1. 60 *g* of a compound on analysis gave $C = 24\ g$, $H = 4\ g$ and O = 32 *g*. Its Empirical formula is
   (a) $C_2H_4O_2$ (b) C_2H_2O
   (c) CH_2O_2 (d) CH_2O

2. A compound has 50% carbon, 50% oxygen and approximate molecular weight is 290. Its molecular formula is
   (a) CO (b) C_4O_3
   (c) $C_{12}O_9$ (d) C_3O_3

3. A hydrocarbon has *C*=85.72% and remaining *H*. The hydrocarbon is
   (a) C_2H_4 (b) C_2H_6
   (c) C_2H_2 (d) CH_4

4. Which of the following relations gives the value of *n* =
   (a) $\frac{\text{Moleculer Mass}}{\text{Atomic Mass}}$ (b) $\frac{\text{Molecular Mass}}{\text{Empirical Mass}}$
   (c) $\frac{\text{Empirical Mass}}{\text{Molecular Mass}}$ (d) None of these

5. A compound of carbon hydrogen and nitrogen contains three elements in the respective ratio of 9 : 1 : 35 *grams*. The Empirical formula for the compound is
   (a) C_2H_4N (b) C_3H_4N
   (c) C_3H_6N (d) C_2H_6N

6. The Empirical formula of a compound is CH_2O and its molecular weight is 120. The molecular formula of the compound is
   (a) $C_2H_4O_2$ (b) $C_3H_6O_3$
   (c) $C_4H_8O_4$ (d) CH_2O

7. Nitrating mixture is
   (a) Fuming nitric acid
   (b) Mixture of conc. H_2SO_4 and conc. HNO_3
   (c) Mixture of nitric acid and anhydrous zinc chloride
   (d) None of these

8. An organic compound has an empirical formula CH_2O, its vapour density is 45. The molecular formula of the compounds is
   (a) CH_2O (b) C_2H_5O
   (c) C_2H_2O (d) $C_3H_6O_3$

9. A mixture of camphor and benzoic acid can be separated by
   (a) Chemical method (b) Sublimation
   (c) Fractional distillation (d) Extraction with a solvent

10. Which of the following compound has the functional group $-OH$
   (a) 1, 2-ethandiol (b) 2-butanone
   (c) Nitrobenzene (d) Ethanal

