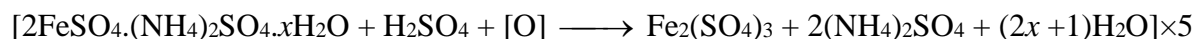


**[10]**

(a) C-10 is a solution containing 1.50 g of potassium permanganate,  $\text{KMnO}_4$  per litre.

(b) C-11 is a solution containing 17.60 g of hydrated ammonium iron (II) sulphate crystals,  $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot x\text{H}_2\text{O}$  per litre.

$$2\text{KMnO}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 3\text{H}_2\text{O} + 5[\text{O}]$$


K = 39   Fe = 56   S = 32   O = 16   Mn = 55   N = 14   H = 1

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- This image shows a full page of white paper designed for handwriting practice. It features 15 evenly spaced, horizontal dotted lines that run across the entire width of the page. The lines are thin and light gray, providing a guide for letter height and placement without being distracting. There is no text or other markings on the page.

(iii) Tabulate your readings.

(b) Calculate the following:

(i) molarity of potassium permanganate solution, C-10.

(ii) molarity of hydrated ammonium iron (II) sulphate solution, C-11.

(iii) experimental molecular mass of hydrated ammonium iron (II) sulphate.

- (iv) value of  $x$  of hydrated ammonium iron (II) sulphate.

**Question 2**

**[5]**

Substance C-13 is a mixture of organic compounds.

- (a) Write down the procedure for the preparation of Lassaigne's extract.

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- (b) Use the extract to identify two elements present in the given organic compound and record your observations in the table given below.

Sl. No.	Experiment	Observation	Inference

Sl. No.	Experiment	Observation	Inference

### Question 3

[5]

- (a) You are provided with a sample of salt, C-14. Carry out the experiment as given below:

#### PROCEDURE

- Take 40 mL of water with calorimeter constant 13 gm in a calorimeter (100 cc beaker) and place it in the heat insulating compartment.
- Measure and record the temperature of water in the calorimeter.
- Weigh 2.0 gram of C-14 and add it to the water in a calorimeter.
- Stir the content till the salt is dissolved completely.

- (v) Record the final temperature of the solution in the table given below. *Show it to the Visiting Examiner.*

Salt	Weight of salt $W_1$ (g)	Temperature of water $T_w$ ( $^{\circ}\text{C}$ )	Temperature of salt solution $T_m$ ( $^{\circ}\text{C}$ )	$T_w - T_m$ ( $^{\circ}\text{C}$ )
C-14				

- (b) State the:
- volume of water taken (V): .....
  - thermometer range used for the measurement: .....
- (c) Total enthalpy change of dissolution ( $\Delta H$ ) =  $[W (T_w - T_m) + (V + W_1) (T_w - T_m)] 4.184 \text{ J}$
- Determine the enthalpy change of dissolution of C-14 by using the above expression.

(ii) Suggest a mechanism by which dissolution of C-14 takes place.

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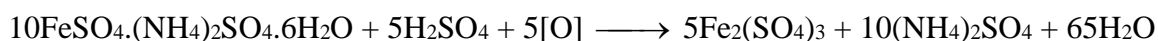
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**[10]**

(a) C-10 is a solution containing 1.80 g of potassium permanganate,  $\text{KMnO}_4$  per litre.

(b) C-11 is a solution containing 17.60 g of hydrated ammonium iron (II) sulphate crystals,  $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot 6\text{H}_2\text{O}$  per litre.

$$2\text{KMnO}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 3\text{H}_2\text{O} + 5[\text{O}]$$


K = 39   Fe = 56   S = 32   O = 16   Mn = 55   N = 14   H = 1

- (i) Write the ionic equation for the given redox reaction.

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(iii) Tabulate your readings.

(b) Calculate the following:

(i) molarity of hydrated ammonium iron (II) sulphate solution, C-11.

(ii) molarity of potassium permanganate solution, C-10.

(iii) strength of potassium permanganate solution, C-10.

- (iv) percentage purity of an impure sample of potassium permanganate.

**Question 2**

**[5]**

Substance C-13 is a mixture of organic compounds.

- (a) Write down the procedure for the preparation of Lassaigne's extract.

