NARAYANA EDUCATIONAL INSTITUTIONS

SR - CHE - CARBOXYLIC ACID - DPT

1. IUPAC name of valeric acid

   1) Propionic acid 2) Butyric acid 3) Pentanoic acid 4) 2-methyl butanoic acid

2. $C_6H_5MgBr \xrightarrow[H_3O^+]{CO_2} P$

   In the above reaction product P is

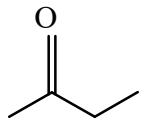
   1) Phenol 2) Benzoic acid 3) Benzaldehyde 4) Benzophenone

3. Among ethanol (I) Acetic acid (II) , Phenol (III) and benzoic acid (IV) , the correct order of increasing acid strength is

   1) I<II<III<IV 2) I<III<II<IV 3) I<III<IV<II 4) III<IV<I<II

4. Predict the product C in the following series of reactions

$$CH_3-COOH \xrightarrow{PCl_5} A \xrightarrow[Anhyd.AlCl_3]{C_6H_6} B \xrightarrow{CH_3MgBr} C$$

   1)  2) $CH_3CH(OH)C_6H_5$ 3) $CH_3CH(OH)C_2H_5$ 4) $(CH_3)_2C(OH)C_6H_5$

5. Correct acidic strength of the following carboxylic acids

   A) C_6H_5COOH B) $o-NO_2(C_6H_4)COOH$

   C) $p-NO_2(C_6H_4)COOH$ D) $m-NO_2(C_6H_4)COOH$

   1) A>B>C>D 2)B>C>D>A 3)B>D>A>C 4)B>D>C>A

6. In the following reaction, X and Y are respectively $CH_3COOH + NH_3 \rightarrow X \xrightarrow{\Delta} Y + H_2O$.

   1) $CH_3CONH_2; CH_4$ 2) $CH_3COONH_4; CH_3CONH_2$

   3) $CH_3CONH_2; CH_3COOH$ 4) $CH_3NH_2; CH_3CONH_2$

7. $CH_3COOH \xrightarrow{1mole\,Cl_2/Red\,P} A \xrightarrow{KCN} B \xrightarrow{H^+/H_2O} C$. Hence C is

   1) Oxalic acid 2) Maleic acid 3) Fumaric acid 4) Malonic acid

8. Among the following acids, which has the lowest p^{K_a} value ?

   1) CH_3COOH 2) $HCOOH$ 3) $(CH_3)_2CH-COOH$ 4) CH_3CH_2COOH

9. The reagent that can be used to distinguish between phenol and ethanoic acid is

   1) Ammonical silver nitrate solution 2) Fehling solution

   3) Phenolphthalein 4) Sodium carbonate solution

10. Compound A reacts with PCl_5 to give B which on treatment with KCN followed by hydrolysis gave propionic acid. What are A and B respectively?

    1) C_3H_8 & C_3H_7Cl 2) C_2H_6 & C_2H_5Cl 3) C_2H_5OH & $C_2H_4Cl_2$ 4) C_2H_5OH & C_2H_5Cl

11. Aqueous 10% $NaHCO_3$ solution is used as a reagent for identifying X . Which one of the following compound yields X on hydrolysis?

    1) $CH_3CO_2C_2H_5$ 2) $C_2H_5-O-C_2H_5$ 3) CH_3CHO 4) CH_3-CH_2-OH

12. Methyl alcohol when reacted with carbon monoxide using cobalt or rhodium as catalyst, compound A is formed A on heating with HI in the presence of red phosphorus as catalyst, B is formed . Identify B

1) CH_3COOH 2) CH_3CHO 3) CH_3CH_2I 4) CH_3CH_3

13. Formic Acid and acetic acid can be distinguished by

1) Baeyer's reagent 2) Tollen's reagent 3) Litmus paper 4) Sodium bicarbonate

14. The organic compounds A and B react with sodium metal and release H_2 gas . A and B react together to give ethyl acetate. Then A and B are

1) HCOOH and C_2H_5OH 2) C_2H_5OH and CH_3COOH

3) CH_3COOH and CH_3OH 4) CH_3COOH and HCOOH

15. $CaC_2 \xrightarrow{H_2O} A + B. A \xrightarrow{HgSO_4+H_2SO_4} C.$ C $\xrightarrow{K_2Cr_2O_7+H_2SO_4} D$. Here A,B,C and D are respectively.

