CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

ORGANIC CHEMISTRY: BASIC PRINCIPLES - PART II (REACTION MECHANISM)

Level I Homework

1. Number of monochloroderivatives possible for $(CH_3)_3C - CH_2 - CH(CH_3)_2$ is

A. 2

B. 3

C. 4

D. 5

Answer:

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2. How many position isomers are possible for dichlorobenzene?

A. 2

B. 3

C. 4

D. 5

Answer:

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3. Maximum enolisation takes place in

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3$

B. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - O - C_2H_5$

C. 

D. 

Answer:

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4. Cycloalkenes are isomeric with

A. Olefins

B. Alkynes

C. Alkenes

D. All of these

Answer:

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5. Number of alcohols represented by the formula $C_4H_{10}O$ are

A. 4

B. 5

C. 6

D. 7

Answer:

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6. Which of the following class of compounds shows metamerism?

A. Ethers

B. Sec. amines

C. Thio ethers

D. All

Answer:

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7. The order of decreasing stability of the following cations is

$CH_3 - \underset{I}{\overset{+}{C}}H - CH_3$,

$CH_3 - \underset{II}{\overset{+}{C}}H - O - CH_3$,

$CH_3 - \underset{III}{\overset{+}{C}}H - \overset{\overset{O}{||}}{C} - CH_3$: $III > II > I$,

$I > II > III, II > I > III, I > III > II$

A. III gt II gt I

B. I gt II gt III

C. II gt I gt III

D. I gt III gt II

Answer:

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8. Which of the following is least basic?

A. Benzyl amine

B. o-nitro aniline

C. m-nitro aniline

D. p-nitro aniline

Answer:

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9. Which of the following represents position isomerism?

A. alcohol and ether

B. alkane nitrile and carbyl amine

C. alkadienes and alkynes

D. n-propyl alcohol and isopropyl alcohol

Answer:

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10. How many π electron are there in the following species?

A. 2

B. 4

C. 6

D. 8

Answer:

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11. In nitrating mixture nitric acid acts as

A. Electrophile

B. Nucleophile

C. Acid

D. Base

Answer:

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12. Shifting of electrons of a multiple bond under the influence of a reagent is

A. I-effect

B. R-effect

C. E-effect

D. T-effect

Answer:

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13. Propene is more stable than ethene due to

A. Hyper conjugation

B. Resonance

C. Inductive effect

D. Electromeric effect

Answer:

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14. Least basic compound is

A. Aniline

B. Benzyl amine

C. Acetamide

D. p-methoxy aniline

Answer:

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15. Which carbocation is most stabilised

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16. Tertiary alkyl halides are practically inert to substitution by SN^2 mechanism because of

A. Steric hindrane

B. Inductive effect

C. Instability

D. Solubility

Answer:

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17. Among the following the most stable carbonium ion is

A. Sec. butyl

B. tert-butyl

C. n-butyl

D. Methyl

Answer:

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18. Arrange the following In the increasing order of stability

$(CH_3)_2CH^+, CH_3-CH_2^+, (CH_3)_3C^+$

A. P gt Q gt R gt S

B. S gt Q gt R gt P

C. S gt R gt P gt Q

D. R gt S gt P gt Q

Answer:

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19. Which alkyl halide is preferentially hydrolysed by S_N1 mechanism?

A. $CH_3 - Cl$

B. $CH_3 - CH_2 - Cl$

C. $CH_3 - CH_2 - CH_2 - Cl$

D. $(CH_3)_3 - C - Cl$

Answer:

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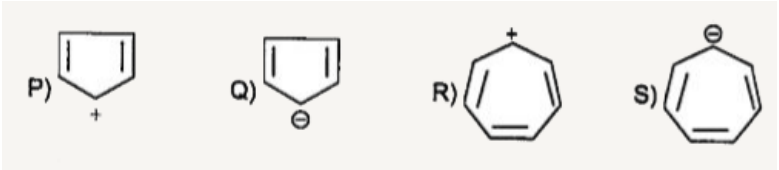
20. Among the cyclic ions, aromatic character is shown by



A. P and S

B. Q and S

C. Q and R

D. PQRS

Answer:

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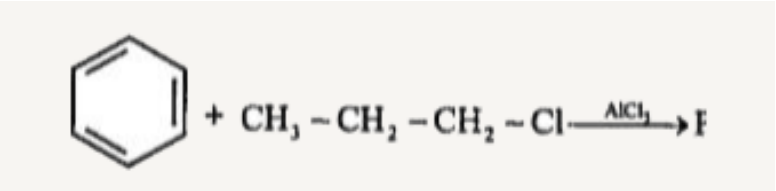
21.