11. IUPAC name of $CH_2 = CH - CH(CH_3)_2$ is

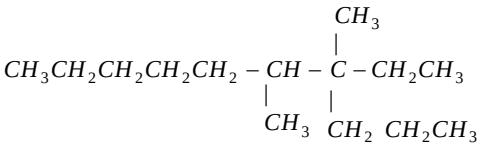
(a) 1, 1-dimethyl-2-propene

(b) 3-methyl-1-butene

(c) 2-vinyl propane

(d) 1-isopropyl ethylene

12. IUPAC name of the compound is



(a) 3, 4-dimethyl-3-n-propyl nonane

(b) 5, 7-dimethyl-7-n-propyl nonane

(c) 4, 5-dimethyl-4-ethyl decane

(d) 6, 7-dimethyl-7-ethyl decane

13. The IUPAC name of $(C_2H_5)_2CHCH_2OH$ is

(a) 2-ethyl butanol-1

(b) 2-methyl pentanol-1

(c) 2-ethyl pentanol-1

(d) 3-ethyl butanol-1

14. IUPAC name of $CH_3 - \underset{\displaystyle CH_2CH_3}{\underset{|}{CH}} - CHO$ is

(a) Butan-2-aldehyde

(b) 2-methylbutanal

(c) 3-methyl isobutyraldehyde

(d) 2-ethylpropanal

15. The structure of 4-methyl pentene-2 is

(a) $(CH_3)_2CH - CH_2CH = CH_2$

(b) $(CH_3)_2CH - CH = CH - CH_3$

(c) $(CH_3)_2CH - CH_2CH = CH - CH_3$

(d) $(CH_3)_2C = CHCH_2CH_3$

16. Which is the correct structure of the compound 3-hexyn-1-oic acid

(a) $CH_3 - CH_2 - CH_2 - C \equiv C - COOH$

(b) $CH_3 - CH_2 - C \equiv C - CH_2 - COOH$

(c) $CH_3 - C \equiv C - CH_2 - CH_2 - COOH$

(d) $CH_3 - CH_2 - CH = CH - CH_2 - COOH$

17. The IUPAC name of the following compound is

$$CH_3 - \underset{\displaystyle CH(CH_3)_2}{\underset{|}{CH}} - CH_2CH_2CH_3$$

(a) 2-isopropylpentane (b) 2, 3-dimethylhexane
(c) Isononane (d) 2, 4-dimethylhexane

18. IUPAC name of the compound $CH_3-CH_2-CH_2(CH_3)_2-C-CH_3$
(a) 1, 1-dimethyl pentane
(b) 2, 2-dimethyl pentane
(c) 1, 2-dimethyl pentane
(d) None of these

19. The IUPAC name of compound
$CH_3-C(CH_3)_2-CH_2-CH=CH_2$ is
(a) 2, 2-dimethyl pent-4-ene
(b) 2, 2 dimethyl-2-pentene
(c) 1, 1, 1-trimethyl but-3-ene
(d) 4, 4-dimethyl pent-1-ene

20. General formula of alkanes is
(a) C_nH_{2n+1} (b) C_nH_{2n+2}
(c) C_nH_{2n-1} (d) C_nH_{2n}

21. Cycloalkane has the formula
(a) C_nH_{2n+2} (b) C_nH_{2n-2}
(c) C_nH_{2n} (d) $C_{2n}H_2$

22. IUPAC name of
$CH_3-\underset{\underset{NH_2}{|}}{CH}-CH_3$ is
(a) Dimethyl amine (b) 2-aminopropane
(c) Isopropylamine (d) 2-propanamine

23. The IUPAC name of Gamaxene is
(a) Benzene hexachloride
(b) Hexachlorobenzene
(c) 1, 2, 3, 4, 5, 6, hexachlorobenzene
(d) 1, 2, 3, 4, 5, 6, hexachlorocyclohexane

24. The IUPAC name of $CH_3COCH(CH_3)_2$ is
(a) Isopropylmethyl ketone
(b) 2-methyl-3-butanone
(c) 4-methylisopropyl ketone
(d) 3-methyl-2-butanone

25. The IUPAC name for CH_3CO-CH_3 is
(a) Dimethyl ketone (b) Acetone
(c) Propanal (d) Propanone

26. In Kjeldahl's method, the nitrogen present in the organic compound is quantitatively converted into

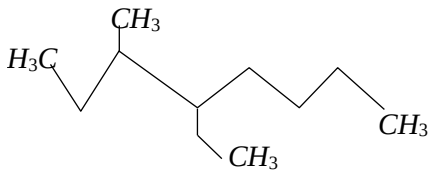
(a) Gaseous ammonia

(b) Ammonium sulphate

(c) Ammonium phosphate

(d) Ammonia

27. Name of the compound given below is



(a) 5-ethyl-6-methyloctane

(b) 4-ethyl-3-methyloctane

(c) 3-methyl-4-ethyloctane

(d) 2, 3-diethylheptane

28. The emperical formula of compound is CH_2O. If its molecular weight is 180. The molecular formula of the compound is

(a) $C_3H_6O_3$ (b) $C_4H_8O_4$

(c) $C_6H_{12}O_6$ (d) $C_5H_{10}O_5$

29. In chromatography, which of the following statement is INCORRECT for R_f?

(a) R_f value depends on the type of chromatography.

(b) The value of R_f can not be more than one.

(c) Higher R_f value means higher adsorption.

(d) R_f value is dependent on the mobile phase.