1) $CH \equiv CH, Ca(OH)_2, CH_3CHO \& CH_3COOH$

2) $Ca(OH)_2, CH \equiv CH, CH_3CHO \& (CH_3COO)_2 Ca$

3) $CH \equiv CH, Ca(OH)_2, CH_3CHO \& (CH_3COO)_2 Ca$

4) $CH \equiv CH, CH_3CHO, Ca(OH)_2 \& (CH_3COO)_2 Ca$

16. What are A,B and C in the following reactions?

$CH_3CO_2Na \xrightarrow{Soda\,lime/\Delta} A, CH_3CO_2H \xrightarrow{LiAlH_4} B,\ \ CH_3CO_2Na \xrightarrow{Kolbe's\,electrolysis} C$

	A	B	C
1)	C_2H_6	C_2H_5OH	CH_4
2)	CH_4	C_2H_5OH	C_2H_6
3)	C_2H_6	CH_3COCH_3	C_3H_8
4)	$(CH_3CO)_2O$	C_2H_6	C_2H_6

17. Identify A,B and C in the following reactions

$$CH_3Cl \xrightarrow{KCN} A \xrightarrow[H_3O^{(+)}]{Hydrolysis} B \xrightarrow[\Delta]{C_2H_5OH\,/\,H^+} C$$

	A	B	C
1)	CH_3NC	CH_3NHCH_3	$CH_3N(CH_3)C_2H_5$
2)	CH_3CN	CH_3CONH_2	CH_3CO_2H
3)	CH_3CN	CH_3CO_2H	$CH_3CO_2C_2H_5$
4)	CH_3CN	CH_3CO_2H	$(CH_3CO)_2O$

18. What is Z in the following sequence of reactions?

$$Phenol \xrightarrow{Zn\,dust} X \xrightarrow[anhyd.AlCl_3]{CH_3Cl} Y.Y \xrightarrow[KMnO_4]{alkaline} Z$$

1) Toluene 2) Benzene 3) Benzoic acid 4) Benzaldehyde

19. The major product of nitration of benzoic acid is

1) 3-nitro benzoic acid 2) 4-nitro benzoic acid

3) 2-nitro benzoic acid 4) 2,4-dinitro benzoic acid

20. Consider an esterification of isotopically labelled carboxylic acid

$$CH_3 - \overset{\overset{O}{\|}}{C} - \overset{18}{O}H + CH_3CH_2OH \xrightarrow{H^+} (A) \& (B)$$

Compounds (A) and (B) respectively are

1) $CH_3-\overset{\overset{O}{\|}}{C}-{}^{18}OC_2H_5; H_2O$

2) $CH_3-\overset{\overset{O}{\|}}{C}-OC_2H_5; H_2O^{18}$

3) $CH_3-\overset{\overset{O}{\|}}{C}-OC_2H_5; H_2O$

4) $CH_3-\overset{\overset{O}{\|}}{C}-{}^{18}OC_2H_5; H_2O^{18}$

21. Number of π electrons in pthalic acid is _____
22. Number of oxygen atoms present in product. Which is formed by the oxidation of toluene with alkali $KMnO_4$
23. How many of the following more acidic than Benzoic acid.
$CH_3COOH,\ HCOOH, NO_2-COOH, C_6H_5-CH_2-COOH, CH_3-CH_2-COOH$
24. How many of the following not involved in HVZ reaction

$$CH_3CH_2COOH, HCOOH,\ C_6H_5-COOH,\ CH_3-\underset{\underset{CH_3}{|}}{CH}-COOH,\ CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{CH}}-COOH$$

25. Sodium ethanoate on decarboxylation to form a product. Number of σ bonds in the product is
26. Number of Lone pairs x, σ bonds y, π bonds z in acetamide. Then sum of x,y,z is _____
27. $3R-COOH + PCl_3 \longrightarrow 3RCOCl + x$. Basicity of x is _____
28. $R-COOH + SOCl_2 \longrightarrow RCOCl + x + HCl$.
Product of σ and π bonds in x is
29. In 4 – methoxy Benzoic acid number of oxygen atoms attached to aryl groups
30. Styrene formula C_xH_y. Product of x & y is _____

KEY

1) **3**	2) **2**	3) **2**	4) **4**	5) **2**	6) **2**	7) **4**	8) **2**	9) **4**	10) **4**
11) **1**	12) **4**	13) **2**	14) **2**	15) **1**	16) **2**	17) **3**	18) **3**	19) **1**	20) **2**
21) **10**	22) **2**	23) **2**	24) **3**	25) **4**	26) **12**	27) **2**	28) **4**	29) **1**	30) **64**

SOLUTIONS

1. Valeric acid $CH_3CH_2CH_2CH_2COOH$
2. - I E Groups increases the acidic strength
3. $A = CH_3COCl$

$$B = C_6H_5-\overset{\overset{O}{\|}}{C}-CH_3$$

$$C = CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}}-C_6H_5$$

4. Presence of –I.E, -R effect groups , acidic strength is high
5. $X = CH_3COONH_4, Y = CH_3CONH_2$

6. $A = \underset{Cl}{CH_2} - COOH, B = \underset{CN}{CH_2} - COOH, C = \underset{COOH}{CH_2} - COOH$