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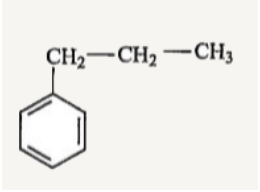
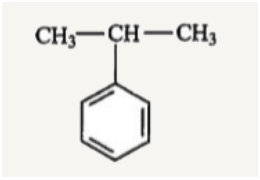
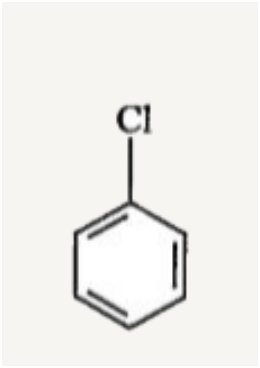
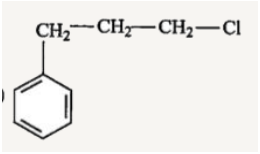
A. 

B. 

C. 

D. 

Answer:

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22. Chlorination of toluene in presence of light and heat followed by treatment with aqueous NaOH gives

A. o-cresol

B. p-cresol

C. 2, 4-dihydroxy benzene

D. Benzoic acid

Answer:

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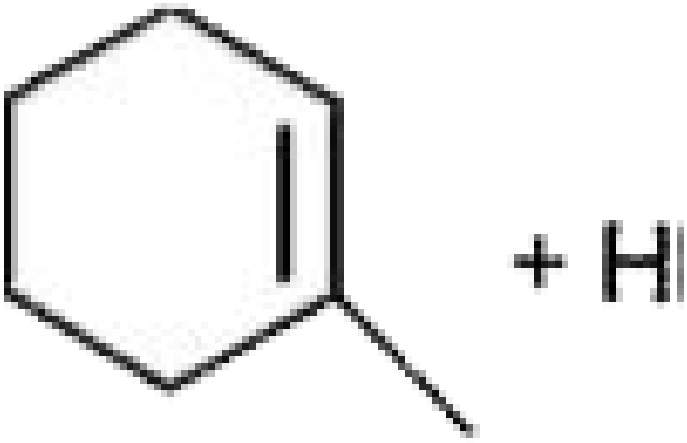
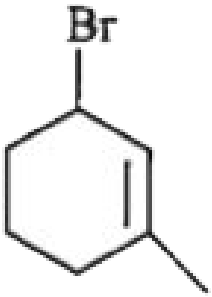
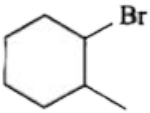
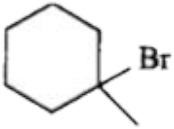


23.

$+HBr \xrightarrow{\text{peroxide}}$ product is

A. 

B. 

C. 

D. None

Answer:

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24. Which of the following is the predominant product in the reaction of HOBr with propene?

A. 2-bromo-1-propanone

B. 3-bromo-1-propanol

C. 2-bromo-2-propanol

D. 1-bromo-2-propanol

Answer:

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25. Most reactive towards nucleophilic addition is:

H C H O

C H 3 C H O

C H 3 − C O − C H 3

C 6 H 5 C H O

A. $HCHO$

B. CH_3CHO

C. $CH_3 - CO - CH_3$

D. C_6H_5CHO

Answer:

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26. The order of reactivities of the following alkyl halides for a SN^2 reaction is

A. R-F gt R - CI gt R - Br gt R - I

B. R - F gt R - Br gt R - CI gt R - I

C. R - CI gt R - Br gt R - F gt R - I

D. RI gt R - Br gt R - CI gt R - F

Answer:

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27. $ROH + SOCl_2 \rightarrow R - Cl + SO_2 + HCl$

mechanism is :

A. SN^1

B. SN^2

C. SE

D. None

Answer:

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28. Which has $+R$ effect?

