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1- (One mark for the chosen question)

(a) Chemical analysis (P.33)

(b) Titration (P.45)

2- (One mark)

Lithium ion battery is more preferable to the mercury cell due to:

1- It is used several times.

2- It is rechargeable (secondary cells).

3- It has electromotive force 3.04 volt. (P.98)

3- (One mark)

$$K_p = \frac{(P_{NO_2})^2}{(P_{N_2})(P_{O_2})^2} \quad (p.66) \quad (1/2 \text{ mark})$$

$$K_p = \frac{(4)^2}{(0.4)(2)^2} = 10 \quad (p.66) \quad (1/2 \text{ mark})$$

4- (One mark)



5- (One mark)

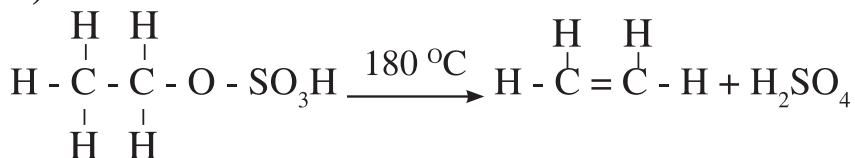
Because manganese uses the 4s and 3d electrons which can be used in the formation of bonds between the atoms of the surface of metal and the reacting molecules leading to the increase of concentration of these molecules on the surface of the catalyst weaken the bond in the reactant molecules and so decreases the activation energy of the reaction. (P.15)

6- (One mark)

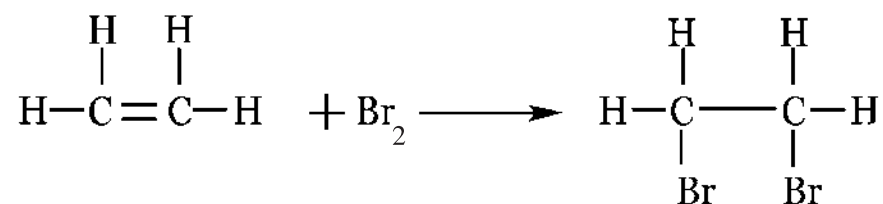
Because the two salts are neutral and have no effect on the indicators and don't make change in the colour of the indicators. (P78- 79)

7- (Two marks)

a)

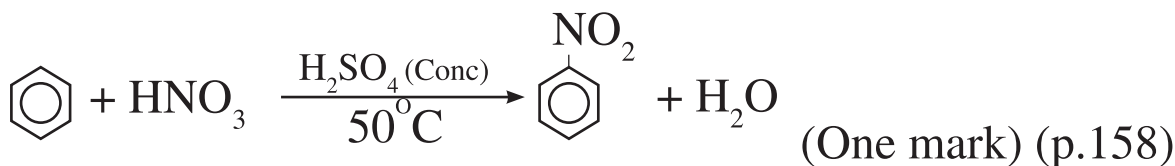


(One mark) (p.140)



(One mark) (p.142)

b)



8- (Two marks)



$$\text{no. of moles of HCl} = 0.015 \times 0.2 = 0.012 \text{ M} \quad (\frac{1}{2} \text{ mark})$$

no. of moles of calcium carbonate

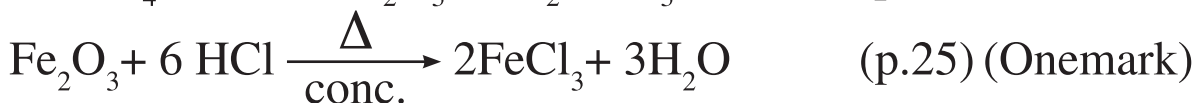
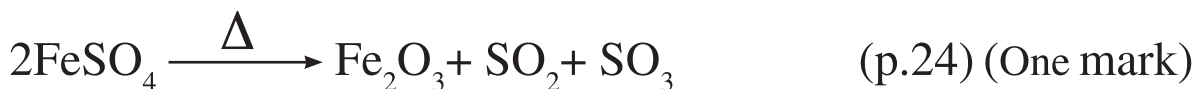
$$= \frac{0.012}{2} = 0.006 \text{ M} \quad (\frac{1}{2} \text{ mark})$$

$$\text{mass of calcium carbonate} = 0.006 \times 100 = 0.6 \text{ g} \quad (\frac{1}{2} \text{ mark})$$

$$\text{Percentage of calcium carbonate} = \frac{0.06 \times 100}{1.5} = 40\% \quad (\frac{1}{2} \text{ mark})$$

