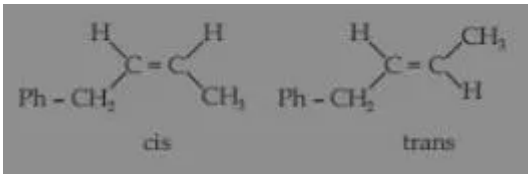
Hydrocarbons

Question 1.
Which of the following compounds will exhibit geometrical isomerism?
(a) 1 – Phenyl – 2 – butene
(b) 3 – Phenyl – 1 – butene
(c) 2 – Phenyl – 1 butene
(d) 1, 1 – Diphenyl – propene.

▼ Answer

Answer: (a) 1 – Phenyl – 2 – butene
Explanation:
$C_6H_5CH_2-CH=CH-CH_3$ (1-phenyl-2-butene) exhibits the phenomenon of geometrical isomerism due to $C_{ab} = C_{ad}$ structure, so its two isomers are possible which are given are follow:



Question 2.
Hydrocarbon containing following bond is most reactive
(a) C ≡ C
(b) C = C
(c) C – C
(d) All of these

▼ Answer

Answer: (a) C≡C
Explanation:
−C≡C−is most reactive because sp-hybridization.

Question 3.
A gas decolourised by KMno4 solution but gives no precipitate with ammoniacal cuprous chloride is
(a) Ethene
(b) Propane
(c) Propene
(d) Methane

▼ Answer

Answer: (a) Ethene
Explanation:
A gas decolourised by KMno4 solution but gives no precipitate with ammoniacal cuprous chloride is Ethene

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Question 4.
A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is _____
(a) 1, 4-dibromobutane
(b) 1, 2-dibromoethane
(c) carbon
(d) none of the above

▼ Answer

Answer: (a) 1, 4-dibromobutane
Explanation:
A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is 1, 4-dibromobutane.

Question 5.
Reaction of HBr with propene in the presence of peroxide gives:
(a) 3 – Bromo propane
(b) Allyl bromide
(c) n – Propyl bromide
(d) Isoproyl bromide

▼ Answer

Answer: (c) n – Propyl bromide

Question 6.
Which branched chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of mono substituted alkyl halide?
(a) Neopentane
(b) Carbon
(c) Isohexane
(d) Neohexane

▼ Answer

Answer: (a) Neopentane
Explanation:
Neopentane chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of mono substituted alkyl halide.

Question 7.
Aromatic compounds burn with a sooty flame because?
(a) They have a ring structure of carbon atoms
(b) They have a relatively high percentage of hydrogen
(c) They have a relatively high percentage of carbon
(d) They resist reaction with oxygen of air

▼ Answer

Answer: (c) They have a relatively high percentage of carbon
Explanation:
Due to the high percentage of carbon, a lot of carbon remains unburnt and escapes as fine particles called soot.

Question 8.
The lowest alkene, that is capable of exhibiting geometrical isomerism is
(a) Ethene
(b) But – 1- ene
(c) But – 2 – ene
(d) Propene

▼ Answer

Answer: (c) But – 2 – ene
Explanation:
The lowest alkene which is capable of exhibiting geometrical isomerism is 2-Butene

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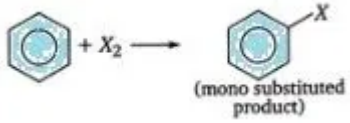
Question 9.
Which one of these is NOT TRUE for benzene?
(a) Heat of hydrogenation of benzene is less than the theoretical value
(b) There are three carbon-carbon single bonds and three carbon-carbon double bonds
(c) It forms only one type of monosubstituted product
(d) The bond angle between carbon-carbon bonds is 120o

▼ Answer

Answer: (b) There are three carbon-carbon single bonds and three carbon-carbon double bonds
Explanation:
The structure of benzene is

Bond order = (number of bonds) /(number of resonating structures) = (4/3) = 1.33
Since, the bond order is in between single and double bond, thus it contains delocalised n bonds.
Hence, it is not possible to obtain number of single and double bonds in benzene.



Question 10.
Ethyl benzene cannot be prepared by _____.
(a) Wurtz Reaction
(b) Wurtz Fittig reaction
(c) Clemmensen Reduction
(d) Carbon

▼ Answer

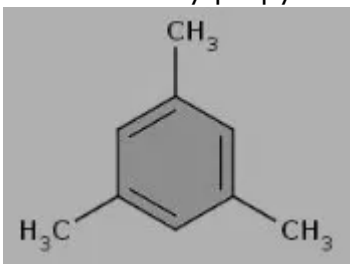
Answer: (a) Wurtz Reaction
Explanation:
Ethyl benzene cannot be prepared by Wurtz Reaction.

Question 11.
Propyne on polymerization yields
(a) Mesitylene
(b) Benzene
(c) Ethyl benzene
(d) Propyl benzene.

▼ Answer

Answer: (a) Mesitylene
Explanation:
This process is similar to the process of obtaining benzene by trimerisation of ethyne.If ethyne is

substituted by propyne leading to the formation of mesitylene.



