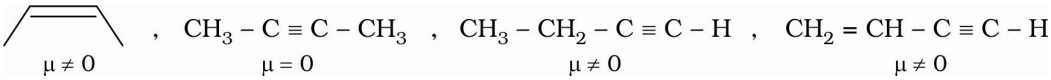
JEE Main Archive	DTS-1

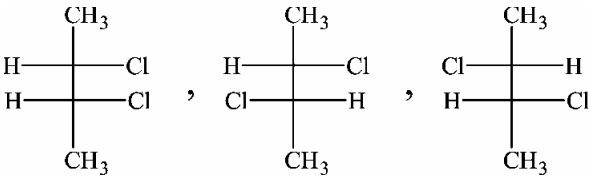
1.(C) Charcoal is used for colored impurity.

- Mixture of o-nitrophenol and p-nitrophenol can be separated by steam distillation.
- Crude naphtha is separated by fractional distillation.

Mixture of glycerol of and sugar can be separated by distillation under reduced pressure.

2.(B) 

3.(D) 2, 3-dichlorobutane

4.(B) 

5.(A) CH_3Cl, CH_2Cl, $CHCl_3$, CCl_4
μ=1.87D μ=1.59D μ=1.01D μ=0.0D

6.(A) 1-chloropentane

7.(A) $H_2C = CH - C \equiv N\,(sp^2, sp^2, sp, sp)$, $HC \equiv CH - C \equiv CH$ (sp, sp, sp, sp)

$CH_2 = C = C = CH_2\,(sp^2, sp, sp, sp^2)$, $CH_2 = CH - CH = CH_2\,(sp^2, sp^2, sp^2, sp^2)$

8.(C) Acetonitrile $(CH_3 - C \equiv N)$

9.(C) 3, 3-dimethyl-1-cyclohexanol

10.(A) $6NaCN + FeSO_4 \longrightarrow Na_4[Fe(CN)_6] + Na_2SO_4$

$4FeCl_3 + 3Na_4[Fe(CN)_6] \longrightarrow Fe_4[Fe(CN)_6]_3 + 12NaCl$

11.(C) $RCONH_2 \xrightarrow[100\,ml,\ 0.1M]{H_2SO_4} \xrightarrow[20\,ml,\ 0.5M]{NaOH}$

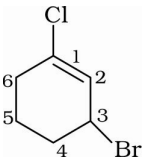
Eq. of ammonia = Eq. of H_2SO_4 used = Initial eq. of H_2SO_4 – Unused eq. of H_2SO_4

$$= \left[(0.1\times 2\times 100) - (0.5\times 20)\right] \times \frac{1}{1000}$$

Mole of N atoms = mole of NH_3

$$= \frac{1}{1000}\left[(0.1\times 2\times 100) - (0.5\times 20)\right] = \frac{1}{1000}[20-10] = 0.01$$

Mole of N atoms $= 2 \times$ mole of urea $= 2 \times \frac{0.3}{60} = 0.01$

12.(C) 

3-Bromo-1-chlorocyclohexene

13.(B) Gaseous density depends upon molar mass. While heat of vapourization, boiling point and vapour pressure depends upon strength of inter molecular forces. C_2H_5OH shows H-bonding while CH_3OCH_3 do not show hydrogen bonding.

14.(C)

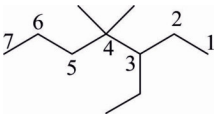
C	H	N	O
20	6.67	46.67	26.66
$\frac{20}{12}$	$\frac{6.67}{1}$	$\frac{46.67}{14}$	$\frac{26.66}{16}$
1.66	6.67	3.33	1.66
$\frac{1.66}{1.66}$	$\frac{6.67}{1.66}$	$\frac{3.33}{1.66}$	$\frac{1.66}{1.66}$
1	4	2	1

Empirical formula of compound is CH_4N_2O molecular formula is $(CH_4N_2O)_n$

$$n = \frac{60}{60} = 1$$

Compound is NH_2CONH_2

15.(D)



The correct answer is 3-ethyl-4, 4-dimethylheptane.