CHEMISTRY

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

BASIC PRINCIPLES AND TECHNIQUES IN ORGANIC CHEMISTRY

Exercise 1

1. The technique used for the separation of acetone and methanol, is

A. steam distillation

B. vacuum distillation

C. fractional distillation

D. simple distillation

Answer: C

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2. The best and latest technique for isolation, purification and separation of organic compound is

A. crystaillsation

B. distillation

C. subimation

D. chromatography

Answer: D

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3. Which of the following method is used to separate aniline from water?

A. Simple distillation

B. Fractional distillation

C. Distillation under reduced pressure

D. Steam distillation

Answer: D

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4. Which of the following mixture does not use fractional crystallisation method for their separation?

A. Sodium sulphate + sodium dichromate

B. Anthracene + benzoic acid

C. Glucose + fructose

D. $KClO_3 + KCl$

Answer: B

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5. The substance which can be used as an adsorbent in column chromatography is

A. Na_2O

B. NaCl

C. Al_2O_3

D. Alum

Answer: B

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6. The Lassaigne's extract is boiled with dil. HNO_3 before testing for halogens because

A. Ag_2S is insoluble in HNO_3

B. AgCN is soluble in HNO_3

C. Na_2S and NaCN are decomposed by HNO_3

D. silver halides are soluble in HNO_3

Answer: C

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7. The compound that does not give a blue colour in Lassaigne's test is

A. aniline

B. glycine

C. hydrazine

D. urea

Answer: C

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8. The compound formed in the positive test for nitrogen with Lassaigne's solution of an organic compound is

A. $Fe_4\left[Fe(CN)_6\right]_3$

B. $Na_3\left[Fe(CN)_6\right]$

C. $Fe(CN)_3$

D. $Na_4\left[Fe(CN)_5NOS\right]$

Answer: A

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9. The techniqu used for the separation of sugar is

A. Carius method

B. Benedict's reagent

C. chromatography

D. fractional crystallisation

Answer: D

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10. The principle involved in paper chromatography is

A. adsorption

B. partition

C. solubility

D. volatility

Answer: B

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11. When sodium extract of an organic compound is treated with an acidified solution of $FeSO_4$ and $FeCl_3$ red colouration is produced. This suggests that the organic compound contains

A. nitrogen

B. sulphur

C. halogen

D. Both nitrogen and sulphur

Answer: D

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12. Amongst the following statements, the statement which is not applicable to Beilstein's test is

A. greenish or blue green flame is due to the formation of cupric halides

B. this test is a very sensitive test and can be easily performed

C. this test confirms the presence of halogen atom

D. this test dose not tell us which halogen atom is present in the organic compound

Answer: C

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13. A gaseous hydrocarbon has 85% carbon and vapour density of 28. The possible formula of the hydrocarbon will be

A. C_3H_6

B. C_2H_4

C. C_2H_2

D. C_4H_8

Answer: D

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14. In Kjeldahl's method, the gas evolved from 1.325g sample of fertilizer is passed into 50.0 mL of 0.2030N H_2SO_4. 25.32 mL of 0.1980 N NaOH are required for percentage of nitrogen in fertilizer ?

A. 0.025

B. 0.0543

C. 0.0648

D. 0.1202

Answer: B

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15. Match the following and choose the correct option.

A. $\begin{matrix} A & B & C & D \\ 2 & 4 & 1 & 3 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 3 & 4 & 1 & 2 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 4 & 2 & 3 & 1 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 4 & 1 & 3 & 2 \end{matrix}$

Answer: B

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16. If 0.1 g of an oranic compound containing phosphorus produces 0.222g of $Mg_2P_2O_7$ the percentage of phosphorus present in the compound is

A. 31

B. 0.2

C. 66

D. 62

Answer: D

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17. An organic compound contains 49.3 % carbon,6.84 % hydrogen and its vapour density is 73 Molecular formula of the compound is

A. $C_3H_5O_2$

B. $C_3H_{10}O_2$

C. $C_4H_{10}O_2$

D. $C_6H_9O_3$

Answer: D

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18. The incorrent statement ragarding the estimation of nitrogen through Kjeldahl's method is