A. $\dot{\ddot{N}}H_2$

B. CH_3

C. $COOH$

D. CN

Answer:

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29. Nitration of benzene using nitrating mixture is an example of

A. SN

B. SE

C. E^1

D. E^2

Answer:

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30. Which among the following carbonium ions will show the highest number of hyper conjugative forms

A. $\overset{+}{C}H_3$

B. $CH_3 - \overset{+}{C}H_2$

C. $(CH_3)_2\overset{+}{C}H$

D.

Answer:

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31. Which of the following intermediate has the complete octect of electrons around the central carbon atom?

A. Carbonium ion

B. Carbanion

C. Free radical

D. Carbene

Answer:

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32. Which of the following statements is false : Further nitration of nitrobenzene is difficult, The unstable intermediate in Hofmann's bromamide reaction is nitrenes, Chlorine atom is deactivating and meta directing, Triplet carbene is sp hybridised

A. Further nitration of nitrobenzene is difficult

B. The unstable intermediate in Hofmann's bromamide reaction is nitrenes

C. Chlorine atom is deactivating and meta directing

D. Triplet carbene is 'sp' hybridised

Answer:

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Level Ii

1. Which of the following represents functional isomerism?

A. Alcohols and Ethers

B. Alkane nitrile and carbyl amines

C. Alkadienes and alkynes

D. All

Answer:

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2. Of the isomeric hexanes the isomers that give the minimum and maximum number of monochloroderivatives are respectively

A. 2-methylpentane and 2, 3-dimethyl butane

B. 2, 3-dimethyl butane and n-hexane

C. 2,2-dimethyl butane and 2-methyl pentane

D. 2,3-dimethyl butane and 2-methyl pentane

Answer:

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3. Which of the following are tautomers?

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4. The type of isomerism exhibited by the compound with M.F. $C_4H_{10}O$ are

A. Chain

B. Functional

C. Chain and functional

D. Chain, functional, metamerism

Answer:

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5. Which of the following compounds will show nitro -acinitro tautomerism? : $C_6H_5 - NO_2$, $CH_3 - CH_2 - NO_2$,

$CH_3 - CH_2 - O - N = O,$

$$CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - NO_2$$

A. $C_6H_5 - NO_2$

B. $CH_3 - CH_2 - NO_2$

C. $CH_3 - CH_2 - O - N = O$

D. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - NO_2$

Answer:

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6. Maximum number of isomers including stereoisomers possible on monochlorination of the following compound is

$$CH_3 - CH_2 - \overset{\overset{H}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH_2 - CH_3$$: 5, 7, 8, 10

A. 5

B. 7

C. 8

D. 10

Answer:

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7. The total number of carbocations for the formula $C_4H_9^+$?

A. 2

B. 3

C. 4

D. 5

Answer:

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8. What type of isomerism is exhibited by the following pairs?

$$CH_3 - \overset{O}{\overset{||}{C}} - OH \text{ and } H - \overset{O}{\overset{||}{C}} - O - CH_3$$

A. functional

B. position

C. chain

D. metamerism

Answer:

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9. Vinyl alcohol and acetaldehyde are

A. Geometrical isomers

B. Tautomers

C. Chain isomers

D. Position isomers

Answer:

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10. Which group has maximum -I effect?

A. $-NO_2$

B. $-C \equiv N$

C. F

D. Cl

Answer:

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11. Which of the following acids has the lowest value of dissociation constant?

A. CH_3COOH

B. $NO_2 - CH_2 - COOH$

C. $F - CH_2 - COOH$

D. $Cl - CH_2 - COOH$

Answer:

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12. Among the acids given below

$CH_3 - CH_2 - COOH - A$

$CH_2 = CH - COOH - B$

$CH \equiv C - COOH - C$

The correct order of increasing strength is :

$A < B < C, \quad A < C < B, \quad B < A < C,$

$C < B < A$

A. A lt B lt C

B. A lt C lt B

C. B lt A lt C

D. C lt B lt A

Answer:

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13. In 1, 3-butadiene the single bond length between C_2 and C_3 is

A. $1.54A^\circ$

B. $1.34A^\circ$

C. $1.29A^\circ$

D. $1.46A^\circ$

Answer:

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14. An organic compound has five $C = C$ bonds. Heat of hydrogenation of $C = C$ bond is 28.6 Kcals. Experimental value of heat of hydrogenation is 98 Kcals. Resonance energy is

A. 45

B. 90

C. 70

D. 140

Answer:

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15. Which among the following statements are true with respect to electronic displacements in a covalent bond?

