ORGANIC CHEMISTRY.

(PART 2.)

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(1) Normal butyric acid has the formula $CH_3 \cdot CH_2 \cdot CH_2 \cdot COOH$. For its preparation see Art. **75.**

(2) See Art. **7.**

(3) From the equations showing the synthetical preparation of citric acid given in Art. **157,** we see that 58 parts of acetone and 142 parts of chlorine are necessary to obtain 192 parts of citric acid; hence,

192 : 58 = 228.39 : 68.97 grams of acetone;

192 : 142 = 228.39 : 168.89 grams of chlorine.

As 1 liter of chlorine weighs 3.17 grams, 168.89 grams = 53.28 liters.

68.97 grams acetone.
53.28 liters chlorine. } Ans.

(4) Potassium xanthate is formed according to the equation:

$$\underset{46}{C_2H_5 \cdot OH} + \underset{76}{CS_2} + \underset{56}{KOH} = \underset{160}{C_2H_5 \cdot O \cdot CS_2K} + \underset{18}{H_2O}$$

Using formula **8,** *Theoretical Chemistry,*

$$W = \frac{Mw}{m}.$$

Substituting the known values, we obtain

$$W = \frac{46 \times 192}{160} = 55.2 \text{ grams.} \quad \text{Ans.}$$

(5)

$CH_3 \cdot OH$ methyl alcohol	$CH_3 \cdot CO_2H$ acetic acid
$C_2H_5 \cdot OH$ ethyl alcohol	$C_2H_5 \cdot CO_2H$ propionic acid
$C_4H_9 \cdot OH$ butyl alcohol	$C_4H_9 \cdot CO_2H$ valeric acid
$C_8H_{17} \cdot OH$ octyl alcohol	$C_8H_{17} \cdot CO_2H$ pelargonic acid

(6) Compounds obtained by synthesis are optically inactive.

(7) See Art. **128.**

(8) Monochlor-acetic acid.

(9) Acetic acid $CH_3 \cdot CO_2H$; carbon dioxide CO_2; and water H_2O.

(10) See Art. **11.**

(11) See Art. **128.**

(12) Sodium stearate.

(13) See Art. **5.**

(14) An optically active organic compound is one which possesses the property of turning the plane of polarization, and it is a compound which possesses one or more asymmetric carbon atoms.

(15) Citric acid has the formula $C_3H_4(OH)(CO_2H)_3$. Its adulteration with tartaric acid is detected by adding to a citric-acid solution some potassium-acetate solution, which precipitates the tartaric acid, if present, as white, crystalline cream of tartar.

(16) Salicylic aldehyde, or oil of meadowsweet.

(17)
$$\underset{90}{CO_2H \cdot CO_2H} = \underset{46}{H \cdot CO_2H} + \underset{44}{CO_2}$$

Using formula **8**, *Theoretical Chemistry*,

$$W = \frac{M\,w}{m}$$

Substituting the known values, we obtain

$$W = \frac{90 \times 100}{46} = 195.65 \text{ kilos.} \quad \text{Ans.}$$

(18) See Art. **109.**

(19) (*a*) $C_2H_5 \cdot OH$; (*b*) $CH_3 \cdot O \cdot CH_3$; (*c*) $(CH_3CO)_2O$; (*d*) $CH_3 \cdot CHO$.

(20) See Art. **111.**

(21) See Art. **158.**

(22) See Art. **35.**

(23) Diethyl sulphide $C_2H_5 \cdot S \cdot C_2H_5$; for its preparation see Art. **27.**

(24) See Arts. **57** and **102.**

(25) For the determination of calcium.

(26) See Art. **1.**

(27) See Art. **10.**

(28) Fehling's solution is an alkaline solution of cupric tartrate, and is used in analytical chemistry for the qualitative and quantitative determination of sugar.

(29) See Art. **64.**

(30) $C_6H_3(OH)_2 \cdot CO_2H$ is protocatechuic acid, and is a phenol acid belonging to the class of monobasic hydroxy acids obtained from the benzene hydrocarbons.

