

CHEMISTRY DEPARTMENT 2023
S.6 BRAINSTORMING TEST
TOPIC; PHYSICAL EQUILIBRIA
SUB-TOPIC; SOLIDIFICATION OF SOLUTIONS
PART ONE; EUTECTICS TIME; 45mins

NAME.....**INDEX number**.....

Signature **expected score(%)**.....

Instructions; Attempt all questions in this paper.

SECTION A

(a) Define the term eutectic mixture. (01 mark)

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(b) Two metals **Q** and **R** form a eutectic mixture with an eutectic point 80°C and 72%**R**. Draw a well labeled phase diagram for the two metals. (Melting points of **Q** and **R** are 242°C and 185°C respectively.

b) Briefly describe how a phase diagram of a mixture of naphthalene-biphenyl can be determined in the laboratory. (03 marks)

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b) The table below shows the melting points of various mixtures of naphthalene - biphenyl system.

Percentage of naphthalene (%)	12.5	27.5	62.5	80.0
Melting point ($^{\circ}\text{C}$)	63.0	53.0	54.0	69.0

Draw a fully labelled phase diagram of the naphthalene - biphenyl system. (The melting points of naphthalene and biphenyl are 86°C and 71°C respectively) (04 marks)

c) Using the phase diagram above, determine the;

i) eutectic temperature. (01 mark)

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ii) Composition of the eutectic mixture. (01 mark)

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d) Describe the changes that would take place if a liquid mixture of the above system containing 15% naphthalene was cooled from 90°C to room temperature. (05 marks)

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d) Determine the mass of biphenyl that crystallises out if 200g of the liquid mixture containing 10% naphthalene is cooled from 95°C to 50°C . (04 marks)

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e) State two differences between eutectic mixture and a pure compound. (02marks)

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(f) (i) State two similarities between eutectic mixture and a pure compound. (02 marks)

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(g) (i) State one Test that can show that a eutectic mixture is not a pure compound. (01 mark)

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(ii) State one application of eutectic mixtures.

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END.