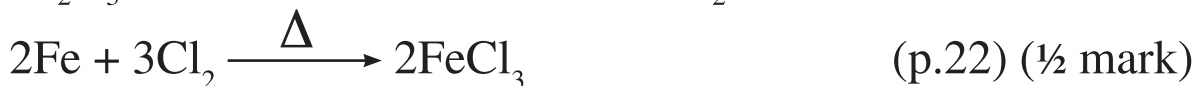
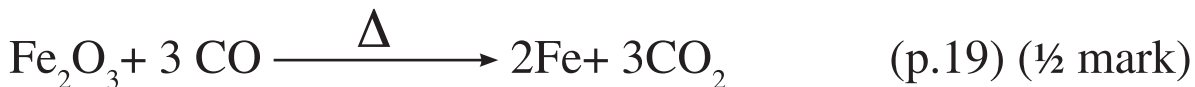
(حساب نسبة شق الكربونات (24%) بطريقة صحيحة تستحق درجة السؤال كاملة)

9- (Two marks)



OR

The last equation can be changed as



10- (One mark for the chosen question)

(a) Electrolytic cell. (P.108)

(b) Secondary cells (P.100)

OR

Galvanic cells

11- (One mark) (P.39)

Adding ammonia solution to:

- Silver iodide: the precipitate insoluble in ammonia solution
(P.39)

Silver phosphate: the precipitate soluble in ammonia solution
(P.40)

(أو أى طريقة أخرى صحيحة علمياً للتمييز بين الملحين)

12- (One mark)

First: Titanium dioxide used in sun protection cosmetics.

(P.5) (½ mark)

Second: Zinc sulphide used in manufacture of illuminating
paints and x-ray screens. (P.8) (½ mark)

13- (One mark)

Compounds of organic nitro molecules contain their own fuel (C, H and O).

Carbone beside oxygen act as oxidizing agent. The weakness of bond between N and O in (N-O) is easily broken to form strong bonds between C and O in (C-O) in carbon dioxide and the bond between (N-N) in nitrogen molecules.

This produce a great amount of heat and gases and accompanied by explosion.

14- (One mark)

The correct answer is (b) 11.3

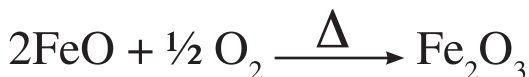
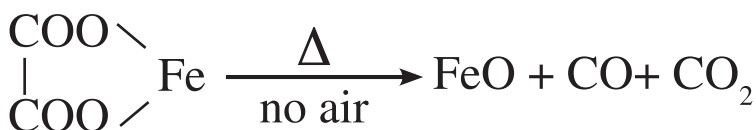
(P.74)

15- (One mark) (P.23)

This is because iron (II) oxalate forming iron (II) oxide by heating in the atmospheric air. But iron (II) oxide is easily to be oxidized in the atmospheric air to form iron (III) oxide.

OR

If the students wrote the two following equations, takes the compelet mark (one)



16- (Two marks for the chosen question)

(a) The effect of temperature on the rate of equilibrium reaction:

1- Bring a flask filled with NO₂ gas (reddish brown colour).

2- Place the flask in cooling mixture (the intensity of the colour decreases gradually until disappeared).

3- Remove the flask from the cooling mixture and keep it at room temperature.

(The reddish brown colour starts to reappear gradually until returns back to first time)

4- the colour degree increases as temperature rises up.

Results:

If an exothermic reaction has reached the equilibrium state, decrease in temp. force the reaction to proceed in the forward direction in order to liberate heat. (One mark)



(b) The effect of concentration on the rate of the reaction

(P.61)

By gradual addition of iron (III) chloride solution (pale yellow colour) to ammonium thiocyanate solution (colourless), the colour of the reaction mixture becomes blood red due to the formation of iron (III) thiocyanate.

