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, 0=16.0) (3mks)

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

$O_2 = 32$

$SO_2 = 64$

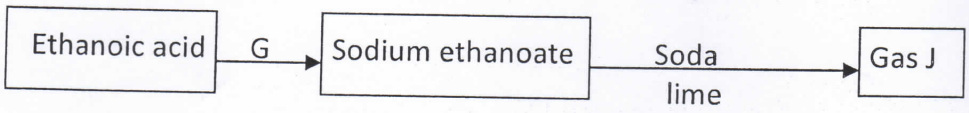
$\frac{2.4}{R_{SO_2}} = \sqrt{\frac{64}{32}}$ ✓ ✓

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

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

$t = 47.14$ 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. ✓ ½ because it is exothermic ✓ ½

....Pale yellow colour intensifies as the brown

....colour fades ✓ 1

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

....Backward reaction is favoured ✓ 1

....Brown colour intensifies as pale yellow

....colour fades ✓