30. A chromatography column, packed with silica gel as stationary phase, was used to separate a mixture of compounds consisting of (A) benzanilide (B) aniline and (C) acetophenone. When the column is eluted with a mixture of solvents, hexane : ethyl acetate (20: 80), the sequence of obtained compounds is

(a) (B), (C) and (A) (b) (A), (B) and (C) (c) (B), (A) and (C) (d) (C), (A) and (B)

1. (d)

Element	No. of Moles	Simple Ratio
C = 24	24/12 = 2	1
H = 4	4/1 = 4	2
O = 32	32/16 = 2	1

Therefore CH_2O.

2. (c)

Elements	Simple ratio
$C = 50$	$50/12 = 4$
$O = 50$	$50/16 = 3$

Empirical formula = C_4O_3

Empirical formula mass = 96

$n = \frac{290}{96} = 3$

Molecular formula = $(C_4O_3)_3 = C_{12}O_9$.

3. (a)

Element		No. of moles	Simple ratio
C	85.72%	85.72/12	7.14 = 1
H	14.18%	14.18/1	14.18 = 2

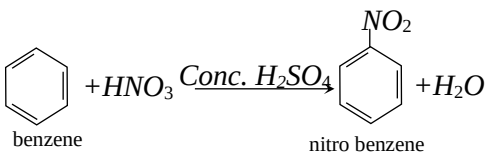
Empirical formula = C_2H_4.

4. (b) $n = \frac{\text{Molecular mass}}{\text{Emperical mass}}$

5. (b)

6. (c)Molecular weight of $C_4H_8O_4$ is 120.

7. (b) The mixture of conc. H_2SO_4 and conc. HNO_3 is called nitrating mixture. It is used in the nitration of aryl compounds.



8. (d)Mol. wt = 2 × Vap. Density

$= 2 \times 45 = 90$

Empirical formula weight

$= 12 + 2 + 16 = 30$

$\therefore\ n = \frac{\text{mol. wt.}}{\text{empirical formula wt.}}$

$= \frac{90}{30} = 3$

$\therefore$ Molecular formula of the compounds

$=(CH_2O)_3 = C_3H_6O_3$

9. (a) Chemical method using $NaHCO_3$ solution.

10. (a)

11. (B)

12. (C)

13. (a)

14. (B)

15. (B)

16. (B)

17. (B)

18. (B)

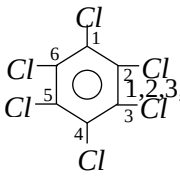
19. (D)

20. (B)

21. (C)

22. (b) $\overset{3}{C}H_3-\underset{\underset{NH_2}{|}}{\overset{2}{C}H}-\overset{1}{C}H_3$

2-amino propane

23. (c) 

1,2,3,4,5,6 hexachlorobenzene.

24. (C)

25. (d) $\overset{1}{C}H_3-\overset{2}{C}O-\overset{3}{C}H_3$

Ketones are named by adding the suffix '-one' in place of '–e' of alkane. Thus IUPAC name is propanone.

26. (d)In Kjeldahl's method, the nitrogen is estimated in the form of ammonia, which is obtained by heating compounds with $NaOH$.

$$CH_3CONH_2 + NaOH \xrightarrow{\Delta} CH_3COONa + H_2O + NH_3$$

27. (b)4 ethyl, 3 methyl octane.

28. (c) Molecular formula = (Emperical formula)$_n$

$$n = \frac{\text{Molecular weight}}{\text{Emperical formula wt.}} = \frac{180}{30} = 6$$

$$= (CH_2O)_6 = C_6H_{12}O_6$$

29. (c) **JEE Main 2019**

In chromatography, R_f represents retardation factor.

$$R_f = \frac{\text{Distance moved by the substance from baseline}}{\text{Distance moved by the solvent from baseline}}$$

∴Higher R_f value means higher adsorption

30. (d)**JEE Main 2020**

More polar compound will come out first