(1) Inductive effect operates through π bonds

(2) Resonance effect operates through σ

bonds

(3) Inductive effect operates through σ bond

(4) Resonance effect operates through π bond

(5) Resonance and inductive effect operates through σ bond

A. 3 & 4

B. 1 & 2

C. 2 & 4

D. 1 & 3

Answer:

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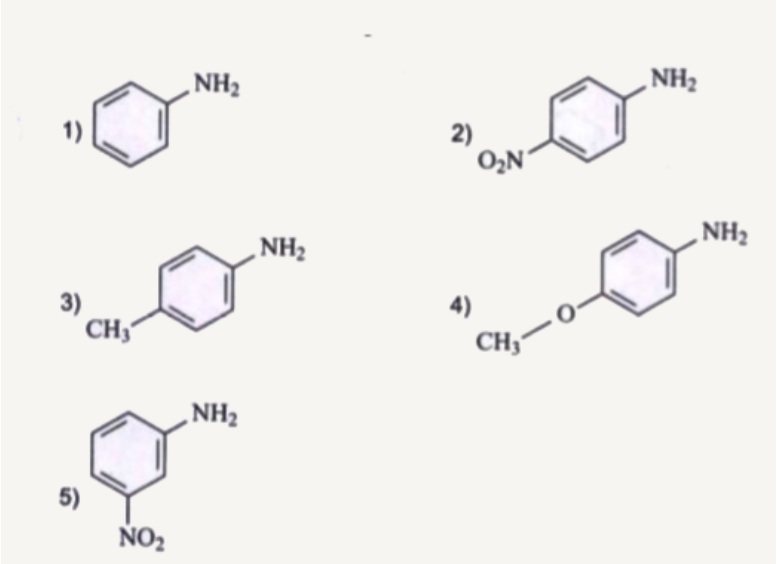
16. The correct order of increasing basic nature of the following bases is



A. $2 < 5 < 1 < 3 < 4$

B. $5 < 2 < 1 < 3 < 4$

C. $2 < 5 < 1 < 4 < 3$

D. $5 < 2 < 1 < 4 < 3$

Answer:

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17. Which among the following statements is false?

A. Benzene does not undergo addition reactions easily

B. Benzyl amine is more basic than aniline

C. Amides are more basic than the corresponding amines

D. Guanidine is an extremely strong base

Answer:

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18. Consider the following bonds

I) $C=C$ II) $C-H$ III) $C-C$ IV) $C=C$ (aromatic)

The correct sequence of these as per their increasing bond length is

A. IV < III < I < II

B. II < I < IV < III

C. IV < III < II < I

D. III < II < IV < I

Answer:

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19. The C-C single bond length in propene is less than $1.54A^{\circ}$. This shrinkage is due to

A. Resonance

B. Hyperconjugation

C. Inductive effect

D. Electromeric effect

Answer:

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20. Which among the following compounds is most stable?

A. Ethene

B. 1-butene

C. cis-2-butene

D. Trans-2-butene

Answer:

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21. Alkyl groups are orthopara directing because of

A. Inductive effect

B. Electromeric effect

C. Resonance

D. Hyperconjugation

Answer:

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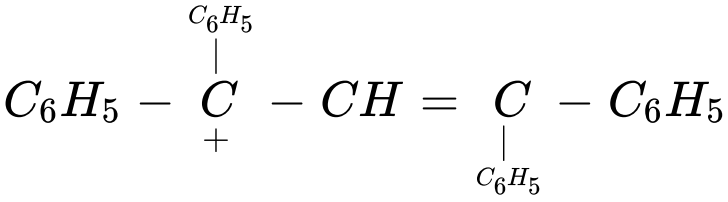
22. In given carbocation positive charge can be obtained at how many more positions?