7. Acidic strength $\propto \frac{1}{p^{K_a}}$

8. Na_2CO_3 solution

9. $A = C_2H_5OH, B = C_2H_5Cl$

10. $$CH_3COOC_2H_5 \xrightarrow[H^+]{H_2O} \underset{\otimes}{CH_3COOH} + C_2H_5OH$$

CH_3COOH can be identified by $NaHCO_3$ solution

11. $$CH_3OH + CO \xrightarrow{Co/Rh} \underset{(A)}{CH_3COOH} \xrightarrow[red\ p]{HI} \underset{(B)}{CH_3CH_3}$$

12. Formic acid reduces Tollen's reagent

$\because$ Formic acid contain $H - \overset{\overset{O}{\|}}{C} - group$

13. Absence of α -hydrogen

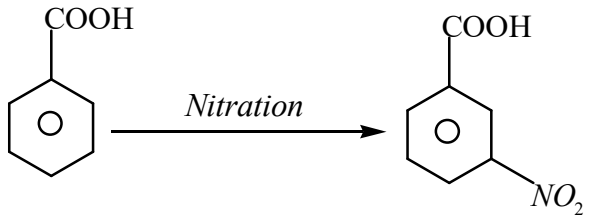
14. $CH_3COOH + C_2H_5OH \xrightarrow{H^+} CH_3COOC_2H_5 + H_2O$

15. $A = CH \equiv CH$; $B = Ca(OH)_2$; $C = CH_3 - CHO$; $D = CH_3COOH$

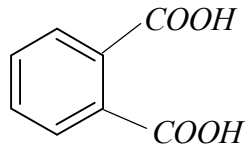
16. A=CH_4,B=C_2H_5OH,C=C_2H_6

17. A=CH_3CN,B=CH_3COOH, C=$CH_3COOC_2H_5$

18. X=C_6H_6 ; Y= C_6H_5-CH_3, Z=C_6H_5-COOH

19. 

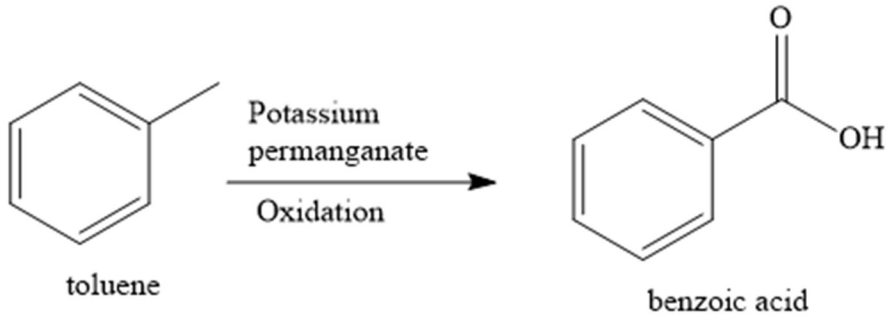
20. Esterfication

21. 

π bonds $= 5$

$\pi e^- = 5 \times 2 = 10$

22.



No. of oxygen atoms = 2

23. $HCOOH$, $NO_2 - COOH$ are more acidic than benzoic acid

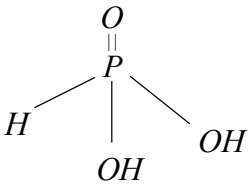
24. α H are not present in $HCOOH$, C_6H_5COOH and $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - COOH$

25. $CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$

σ *bonds* $= 4$

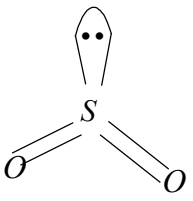
26. $CH_3 - \overset{\overset{\cdot\cdot}{O}:}{\overset{||}{C}} - \overset{\cdot\cdot}{N}H_2$ L.P x = 3 $\sigma = 8$, $\pi = 1$ $x + y + z = 8 + 3 + 1 = 12$

27. $x = H_3PO_3$



Basicity is 2

28. $x = SO_2$

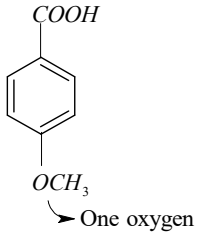


$\sigma = 2$

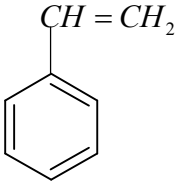
$\pi = 2$

$\sigma + \pi = 4$

29.



30. C_8H_8



x = 8, y = 8 $\Rightarrow 8 \times 8 = 64$