A. $CuSO_4$/ Hg acts as a catalyst

B. K_2SO_4 is used for elevating the boiling point of H_2SO_4

C. N_2 gets collected over the solution of potash

D. nitrogen quantitatively decomposed to give ammonium sulphate

Answer: D

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19. The first organic compound synthesised in the laboratory from an inorganic compound is

A. acetic acid

B. acetylene

C. methane

D. urea

Answer: D

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20. The IUPAC name for

$CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - OH$ is :

A. 1-hydroxypentane-1, 4-dione

B. 1, 4-dioxopentanol

C. 1-carboxybutane -3-one

D. 4-oxopentanoic acid

Answer: D

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21. The different members of a homologous series possess

A. different molecular weights

B. different general formulae

C. different methods of preparation

D. different chemical properties

Answer: A

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22. The IUPAC name for

A. 1-chloro-2-nitro-4-methylbenzne

B. 1-chloro-4-methyl-2-nitrobenzene

C. 2-chloro-1-nitro-5-methylbenzene

D. m-nitro-p-chlorotoluene

Answer: B

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23. The systematic name of $PhCH_2COOH$ is

A. 2-phenylethanoic acid

B. phenylmethly carboxylic acid

C. 2-phenylmethyl carboxylic acid

D. benzene acetic acid

Answer: A

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24. Convalent bond can undergo fission in two different ways. The correct representation involving a heterolytic fission of $CH_3 - Br$ is

A. 

B. 

C. 

D. None of the above

Answer: B

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25. The bond that undergoes heterolytic cleavage most readily is

A. C-O

B. C-C

C. C-H

D. O-H

Answer: A

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26. The correct stability order for the following species is

A. $II > IV > I > III$

B. $I > II > III > IV$

C. $II > I > IV > III$

D. $I > III > II > IV$

Answer: D

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27. Hyperconjugation involves overlap of the following orbitals :

A. $\sigma - \sigma$

B. $\sigma - p$

C. p-p

D. $\pi - \pi$

Answer: D

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28. Among the following the least stable resonance structre is

A. 

B. 

C. 

D. 

Answer: A

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29. Arrange the carbanions, $(CH_3)_3\overline{C}, \overline{C}Cl_3, (CH_3)_2\overline{C}H, C_6H_5\overline{C}H_2$, in order of their decreasing stability

A. $C_6H_5\overline{C}H_2 > \overline{C}Cl_3 > (CH_3)_3\overline{C} > (CH_3)_3\overline{C} > (CH_3)_2\overline{C}H$

B. $(CH_3)_2\overline{C}H > \overline{C}Cl_3 > C_6H_5\overline{C}H_2 > (CH_3)_3\overline{C}$

C. $\overline{C}Cl_3 > C_6H_5\overline{C}H_2 > (CH_3)_2\overline{C}H > (CH_3)_3\overline{C}$

D. $\overline{C}Cl_3 > C_6H_5\overline{C}H_2 > (CH_3)_2\overline{C}H > (CH_3)_3\overline{C}$

Answer: C

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30. Which is the most stable carbocation ?

A. 

B. 

C. 

D. 

Answer: C

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31. Which is not the intermediate formed by the unsymmetrical fission cleavage of covalent bonds?

A. Free radicals

B. Carbocation

C. Carbonium ion

D. Carbanion

Answer: A

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32. Consider the following carbocations,

$$\underset{I}{(CH_3)_3C\overset{+}{C}H_2}, \underset{II}{(CH_3)_3C^+}, \underset{III}{CH_3C H_2\overset{+}{C}H_2}, \underset{IV}{CH_3\overset{+}{C}H} - CH_3$$

The correct order for the stability of the above carbocations is

A. $I < III < IV < II$

B. $III < IV < I < II$

C. $IV < III < II < I$

D. $II < IV < III < I$

Answer: A

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33. The geometry of $\dot{C}H_3$ is

A. pyramidal

B. linear

C. tetrahedral

D. planar

Answer: D

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34. Which one of the following species is not an electrophile?