If an excess amount of iron (III) chloride is added, the red colour of the solution increases indicating formation of more iron (III) thiocyanate. (One mark)





17- (Two marks)

(P.48)

$$\text{mass of crystalline water} = 1.43 - 0.53 = 0.9 \text{ g} \quad (\frac{1}{2} \text{ mark})$$



$$0.53 \qquad \qquad \qquad 0.9$$

$$106 \qquad \qquad \qquad ?? \quad (\frac{1}{2} \text{ mark})$$

$$\text{molar mass of crystalline water} = \frac{106 \times 0.9}{0.53} = 180 \text{ g} \quad (\frac{1}{2} \text{ mark})$$

$$\text{no of moles of cryst. water} = \frac{180}{18} = 10 \text{ mole} \quad (\frac{1}{2} \text{ mark})$$

Another solution

$$\text{Mass of crystalline water} = 1.43 - 0.53 = 0.9 \text{ g}$$



$$0.53 : 0.9 \quad (\frac{1}{2} \text{ mark})$$

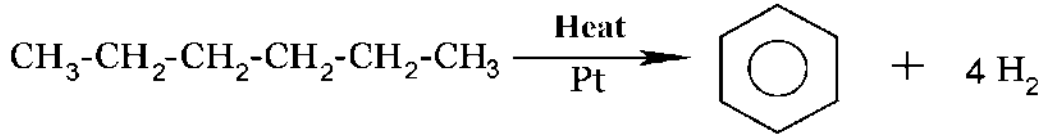
$$\text{no. of moles} = \frac{0.53}{108} : \frac{0.9}{18} \quad (\frac{1}{2} \text{ mark})$$

$$= \frac{0.005}{0.005} : \frac{0.05}{0.005} \quad (\frac{1}{2} \text{ mark})$$

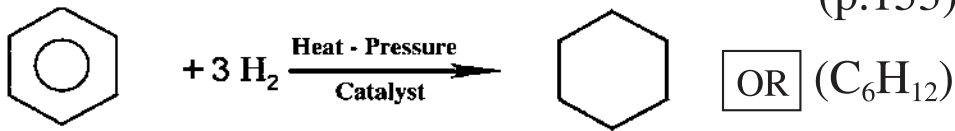
$$1 : 10$$

$$\text{no. of moles} = 10 \text{ moles.} \quad (\frac{1}{2} \text{ mark})$$

18- (Two marks)



(p.153)(One mark)



(p.156)(One mark)

19- (One mark for the chosen question)

(a) Concentrating processes (P.18)

(b) Sintering processes (P.18)

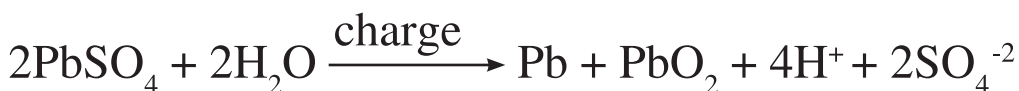
20- (One mark for the chosen question)

(a) This is due to the presence of symmetrical and asymmetrical alkenes and Marknikoff's rule is applied only in the asymmetrical alkenes (P.142)

(b) This is because 2-methyl-2-propanol is a tertiary alcohol and does not contain a hydrogen directly attached to the carbinol group, which does not oxidize by the acidified potassium permanganate. (P.179)

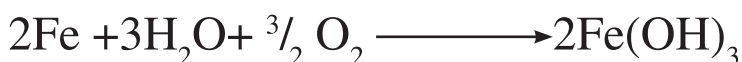
21- (One mark for the chosen question)

a- The reaction happened when charging the lead accumulator is: (P.103)



b- The total equation of the cell of the iron rust is:

(P.106)



22- (One mark)

The salt is: $\text{Ca}_3(\text{PO}_4)_2$ OR calcium phosphate

(يحصل الطالب على نصف درجة للتعرف على أحد شقى الملح)

23- (One mark)

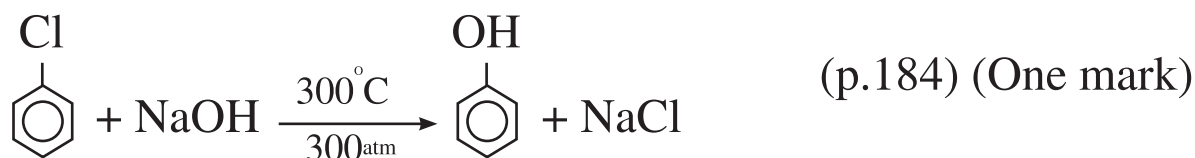
The correct answer is: (b) Decreasing pressure. (P.69)

24- (One mark)

