CHEMISTRY

BOOKS - CBSE COMPLEMENTARY MATERIAL CHEMISTRY (HINGLISH)

ORGANIC CHEMISTRY: SOME BASIC PRINCIPLES AND TECHNIQUES

Multiple Choice Questions

1. Homolytic fission of carbon-carbon bond of ethane produces an intermediate in which the carbon atom is in

A. sp^3 hybridised

B. sp^2 hybridised

C. sp-hybridised

D. $sp^3d - hybridised$

Answer: b

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2. The kind of delocalization involving sigma bond orbitals is called:

A. Inductive effect

B. Hyperconjugation effect

C. Electromeric effect

D. Mesomeric effect

Answer: b

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3. which organic species has only one type of hybridized carbon?

A. $CH_2 = C = CH_2$

B. $CH_3 - CH_2 - CH_3$

C. $CH_3 - CH = CH_2$

D. $CH_2 = CH - CH_3$

Answer: d

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4. Which of the following can act as an electrophile?

A. CN^-

B. OH^-

C. H_2O

D. BF_3

Answer: d

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5. which of the following is correct about species: $(CH_3)_3 - C^+$

A. Its is plNNR

B. Its C^+ is sp^2 hybridized

C. A nucleophlie can attek on itsC^+

D. all of these

Answer: d

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6. Which one of the following has inductive, mesomeric and hyperconjugation effect?

A. CH_3CI

B. $CH_3 - CH - CH_2$

C. $CH_3CH = CHCOCH_2CI$

D. $CH_2 = CH - CH_2$

Answer: c

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7. The most stable free radical among the following is

A. $C_6H_5CH_2CH_2$

B. $C_6H_5CHCH_3$

C. CH_3CH_2

D. CH_3CHCH_3

Answer: b

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8. isomera of a compound must have

A. Same physical properties

B. Same chemical properties

C. Same sturtural properties

D. Same molecular properties

Answer: d

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9. The type of isomerism not found in alkenes is :

A. Chain isomerism

B. Geometrical isomerism

C. Metamerism

D. Position isomerism

Answer: c

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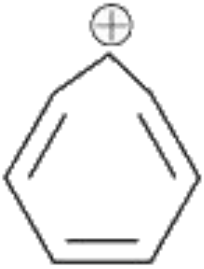
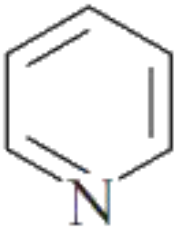
10. which of the following species have six Pi constructed electrons?



A.

B. $ch_2 = ch - ch = ch - ch_2(-)$



C.

D. all of these

Answer: d

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11. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is

A. $-COOH,\ -SO_3H,\ -CONH_2 - CHO$

B. $-SO_3H,\ -COOH,\ -CONH_2,\ -CHO$

C. $-CHO,\ -COOH,\ -SO_3H,\ -CONH_2$

D. $-CONH_2,\ -CHO, SO_3H,\ -COOH$

Answer: a

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12. the IUPAC name of

$CH_3 - CH = CH - C \equiv CH$

A. pent-3-en-1-yne

B. pent-3-en-2-yne

C. pent-2-en-4-yne

D. pent-2-en-3-yne

Answer:

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13. Different structures generated due to rotation about C - C axis, of an organic molecule, are the examples of :

A. Geometrical isomerism

B. Conformational isomerism

C. optical isomerism

D. structural isomerism

Answer: b

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14. Which one of the following is not used for the purification of solid impurities ?

A. Distillation

B. Sublimation

C. Crystallistion

D. Vapouristataion

Answer: d

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15. Quantitaive measurement of nitrogen in an organic compound is done by the method _____.

A. Berthelot method

B. Lassaigne method

C. carius method

D. kjehldahl method

Answer: a

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Fill In The Blanks

1. The molecule has..... structure

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2. What are the two properties of carbon that make it capble of forming a large number of compounds ?

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3. A triple bond between two carbon atoms is composed of one..... and ..... bonds

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4. An organic compounds which decomposes below its boiling point can be purified by .....

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5. The cenral atom of compound $ch_2 = c = ch_2$ is ..... Hybridized

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6. The difference in molecular weights of two consecutive members of a homologous series is

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7. geomerical isometism happens due to..... around p bond

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8. electrophiles are the species which attack the regions of..... electron density

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9. Hyperconjugation is also known as

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10. In the Duma's method of estimation of nitrogen,the nitrogen,the nitrogen in the organic compound is finally converted into

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True And False Type Questions

1. State true or false: in homologous series all the members have the same physical prperties

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2. Predict true or false, IUPAC name of CH_3CN is methanenitrile

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3. Write true or false. Cis-trans isomers have different dipole moments

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4. ethanol and methoxymethane are position isomers. State true or false

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5. A free radical is aspecies with an unpaired valence electron . State true or false

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6. Acetylene is a linear molecule. State true or false.

