O.
- E. 1. NaBH₄ 2. H₃O⁺.

Answer : D

41. Which straight-chain alkane is a structural isomer of 3-ethylheptane?

- A. Heptane.
- B. Octane.
- C. Nonane.
- D. Decane.
- E. None of the above.

Answer: C

42. Which of the following compound has the formula C₆H₁₄?

- A. Isopentane.
- B. Neopentane.
- C. Cyclohexane.
- D. 2,2-dimethylpropane.
- E. 2,3-dimethylbutane.

Answer: E



43. Which of the following compounds can exhibit cis/trans isomerism?

- A. 1-pentene.
- B. 2-pentene.
- C. 2-methyl-2-pentene.
- D. 3-methyl-1-pentene E. 1-hexene.

Answer: B

44. The hybridization state of the charged carbon in a carbocation is?

- A. sp⁴.
- B. sp³.
- C. sp².
- D. sp.
- E. sp³d.

Answer: C

45. Which of the following alkanes would have the highest boiling point?

- A. Pentane.
- B. Isopentane.
- C. Neopentane.
- D. Hexane.
- E. Isohexane.

Answer: D

46. Which of the following molecules contain the same functional groups?



I



II



III

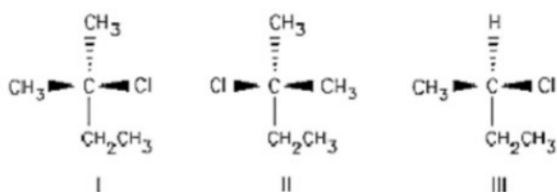


IV

- A. I, II, III.
- B. I, II, IV.
- C. II, III, IV.
- D. I, III, IV.
- E. I, II, III, IV.

Answer: B

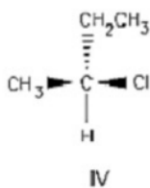
47. (R)-2-Chlorobutane is represented by?



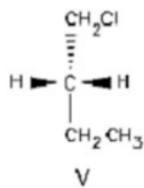
I

II

III



IV



V

- A. I.
- B. II.
- C. III.
- D. IV.
- E. V.

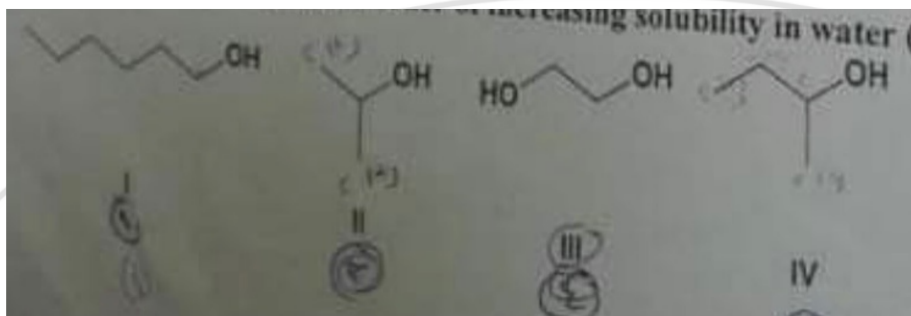
Answer: C

48. Which of the following is not a nucleophile?

- A. H_2O .
- B. CH_2O^- .
- C. NH_3 .
- D. NH_4^+ .
- E. All are nucleophiles.

Answer: D

49. Arrange the compounds in the order of increasing solubility in water (least soluble first)?



- A. I, III, II, IV.
- B. III, I, IV, II.
- C. I, IV, II, III.
- D. IV, I, III, II.

Answer: C