A. $\overset{+}{N}O_2$

B. H_3O^+

C. Cl^+

D. BH_3

Answer: B

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35. The correct stability order of the following free radicals is

A. $(CH_3)_2\dot{C}H < (CH_3)_3\dot{C} < (C_6H_5)_2\dot{C}H$

B. $(C_6H_5)_2\dot{C}H < (C_6H_5)_3\dot{C} < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$

C. $(C_6H_5)_3\dot{C}H < (C_6H_5)_2\dot{C}H < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$

D. $(CH_3)_2\dot{C}H < (CH_3)_3\dot{C}H < (C_6H_5)_3\dot{C}$

Answer: D

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36. Electrophillic addition reaction proceed in two steps. The first step involves the addition of an electrophile. Name the type of intermediate formed in the first step of the following addition reaction.

$H_2C - HC = CH_2 + H^+ \rightarrow$?

A. 2° carbocation

B. 1° carbocation

C. 2° carbanion

D. 1° Carbanion

Answer: A

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37. $CH_3\underset{\underset{CH_3}{|}}{C}HCH = CH_2 + HBr \rightarrow A$, A (predominant is

A. $CH_3\underset{\underset{CH_3}{|}}{C}H\underset{\underset{Br}{|}}{C}HCH_2$

B. $CH_3CH\underset{\underset{CH_3}{|}}{C}H_2CH_2Br$

C. $CH_3\overset{\overset{Br}{|}}{\underset{\underset{CH_3}{|}}{C}}CH_2CH_3$

D. None of these

Answer: C

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38. Classify the following reactions,

$$CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2Br + C_2H_5\overline{O} \rightarrow$$

II. $$CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2Br + C_2H_5OH \rightarrow$$

A. $I: S_N1, II: S_N2$

B. $I: S_N2, II: S_N1$

C. Both S_N1

D. Both S_N2

Answer: B

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39. Increasing order of the following alkyl halides for S_N1 reaction is $CH_3Cl(I), CH_3\underset{Cl}{CH}CH_3(II), (CH_3)_3CCl(III)$

A. $I < II < III$

B. $II < I < III$

C. $III < I < II$

D. $I < III < II$

Answer: A

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40. $CH_2 = CHCH_3$ undergoes free radical substitution using NBS. Product formed is

A. $CH_2CH = CHBr$

B. $CH_3\underset{\underset{Br}{|}}{C}H\underset{\underset{Br}{|}}{C}H_2$

C. $CH_2 = CHCH_2Br$

D. $CH_2 = \underset{\underset{Br}{|}}{C}CH_3$

Answer: C

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Exercise 2

1. When CH_3Cl undergoes homolytic bond-fission

A. carbon undergoes a geometric changed from tetrahedral to planar

B. hybridisation changed from $sp^3 \text{to} sp^2$

C. Both of these takes place

D. None of the above

Answer: C

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2. Which one of the following C-H bonds is the wekest for homolytic fission ?

A. $CH_3 - H$

B. $(C_6H_5)CH_2 - H$

C. $C_6H_5 - H$

D. $(C_6H_5)_3C - H$

Answer: D

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3. In which of the following ways does the hydride ion tend to function ?

A. an electrophile

B. A nucleophile

C. A free radical

D. An acid

Answer: B

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4. Most stable radical is

A. $CH_2 = \dot{C}H$

B. $CH_2 = CH\dot{C}H_2$

C. 

D. 

Answer: D

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5. Select the incorrect statement .

A. Electron-withdrawing inductive effect of the carbonyl group in- COOH groups weaknes the O-H bond and favours ionisation of carboxylic acid compared with an alcohol

B. Inductive effect of the chlorine destablises the acid and stabilises the conjugate base

C. Aniline is a weaker base than ammonia

D. Phenol is a weaker acid than water

Answer: D

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6. Dehydrobromination (-HBr) of the following in increasing order is

A. $I < II < III$

B. $III < II < I$

C. $I = II < III$

D. $III < I < = II$

Answer: A

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7. The structural formula of 2-oxo-3-methyl-(N-bromo) butanamide is