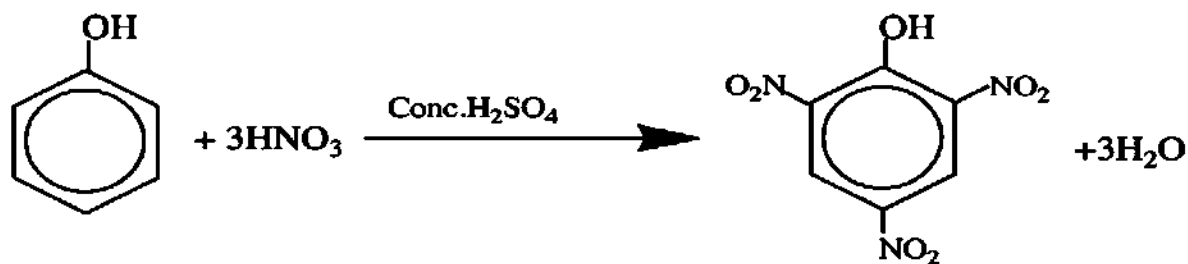
This will stop the flow of the electric current in the external wire between the two half cells. Because barium chloride will react with the sulphate anions forming barium sulfate precipitate. This will consume the sulphate cation in solution and stop the flow of the electric current (P.92, 40)

25- (Two marks)

Picric acid from chlorobenzene



chlorobenzene



(Picric acid)

(p.184) (One mark)

26- (One mark)

(a) 2-Bromo-4-phenylpentane (½ mark)

(b) 4-Methyl-2-hexyne (½ mark)

27- (Two marks)

Put a small amount of an organic substance (tissue) mixed with copper oxid (CuO) in a glass tube that resists heat.

Heat the test tube strongly then pass the resulting gasses over anhydrous white copper sulphate (CuSO₄), then through lime water. (½ mark)

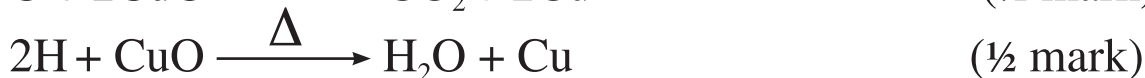
Observation

1- The white colour of anhydrous copper (II) sulphate turns into blue which indicates the absorption of CuSO₄ to water vapour that formed from combination of oxygen of copper (II) oxide with the hydrogen of organic compounds.

2- Lime water turns turbid due to the evolution of CO₂ which is formed from combination of oxygen of Cu (II) oxide with the carbon of the organic compound. (½ mark)

Conclusion

The organic compound contains carbon and hydrogen



(p.129 - 130)

28- (One mark for the chosen question)

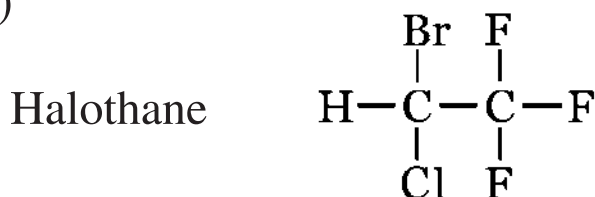
(a) soap: By treating the oils or fats with sodium hydroxide

(P.201)

(b) Industrial Detergents: By treating alkyl benzene sulphonic acid with sodium hydroxide

(P.159)

29- (One mark)



2-Bromo-2-chloro-1,1,1-tri fluoroethane

(P.137)

30- (One mark)

(P.62)

The correct answer in (c) Less than one.

31- (One mark)

Cell potential = oxid. potential H_2 – Oxid. pot.of Cu

0.34 = zero – oxid. poten. of Cu

- oxidation potential of Cu = -0.34 volt.

OR Cell potential = Reduction Pot. of Cu - Red.Pot. of H_2

OR Cell potential = Oxidation Pot. of H_2 + Red. Pot. of Cu.