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7. Resonance bring down the stability of molecule. State true or false.

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8. inductive effect is observed in bond in presence of attacking reagent. State true or false.

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9. the percentage of carbon and hydrogen are estimated simultaneously in an organic cmpound by

liebig method. State true or false.

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10. chromatography is the mathod used to separate and purify compounds when present in small amounts. State true or false.

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Assertion Reason Type Questions

1. Assertion :But-1-ene2-Methylprop-1-ene are position isomers. Reason Position ismoers have same molecular

formula but different arrangrment of carbon atoms

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: d

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2. Assertion (A) : All the C atoms of but-2-ene lie in one plane

Reason (R): Double-bond C atoms are sp^2-hypbridised.

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: c

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3. Assertion : Alkanes having more than three carbon atoms exhibit chain isomerism.

Reason : All carbon atoms in alkanes are $sp-$ hybridized

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: c

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4. Assertion :In $ch_2 = c = ch_2$ all the carbon atmos are sp2 hybridised. Reason: All the hydrpogen atoms lie in one plane

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: d

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5. Assertion : Butane and $2-$ methyl butane are chain isomers.

Reason : Butane is a straight chain alkane while $2-$ methyl butane is a branched chain alkane.

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: b

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6. (A) Tertiary carbocations are generally formed more easily than primary carbocations.

(R) Hyperconjugation as well as inductive effect due to additional alkyl groups stabilize tertiary cabocations.

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: a

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7. Assertion: Alkyl carbonaions like ammonia have pyramidal shape.

Reason: The carbon carrying negative charge has an octet of electrons.

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: b

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8. Assertion : Carbocation are planar in nature.

Reason : Carbocations are sp^2 hybridised.

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: a

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9. Assertion :IPUAC name of compound is but-2-enal.Reason :functional group gets preference over multiple double bond in IUPAC name of a compound

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: a

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10. compuond with difference in their boiling point by about 3°C can be separated by simple distillation.Reason: all liquid mixture can be separated by distillation method

A. If both assertion and reason are correct and reason is crect explanation for assertion

B. If both assertion and reason are correct but reason is not cottect explanation for assertion

C. If reason is correct but assertion is incorrect

D. If both assertion and reason are incorrect

Answer: c

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Match The Columns

1. match the staements (a,b,c,d) in column I with the statements(I,ii,iii,iv) in column II

Column I	Column II
a. Leibig method	i. N_2
b. Dumas method	ii. AgX
c. Kjehldahl method	iii. CO_2 and H_2O
d. Carius method	iv. NH_3

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2. match the staements (a,b,c,d) in column I with the statements(I,ii,iii,iv) in column II

Column I	Column II
a. Nonbenzenoid aromatic compound	i. 50% s character
b. Catenation	ii. Species containing single unpaired nonbonding electrons
c. Free radical	iii. Chain-forming property of an element
d. sp-hybridised carbon atom	iv. Tropolone

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One Word Answer Type Questions

1. write the formula of next higher homologue of C_2H_5OH.

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2. mention the hybridisation of underlined carbon in $CH_3C \equiv N$.

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3. what type of isomerism is shown by pentane and 2-methylbutane?

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4. nucleophiles are lewis acids or lewis bases?

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5. what type of bond fission results in the formation of free radicals

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6. what is the number of electrons presnt in the outermost shell of carbon in the methyl radical

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7. what is the other name for no-bond resonance?

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8. what is the name of the prussian blue colouerd compound formed in lassaigne's test for nitrogen in an organic compound ?

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9. SO_3 is an electrophile or nucleophile in sulphonation reaction of benzene?

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10. Name a suitable technique of the components from a mixture of calcium sulphate and comphor.

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1 Mark Question

1. Which unique property of carbon is responsible for large number of carbon compounds?

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2. How many σ and π bonds are there in propyne?

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3. What is the hybridization of carbon in ethyne?

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4. Which has the longest $C-C$ bond length among ethane, ethene and ethyne.

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5. How many secondary carbon atoms are present in 2-methylpentane?

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6. Draw stucture of 3-isopropy 2-methylhexane.

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7. draw bond line structure of $ch_3(ch_2)_6ch = ch(ch_2)_2 - c\infty h$

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8. what are the bond angels in sp^3, sp^2 and sp hybrid orbitals?