(31) See Arts. **13** and **14.**

(32) See Arts. **5** and **110.**

(33) By oxidation of the corresponding alcohol. See Art. **47.**

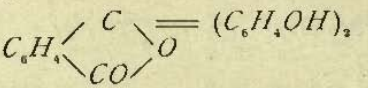
(34) See Art. **76.**

(35) Allyl alcohol belongs to the monohydric alcohols of the olefine series; its formula is $C_3H_5 \cdot OH$. For its preparation see Art. **21.**

(36) Yes; racemic is an isomeride of tartaric acid, it is externally compensated tartaric acid.

(37) (*a*) and (*b*) See Arts. **4** and **5.**

(38) Phenol phthalein has the formula



It is frequently used as an indicator in volumetric analysis. See *Theoretical Chemistry*, Art. **116**, and other places.

(39) See Art. **9**.

(40) $C_6H_3(OH)_2 \cdot CH : CH \cdot CO_2H$ is caffeic acid. For its preparation see Art. **125**.

(41) See Art. **36**.

(42) Potassium formate is obtained according to the equation :

$$\underset{28}{CO} + \underset{56}{KOH} = \underset{84}{HCO \cdot OK}$$

500 liters of CO = 625 grams, then

28 : 84 = 625 : 1,875 grams. Ans.

(43) See Art. **148**.

(44)

$$Ca(C_2H_5SO_4)_2 + 2KSH = CaSO_4 + K_2SO_4 + 2(C_2H_6 \cdot SH)$$

(45) $C_nH_{2n-2}(CO_2H)_2$

(46) By the action of heat and sulphuric acid, lactic acid is decomposed into aldehyde and formic acid, and if the sulphuric acid is of sufficient strength, this acid acts further on the newly formed formic acid, decomposing it into water and carbon monoxide.

(47) See Art. **5**.

(48) $C_nH_{2n}(COOH)_2$.

(49) Mannite or mannitol. See Art. **43**.

(50) Tartaric acid has the formula $C_2H_2(OH)_2(CO_2H)_2$. For its preparation see Art. **145**.

(51) See Art. **69**.

(52) $CH_2(CO_2H)_2$ is malonic acid. For its preparation see Art. **130**.

(53) A diatomic, or dihydric, alcohol is an alcohol containing two hydroxyl (HO) groups.

(54) Writing ink is a mixture of gallotannic acid and ferrous sulphate to which gum arabic has been added to give the fluid the proper adhesive and drying properties.

(55) $CH_2 \cdot CHO$. For the preparation of acetic aldehyde see Art. **50.**

(56) See Art. **17.**

(57) $(C_6H_5CO)_2O$ is benzoic anhydride, or dibenzoyl oxide, and $(C_6H_5CO)_2O_2$ is benzoic peroxide. For their preparation see Art. **102.**

(58) Palmitic acid.

(59) See Art. **118.**

(60) (*a*) See Art. **23.** (*b*) Aromatic alcohols.

(61) See Art. **116.**

(62) See Art. **57.**

(63) See Arts. **35** and **108.**

(64) (*a*) Monohydric alcohols of the paraffin series are produced by the replacement of one hydrogen atom of a paraffin hydrocarbon by the group OH. (*b*) Their general formula is $C_nH_{2n+1} \cdot OH$.

(65) Fumaric acid exists in two modifications; namely,

$$CO_2H \cdot CH : CH \cdot CO_2H$$

and

$$CH_2 : C(CO_2H)_2$$

(66) See Art. **87.**

(67) All optically active compounds contain one or more carbon atoms, to which four different elements or radicals are attached.

(68) See Art. **163.**

(69) See Art. **6.**

(70) See Art. **68.**

(71) See Art. **39.**

(72) See Art. **136.**

(73) See Art. **158.**

(74) Hexa-hydroxy-anthraquinone $C_{14}H_2(OH)_6O_2$ is obtained as a red precipitate by heating 1 part of gallic acid $C_6H_2(OH)_3 \cdot CO_2H$ with 4 parts of H_2SO_4, and pouring the cooled mixture in water.