Question 12.
A gas decolourised by KMno4 solution but gives no precipitate with ammoniacal cuprous chloride is
(a) Ethene
(b) Propane
(c) Propene
(d) Methane

▼ Answer

Answer: (a) Ethene
Explanation:
A gas decolourised by KMno4 solution but gives no precipitate with ammoniacal cuprous chloride is Ethene

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Question 13.
Among the following compounds the one that is most reactive towards electrophilic nitration is
(a) Toluene
(b) Benzene
(c) Benzoic Acid
(d) Nitrobenzene

▼ Answer

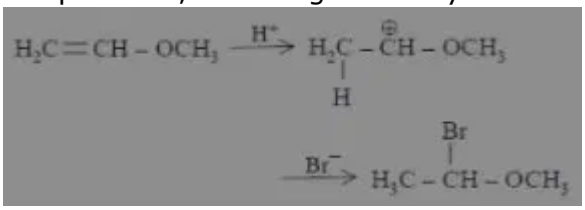
Answer: (a) Toluene
Explanation:
Toluene contains electron donating methyl group which shows +I effect and increases the electron density on benzene ring thus making it suitable for electrophilic substitution reaction.

Question 14.
HBr reacts with $CH_2 = CH - OCH_3$ under anhydrous conditions at room temperature to give
(a) CH_3CHO and CH_3Br
(b) $BrCH_2CHO$ and CH_3OH
(c) $BrCH_2 - CH_2 - OCH_3$
(d) $H_3C - CHBr - OCH_3$

▼ Answer

Answer: (d) $H_3C - CHBr - OCH_3$
Explanation:
Methyl vinyl ether is a very reactive gas. It is hydrolysed rapidly by dilute acids at room temperature to give methanol and aldehyde. However, under anhydrous conditions at room

temperature, it undergoes many addition reactions at the double bond.



Question 15.
The angle strain in cyclobutane is
(a) 24°44
(b) 29°16
(c) 19°22
(d) 9°44

▼ Answer

Answer: (d) 9°44
Explanation:
According to Baeyers strain theory, the amount of the strain is directly proportional to the angle through which a valency bond has deviated from its normal position. i.e., Amount of deviation) in cyclobutane (d) = (109°28 − 90°)/(2) = 9°44

Question 16.
The lowest alkene, that is capable of exhibiting geometrical isomerism is
(a) Ethene
(b) But – 1- ene
(c) But – 2 – ene
(d) Propene.

▼ Answer

Answer: (c) But – 2 – ene
Explanation:
The lowest alkene which is capable of exhibiting geometrical isomerism is 2-Butene

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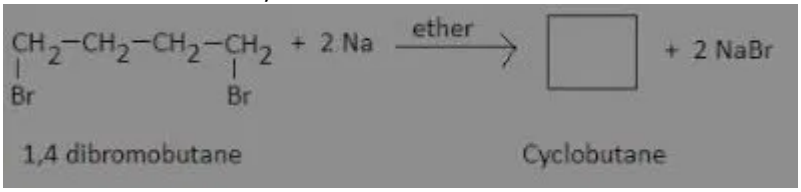
Question 17.
A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is _____.
(a) 2, 2-dibromobutane
(b) 1, 1-dibromopropane
(c) 1, 4-dibromobutane
(d) 1, 2-dibromoethane

▼ Answer

Answer: (c) 1, 4-dibromobutane
Explanation:
The derivative is 1,4 dibromobutane. This on reaction with sodium metal gives cyclobutane.



This reaction is an example of internal Wurtz reaction.

Question 18.
Phenyl magnesium bromide reacts with methanol to give
(a) A mixture of Benzene and Mg(OME) Br
(b) A mixture of Propane and Mg(OME) Br
(c) A mixture of Methane and Mg(OME) Br
(d) All of the above

▼ Answer

Answer: (a) A mixture of Benzene and Mg(OME) Br
Explanation:
Phenyl magnesium bromide reacts with methanol to give a mixture of benzene and Mg(OME)Br.

Question 19.
A gas decolourised by $KMnO_4$ solution but gives no precipitate with ammoniacal cuprous chloride is
(a) Ethane
(b) Methane
(c) Ethene
(d) Acetylene

▼ Answer

Answer: (c) Ethene
Explanation:
A gas decolourised by $KMnO_4$ solution but gives no precipitate with ammonical cuprous chloride is ethene $CH_2 = CH_2$. Since it contains carbon-carbon double bond, it reacts with $KMnO_4$. to form vicinal diol. Hence, $KMnO_4$ is decolourised.
$CH_2 = CH_2 + H_2O + (O)$ à $HO\text{-}CH_2\text{-}CH_2\text{-}OH$
Acetylene gives a precipitate with ammonical cuprous chloride.

Question 20.
When cyclohexane is poured on water, it floats because
(a) Cyclohexane is in boat form
(b) Cyclohexane is in chair form
(c) Cyclohexane is in crown fromorm
(d) Cyclohexane is less dense than water.

▼ Answer

Answer: (d) Cyclohexane is less dense than water.
Explanation:
As alkanes and cycloalkanes are non-polar molecules and are insoluble in H_2O they are also denser than H_2O and that is why can float on water.
