1. 120 cm^3 of oxygen gas diffused through a porous partition in 50 seconds. How long would it take 80cm^3 of Sulphur (IV) oxide to diffuse the same partition under the same conditions? (S=32.0, O=16.0)
(3mks)

$R_{O_2} = \frac{120}{50} = 2.4\ cm^3/sec$

$O_2 = 32$

$SO_2 = 64$

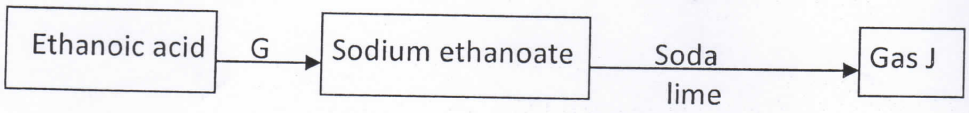
$\frac{2.4}{R_{SO_2}} = \sqrt{\frac{64}{32}}$

$R_{SO_2} = 1.697\ cm^3/sec$

$\frac{1.697}{t} = \frac{80\ cm^3}{t}$

$t = 47.14$ sec.

2. The flow chart represents a series of reactions . Study it and answer the questions that follow.



i. Identify substances G and J (2mks)

G....Sodium hydroxide.....

J....Methane.....

ii. Write a chemical equation for the formation of J. (1mk)

$CH_3COONa_{(s)} + NaOH_{(aq)} \longrightarrow CH_{4(g)} + Na_2CO_{3(s)}$

3. At 20^{0}C, NO_2 and N_2O_4 gases exist in equilibrium as shown in the equation below.

$2NO_{2(g)} \rightleftharpoons N_2O_4(g)\ \Delta H = -VE$

Brown Pale yellow

State and explain the observation that would be made when.

(a) The syringe containing the mixture is immersed in ice-cold water. (2mks)

....Forward reaction is favoured because it is exothermic....

....Pale yellow colour intensifies as the brown colour fades....

(b) The volume in the gaseous mixture in the syringe is reduced. (2mks)

....Backward reaction is favoured (forward reaction is favoured)....

....Brown colour intensifies as pale yellow (Pale yellow brown)....

....colour fades....