32- (One mark)

The correct answer is (a) Fe^{2+} (p42)

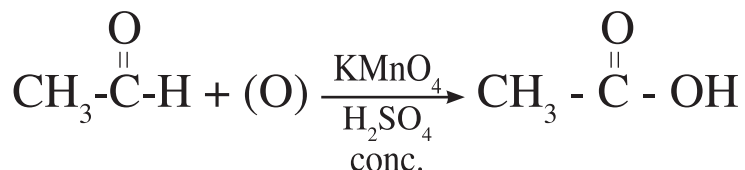
33- (One mark)

Type of alloy	Its components
<u>Inter - metallic</u>	Aluminum + Nickel
Interstitial	<u>Iron + carbon</u>

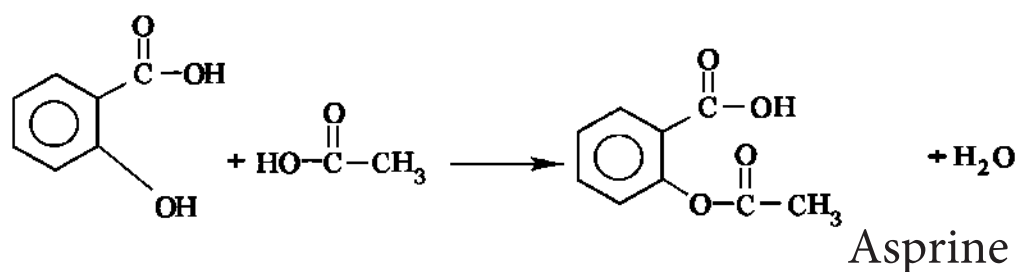
(p.20)

34- (2 marks for the chosen question)

(a)



(p.178) (One mark)

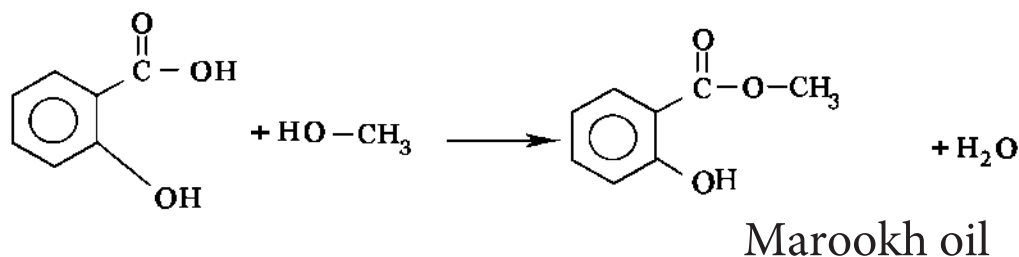


(p.202)(One mark)

(b)



(p.173)(One mark)



(p.202)(One mark)

35- (Two marks)

First : Electrode (A) oxidized or coroded or dissolved or decreased its mass. (½ mark)



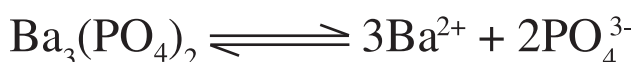
Second: The impure silver deposited without oxidation.

(½ mark)

This is due to the smaller value of oxidation potential of silver than the oxidation potential of copper. (½ mark)

36 (Two marks)

The solubility product is the product of multiplication of the concentration (expressed as mole/ liter) of its ions, raised to the power of the number of ions, which exist in equilibrium with its saturated solution.



$$K_{\text{sp}} = [\text{Ba}^{2+}]^3 [\text{PO}_4^{3-}]^2$$

$$K_{\text{sp}} = [3 \times 10^{-3}]^3 [2 \times 10^{-3}]^2 = 1.08 \times 10^{-13}$$

(p.82) (One mark)

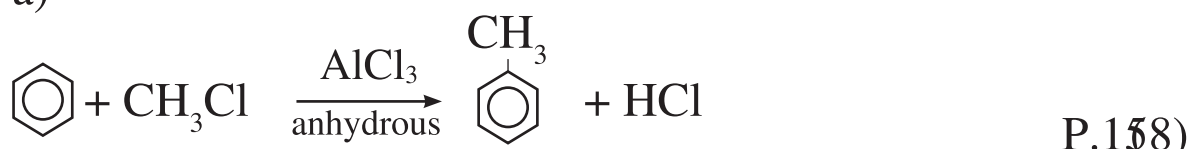
37- (One mark for the chosen question)

(a) The equilibrium system (P57)

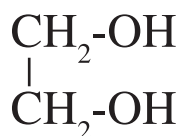
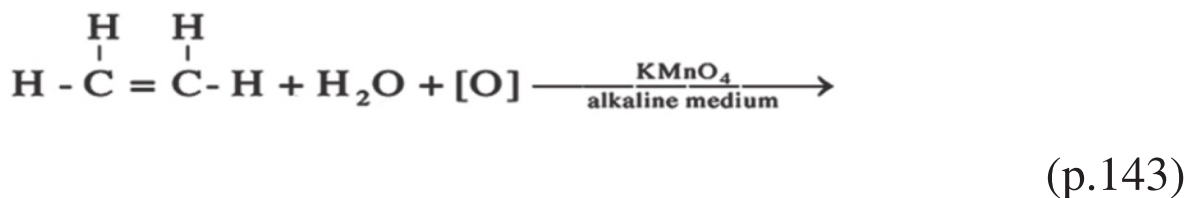
(b) The law of mass action (P61)