A. 11

B. 12

C. 13

D. 17

Answer:

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23. Which of the following statements are correct?

A. Methyl carbanion is isoelectronic and isostructural with ammonia

B. $+$ I group stabilise a carbocation

C. Number of electrons associated with the central carbon atom in a carbanion is 8

D. AII

Answer:

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24. Which one of the following carbocation is most stable?

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25. Which carbocation is more stable?

A. 

B. 

C. 

D. 

Answer:

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26. The carbon-chlorine bond length is shortest in

A. $C_6H_5 - Cl$

B. $C_6H_5 - CH_2 - Cl$

C. $CH_2 = CH - Cl$

D. $CH_2 = CH - CH_2 - Cl$

Answer:

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27. Which of the following carbocation is least stable?

A. $C_6H_5 - \overset{+}{C}H_2$

B. $p - NO_2 - C_6H_4 - \overset{+}{C}H_2$

C. $p - CH_3 - O - C_6H_4 - \overset{+}{C}H_2$

D. $p - Cl - C_6H_4 - \overset{+}{C}H_2$

Answer:

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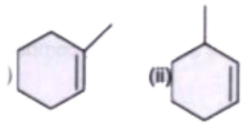
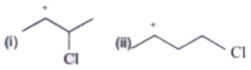
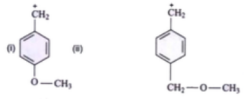
28. In which of the following pairs the second member is more stable than first?

A. 

B. 

C. (i) $C_6H_5 - \overset{+}{C}H - CH_3$ (ii) $CH_3 - \overset{+}{C}H_2$

D. 

Answer:

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29. Arrange the following In the increasing order of stability

$(CH_3)_3CH^+, CH_3CH_2^+, (CH_3)_3C^+$

A. S gt R gt Q gt P

B. P gt Q gt R gt S

C. Q gt P gt R gt S

D. P gt Q gt S gt R

Answer:

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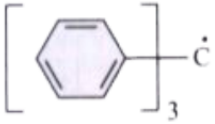
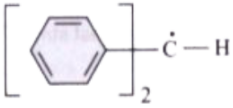
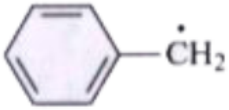
30. Which of the following free radical is most stable?

A. 

B. 

C. 

D. $CH_2 = CH - \dot{C}H_2$

Answer:

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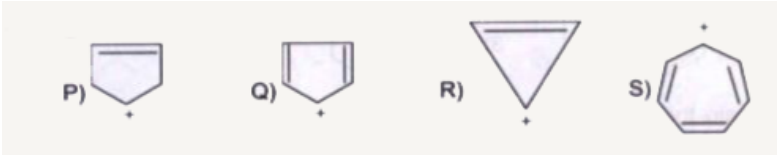
31. The stability order of the following carbocations is



A. $P > Q > R > S$

B. $R > S > Q > P$

C. $S > R > P > Q$

D. $Q > R > S > P$

Answer:

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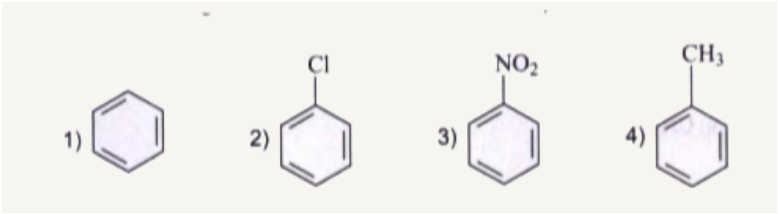
32. The decreasing order of reactivity towards electrophilic substitution of the following compounds is



A. $1 > 3 > 4 > 2$

B. $4 > 1 > 3 > 2$

C. $4 > 1 > 2 > 3$

D. $4 > 2 > 1 > 3$

Answer:

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33. Which is wrong statement?

A. SN^2 mechanism proceeds through T.S

B. SN^1 mechanism proceeds through carbonium ion

C. SN^1 mechanism is a two step mechanism

D. SN^1 mechanism results in complete inversion

Answer:

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34. Arrange the following halides in the increasing order of SN^2 reactivity?