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9. write the formule of first four members of homologous series of alkyne family

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10. write the carrect of priority of the following functional groups:

$-C \equiv N,\ > C + O,\ -OH,\ -COOH,\ -CONH_2$

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11. write IUPAC name of :

(1) $CH_3 - CH_2 - CH_3$

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12. write IUPAC name of :

(2)$CH_3CH_2CH_2OH$

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13. write IUPAC name of :

(3)$CH_3CH_2CH(CH_3)-CO-CH_2CH_3$

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14. write IUPAC name of :

(4)$CH_3CH_2 = O - CH_2CH_2CH_2(CH_3)CH_3$

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15. write IUPAC name of :

(5) $CI - CH_2 - C \equiv CH$

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16. Which type of isomerism is shown by the propanal and propanone ?

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17. what is the essential condition for a compound to exhibit geomatrical isomerism?

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18. classify the following into electophiles and nucleophiles:

$H + NH_3, AICI_3, NO_2^+, H_2O, ROH, RNH_2$

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19. what type of attacking reagents are produced by heterolytic cleavage of covalent bond ?

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20. name each of the following species and indicate which member of each pair is more stable:

1. CH_3^+, $CH_3CH_2^+$

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21. name each of the following species and indicate which member of each pair is more stable:

2. $C_6H_5CH(+)CH_3$ and $CH_3CH(+)CH_3$

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22. name each of the following species and indicate which member of each pair is more stable:

3. $CH_2=CH-CH_2(+), CH(+)=CH-CH_3$

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23. name each of the following species and indicate which member of each pair is more stable:

4. $CH_3CH_2(+), CH_3-CH(+)-CH_3$

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24. identify electrophilic centre in CH_3CHO

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25. what is state oh hybridization of positively charged carbon atom in carbocation?

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26. what is the effect of introducing an alky1 group on the stability of carbocation ?

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27. Out of benzyl and ethyl carbocation which is more stable?

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28. arrange athe following in increasing order pf acidic strength:

$CICH_2COOH, CH_3CH2COOH, FCH_2COOH$

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29. name two solvents which are commenly used to dissolve organic solids

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30. name one commonly used adsorbent in column chromatography

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31. under what condition do we use fractional distillation ?

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32. which element are normally not detected in an organic compound ?

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33. for which type of compunds Kjehldahl's method is not useful?

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34. how do you precipitates sulphur in carius method?

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35. which method is used to estimate carbon and hydrogen ?

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36. what do we notice in lassaigne's test if the compound contains both nitrogen and sulphur?

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2 Marks Quetion

1. how will you account for the presence of large number of organic compund

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2. draw the structural formulae of the following compunds :

(1) ethoxypropane

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3. draw the structural formulae of the following compunds :

(2) but -1-en-3-yne

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4. draw the structural formulae of the following compunds :

(3) 3,4,4,-trimethylhex-1-yne

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5. draw the structural formulae of the following compunds :

(4) sec-butyl alcohol

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6. draw the structural formulae of the following compunds :

(5) but-enoic acid

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7. how is alky1 group represented? Given the structure and the name of the alky1 groups which orginate frome

(1) n-butane

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8. give IUPAC name of the following compunds

(1) $C_6H_5CH_2CH_2OH$

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9. give IUPAC name of the following compunds

(2)$(CH_3)_2CH_2CH_2CHO$

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10. give IUPAC name of the following compunds

(3) $CH_2 = CH - C \equiv N$

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11. $CH_3 - CH = C = CH - CH_3$

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12. give IUPAC name of the following compunds

$CH_3 - CH(CH_3) - CH = C - CH_2 - COOH$

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13. what is functional isomerism? Give two examples

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14. distinguish between position isomerism and functional isomerism

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15. What is Metamerism? Give an example.

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16. how are free radicals formed?

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17. what is the effect of introducing an alky1 group on the stability of a free radical?

Watch Video Solution

18. give two examples each of the group exerting -I and + I effect when attached to a chain of carbon atoms

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19. what do you anderstand by +R and -R effect ?

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20. hyperconjugation

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21. what is the difference between inductive and electromeric effect?

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22. all electrophiles are Lewis acid while nucleophile are Lewis bases explain

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23. what is the purpose of filtration through hot water funnel ?

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24. discuss the principle of steam distillation

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25. What is the function of fractionating column in fractional distillation?

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26. how will you prepare lassaigne's extract? Name the elements which can be detected from this extract?

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3 Marks Question

1. discuss the orbital structure of ethene

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2. how do you understand by 1°,2°,3° and 4° carban? write one example having atleast one of each type

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3. what are the various condition essential for resonance?