38- (One mark for the chosen question)

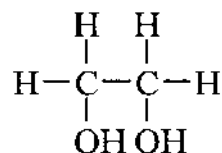
a)



b)



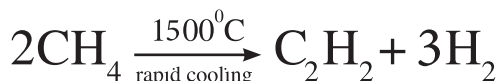
OR



39- (One mark for the chosen question)



OR



40- (One mark)

The correct answer is (c) ScCl_3 (P.16)

41- (One mark)

In the fuel cell:

The material of the anode is

hydrous potassium hydroxide OR KOH (½ mark)

The cathode reaction is



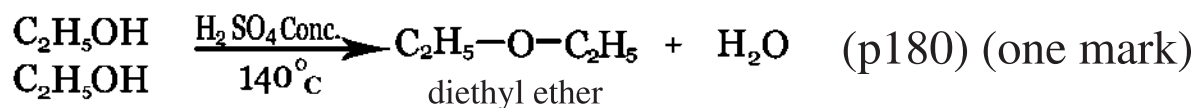
42- (One mark)

Hydrochloric acid is more stable than the acid from which the sulphite anion is derived, while it is less stable than the sulphuric acid from which the sulphate anion is derived.

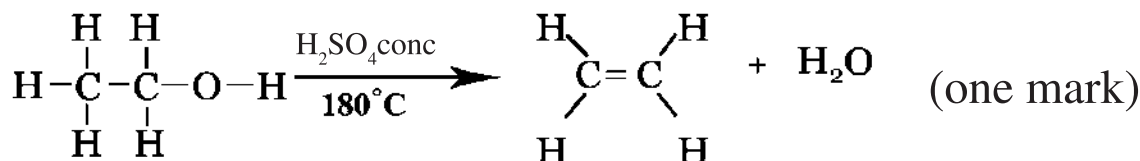
(P.35)

43- (Two marks)

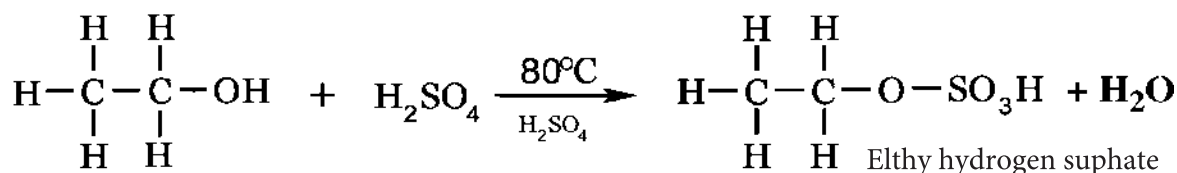
Elimination of one molecule of water from two alcohol molecules



Elimination of one molecule of water from one alcohol molecules.



OR



(148) (one mark)

44- (Two marks)

Quantity of electricity = 15 x 50 x 60 = 45000 coulombs

(½ mark)

$$\text{Equivalent mass} = \frac{\text{Deposited mass} \times 96500}{\text{amount of electricity}} = 20 \text{ g} \quad (\text{½ mark})$$

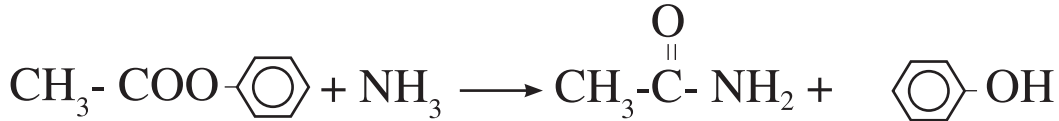
$$\text{Equivalent mass} = \frac{96500 \times 9.35}{45000} = 20 \text{ g} \quad (\text{½ mark})$$

$$\text{the atomic mass of the metal} = 2 \times 20 = 40 \text{ g} \quad (\text{½ mark})$$

45- (Two marks)



(p.200)(One mark)



(One mark)