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- (b) Use the extract to identify two elements present in the given organic compound and record your observations in the table given below.

Sl. No.	Experiment	Observation	Inference

Sl. No.	Experiment	Observation	Inference

### Question 3

[5]

- (a) You are provided with a sample of salt, C-14. Carry out the experiment as given below:

#### PROCEDURE

- Take 40 mL of water with calorimeter constant 13 gm in a calorimeter (100 cc beaker) and place it in the heat insulating compartment.
- Measure and record the temperature of water in the calorimeter.
- Weigh 2.0 gram of C-14 and add it to the water in a calorimeter.
- Stir the content till the salt is dissolved completely.

- (v) Record the final temperature of the solution in the table given below. *Show it to the Visiting Examiner.*

Salt	Weight of salt $W_1$ (g)	Temperature of water $T_w$ ( $^{\circ}\text{C}$ )	Temperature of salt solution $T_m$ ( $^{\circ}\text{C}$ )	$T_w - T_m$ ( $^{\circ}\text{C}$ )
C-14				

- (b) State the:
- volume of water taken (V): .....
  - thermometer range used for the measurement: .....
- (c) Total enthalpy change of dissolution ( $\Delta H$ ) =  $[W (T_w - T_m) + (V + W_1) (T_w - T_m)] 4.184 \text{ J}$
- Determine the enthalpy change of dissolution of C-14 by using the above expression.

- (ii) Suggest a mechanism by which dissolution of C-14 takes place.

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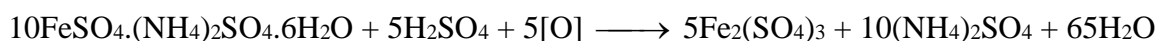
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**[10]**

(a) C-10 is a solution containing 1.0 g of potassium permanganate,  $\text{KMnO}_4$  per litre.

(b) C-11 is a solution containing 10.20 g of an impure sample of hydrated ammonium iron (II) sulphate crystals,  $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot 6\text{H}_2\text{O}$  per litre.

$$2\text{KMnO}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 3\text{H}_2\text{O} + 5[\text{O}]$$


K = 39   Fe = 56   S = 32   O = 16   Mn = 55   N = 14   H = 1

- (i) Write the ionic equation for the given redox reaction.

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- [illegible]

(iii) Tabulate your readings.

(b) Calculate the following:

(i) molarity of potassium permanganate solution, C-10.

(ii) molarity of hydrated ammonium iron (II) sulphate solution, C-11.

(iii) strength of hydrated ammonium iron (II) sulphate solution, C-11.

- (iv) percentage purity of hydrated ammonium iron (II) sulphate.

**Question 2**

**[5]**

Substance C-13 is a mixture of organic compounds.

- (a) Write down the procedure for the preparation of Lassaigne's extract.

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- (b) Use the extract to identify two elements present in the given organic compound and record your observations in the table given below.

Sl. No.	Experiment	Observation	Inference

Sl. No.	Experiment	Observation	Inference

### Question 3

[5]

- (a) You are provided with a sample of salt, C-14. Carry out the experiment by following the procedure given below.
- Take 40 mL of water with calorimeter constant 13 gm in a calorimeter (100 cc beaker) and place it in the heat insulating compartment.
  - Measure and record the temperature of water in the calorimeter.
  - Weigh 2.0 gram of C-14 and add it to the water in a calorimeter
  - Stir the content till the salt dissolves completely.

- (v) Record the final temperature of the solution in the table given below.

*Show it to the Visiting Examiner.*

Salt	Weight of salt $W_1$ (g)	Temperature of water $T_w$ ( $^{\circ}\text{C}$ )	Temperature of salt solution $T_m$ ( $^{\circ}\text{C}$ )	$T_w - T_m$ ( $^{\circ}\text{C}$ )
C-14				

- (b) State the:

- (i) volume of water taken (V): .....
- (ii) thermometer range you used for the measurement: .....

- (c) Total enthalpy change of dissolution ( $\Delta H$ ) =  $[W (T_w - T_m) + (V + W_1) (T_w - T_m)] 4.184 \text{ J}$

- (i) Determine the enthalpy change of dissolution of C-14 by using the above expression.

(ii) Suggest a mechanism by which dissolution of C-14 takes place.

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