$CH_3Cl, CH_3Br, CH_3CH_2Cl, (CH_3)_2CHCl.$

A. 3 gt 1 gt 2 gt 4

B. 1 gt 4 gt 2 gt 3

C. 1 gt 3 gt 2 gt 4

D. 4 gt 2 gt 3 gt 1

Answer:

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35. Chlorination of toluene in presence of sunlight is an example of

A. Free radical substitution

B. Electrophilic substitution

C. Nucleophilic substitution

D. Nucleophilic addition

Answer:

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36. Addition of HCN to carbonyl compounds is

A. Nucleophilic addition

B. Electrophilic addition

C. Free radical addition

D. None

Answer:

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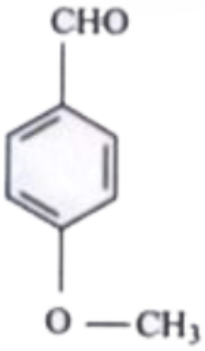
37. The most reactive of the following towards nucleophilic addition is

A.

B.

C. 

D. 

Answer:

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38. $B^{\Theta} + R - X \rightarrow B - R + X^{\Theta}$. The reaction is

A. SE

B. SN^1

C. SN^2

D. E^1

Answer:

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39. The main product of the reaction

$$CH_3 - \underset{\underset{CI}{|}}{CH} - CH_2 - CH_3 + KOH(\text{alc}) \rightarrow$$

Product is

A. $CH_3 - CH_2 - CH = CH_2$

B. $CH_3 - CH = CH - CH_3$

C. $CH_3 - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_3$

D. $HO - CH_2 - \underset{\underset{CI}{|}}{CH} - CH_2 - CH_3$

Answer:

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40. When 3,3 -dimethyl '-2' -butanol is heated with 'H_2 SO_4', the major product is 3,3 -dimethyl-1-butene 2,3 -dimethyl-2-butene 2,3 -dimethyl-1-butene

A. 3, 3-dimethyl but-1-ene

B. 3, 3-dimethyl but-2-ene

C. 2, 3-dimethyl but-2-ene

D. 2, 3-dimethyl but-1-ene

Answer:

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41. Assertion : 1-butene on reaction with HBr presence of peroxide produces 1-bromobutane Reason : It involves the formation of a primary free radical

A. Both assertion and reason are correct, reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is true reason is false

D. Assertion is false reason is true

Answer:

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42. Assertion : Tricyclopropyl methyl carbonium ion is more stable than tropylium ion.

Reason : Stability of tricycle propyl methyl carbocation is a result of conjugation between the bent orbitals of cyclopropyl ring and the vacant p-orbital of cationic carbon. (σ - resonance) : Both assertion and reason are correct, reason is the correct explanation of assertion, Both assertion and reason are correct and reason is not the correct

explanation of assertion, Assertion is true reason is false, Assertion is false reason is true

A. Both assertion and reason are correct, reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is true reason is false

D. Assertion is false reason is true

Answer:

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43. Assertion : m-chlorobenzoic acid is a stronger acid than p-chlorobenzoic acid

Reason : In p-chlorobenzoic acid both -I and +R effect of chlorine operate but in m-chlorobenzoic acid only -I effect of chlorine operates.

A. Both assertion and reason are correct, reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is true reason is false

D. Assertion is false reason is true

Answer:

44. Assertion : Allyl phenyl ether on heating rearranges to O-allyl phenol. (Claisen rearrangement)

Reason : During Claisen rearrangement a - carbon atom gets attached to the orthoposition

A. Both assertion and reason are correct, reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is true reason is false

D. Assertion is false reason is true

Answer:

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45. Assertion : Cyanides $R - C \equiv N$: are very much weaker bases than aliphatic bases.

Reason : This is due to the fact that as the nitrogen atom becomes more multiply bonded, the lone pair of electrons are accommodated in an orbital that has more 'S' character. The electron pair is thus drawn closer to the nitrogen nucleus, and held more lightly by it.

A. Both assertion and reason are correct, reason is the correct explanation of

assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is true reason is false

D. Assertion is false reason is true

Answer:

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