A. $CH_3 - CH_2 - CO - CO - NH - Br$

B. $CH_3 - \overset{CH_3}{\overset{|}{C}}H - CO - NH - Br$

C. $CH_3CH - CO - CO - \overset{CH_3}{\overset{|}{N}}OBr$

D. $(CH_3)_3C - CO - CO - NHBr$

Answer: B

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8. Indicate the wrongly named compound

A. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2 - CHO$

$(4-\text{methyl-1-pentanal})$

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - C \equiv C - COOH$

$(4-\text{methyl-2-pentyn-1-oic acid})$

C. $CH_3CH_2CH_2 - \underset{\underset{CH_3}{|}}{CH} - COOH$

$(2-\text{methyl-1-pentanoic acid})$

D. $CH_3CH = CH - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

$(3-\text{hexen-2-one})$

Answer: D

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9. The most stable carbanion is

A. $Ph\overset{\Theta}{C}H_2$

B. 

C. 

D. $PhCH_2CH_2\overset{\Theta}{C}H_2$

Answer: C

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10. The most stable free radical among the following is

A. $PhCH_2\dot{C}H_2$

B. $Me\dot{C}H_2$

C. $Me\dot{C}H$

D. $Ph\dot{C}HMe$

Answer: D

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11. $CH_3\dot{H}_2$ disproportionates to

A. $CH_2 = CH_2$ and CH_3CH_3

B. $CH_2 = CH_2$ and $CH_3CH_2CH_2CH_3$

C. CH_3CH_3

D. $CH_2 = CH_2$

Answer: A

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12. Additionof HCI to 3,3 dimethyl but-1-ene yields two products, one of which has a rearranged carbon skeleton. Which of the following cations are intermediates in that reaction ?

$(CH_3)_3\underset{I}{\overset{\oplus}{C}}CHCH_2Cl$ $(CH_3)_3\underset{II}{\overset{\oplus}{C}}CHCH_3$

$(CH_3)_2\underset{III}{\overset{\oplus}{C}}(Cl)(CH_3)_2$ $(CH_3)_2\underset{IV}{\overset{\oplus}{C}}CH(CH_3)_2$

A. Both I and II

B. Both I and III

C. Both II and III

D. Both II and IV

Answer: D

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13. Basic strength of $CH \equiv \overset{\Theta}{C}(l), CH_2 = \overset{\Theta}{C}H(II)$ and $CH_3\overset{\Theta}{C}H_2(III)$ will be in order

A. $I < II < III$

B. $II < III < I$

C. $III < II < I$

D. $III < I < = II$

Answer: A

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14. Electrophile $\overset{\oplus}{N}O_2$ attacks the following

In which cases $\overset{\oplus}{N}O_2$ will be at meta-position ?

A. Both I and IV

B. I,II and III

C. Both II and III

D. Only I

Answer: B

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15. Major organic product fomred from the following sequence of reactions is

A. 

B. 

C. 

D. 

Answer: C

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16. Among the following, which is least acidic ?

A. phenol

B. o-cresol

C. p-nitrophenol

D. p-chlorophenol

Answer: B

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17. In which of the following compounds, does the substituent not exert its resonance effect?

A. $C_6H_5NH_2$

B. $C_6H_5\overset{+}{N}H_3$

C. C_6H_5OH

D. C_6H_5Cl

Answer: B

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18. When acidified sodium extract of organic compound is treated with acetic cid and lead acetate, blacke precipitate is obtained. This suggests that the organic compund contains

A. halogen

B. phosphorus

C. sulphur

D. nitrogen

Answer: C

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19. The formation of yellow precipitate by the addition of solution of ammonium molybdate to the sodium extract of an organic compound confirms the presene of

A. chlorine

B. sulphur

C. phosphorus

D. nitrogen

Answer: C

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20. In Carius tube, the compound $ClCH_2COOH$ was heated with fuming HNO_3 and $AgNO_3$. After filtration and washing, a white precipitate was formed. The precipitate is of

A. $AgSO_4$

B. $AgNO_3$

C. $ClCH_2COOAg$

D. $AgCl$

Answer: D

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