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4. inductive effect is to permanent nature while electromeric effect it is only temporary explain

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5. you are giving a Mixture of methanol and acetone. discuss the process which when employ to separate them

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6. Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen sulphur and halogen.

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3 Mark Questions

1. define

1 functional group 2. Homologous series

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2. HOMOLOGOUS SERIES

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3. why stability of carbocation follow the order:tertiary>secondary> primary?

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4. Write resonating structures for $CH_2 = CHCHO$. Indicate relative stability of the contributing structures :

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5. what is chromatography? name different type of chromatographic process?

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5 Mark Questions

1. what are the free radicals? justify the stability of the aliphatic primary secondary and tertiary free radicals

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2. what is a carbanion? how is it formed? discuss relative stability of primary secondary and teriary carbanion?

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3. arrange the following in the order of property indicate against each set

(1)

$-C_6H_5, \ -NO_2 - COOH, \ -I - F, \ -CH_3, \ -C_2H_5$

(In the increasing order of -i effect)

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4. arrange the following in the order of property indicate against each set

(2) $CH_3CH_2CH_2CH_2+, (CH_3)_3C+.$

$CH_3CH_2CH_2CHCH_3$(In the order of increasimg staility)

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5. arrange the following in the order of property indicate against each set

(3) $-CI,\ -CONH_2,\ -CHO$(In the incresing priority if present in same molecule)

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6. Draw the resonance stutuctures for the following compounds. Show the electron shift using curved arrow notaion.

(1)$C_6H_5NO_2$

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7. Draw the resonance stutuctures for the following compounds. Show the electron shift using curved arrow notaion.

(2) $CH_3CH = CHCHO$

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8. Draw the resonance stutuctures for the following compounds. Show the electron shift using curved arrow notaion.

(3) C_6H_5OH

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9. Draw the resonance stutuctures for the following compounds. Show the electron shift using curved arrow notaion.

(4) $C_6H_5CH_2^+$

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10. Draw the resonance stutuctures for the following compounds. Show the electron shift using curved arrow notaion.

(5) $CH_3CH=CHCH_2^+$

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11. Suggest a method to separate the constituents from the following mixture:

(1) Maxture of two miscible liquids

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12. Suggest a method to separate the constituents from the following mixture:

(2) A mixture of oil and water

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13. Suggest a method to separate the constituents from the following mixture:

(3) A mixture of plant pigments

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14. Suggest a method to separate the constituents from the following mixture:

(4) A mixture if solid benzoin acid and sodium choride

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15. Suggest a method to separate the constituents from the following mixture:

(5) o-Nitrophenol and p-Nitrophenol present in the mixture.

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Unit Test

1. Write bond line formula for the following compound

$HOCH_2CH_2CH(CH_3)CH(CH_3)COOH$

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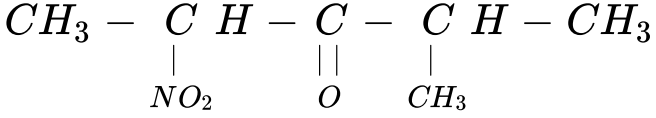
2. WRITE IUPAC name of the following compound:



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3. The cenral atom of compound $ch_2 = c = ch_2$ is ..... Hybridized

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4. The difference in molecular weight of two consecutive members of a homologous series is

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5. What type of ismomerism is exhibvbited by the following pair of compounds?

CH_3CH_2CHO and $CH_3\overset{\overset{||}{O}}{C}-CH_3$

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6. Give one example each of nucleophile and electrophile

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7. Arrage thje following uin increasing order of staboltiy: $(ch_3)_3c^-$, $ch_3 - ch - ch_3$. ch_3ch_2

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8. Write two point of difference between inductive and electromeric effect.

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9. When do we use hot water funnel for filtration?

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10. How would you isolate a mixture of two organic compoundas which have differnt solubilitties in the same solvent?

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11. An organic liqiuid decomposes below or at its boiling point. How will you purift it?

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12. Draw the resonating sturctures of

1. Phenol

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13. Draw the resonating sturctures of

2. benzaldehyde

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14. Arraange the following in the order of the order of property indicated against each set:

2.

$CH_3CH_2CH_2CH_2^+, (CH_3)_3C^+, Ch_3ch_2ch_2ch^+ch_3$

stability of carbocation

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15. Arraange the following in the order of the order of property indicated against each set:

3. $-c\infty h,\ -conh_2,\ -cho($ priority of functional group)

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16. Arraange the following in the order of the order of property indicated against each set:

4. $o_2nch_2o^-, ch_3ch_2o^-$ stability of ions

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