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EXAMINATION PREPARATION PAPER 2: MATTER AND MATERIALS

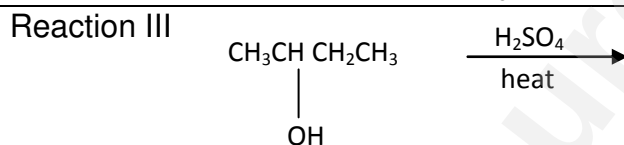
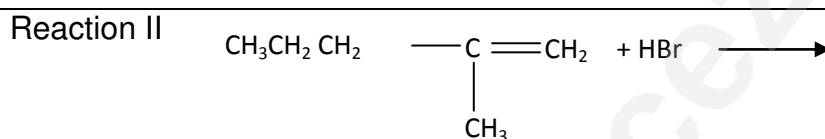
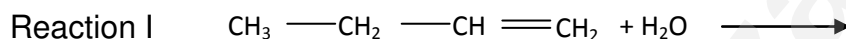
Learner Note: Make sure that you have studied the conditions for the different types of organic reactions.

SECTION A: TYPICAL EXAM QUESTIONS

Question 1: 12 marks 17 minutes

(Taken from the DoE Physical Sciences Feb-March Paper 2 2009)

Most organic compounds can undergo substitution or addition or elimination reactions to produce a variety of organic compounds. Some incomplete organic reactions are represented below.



- 1.1 Name the type of reaction represented by reaction III. (1)
- 1.2 Both reactions I and II are examples of addition reactions. Name the type of addition that is represented by each reaction. (2)
- 1.3 Write down the structural formula and IUPAC name of the major product formed in reaction I (3)
- 1.4 Reaction I only takes place in the presence of a catalyst. Write down the formula of the catalyst used in reaction I. (1)
- 1.5 Write down the structural formula and IUPAC name of the major product formed in reaction II. (3)
- 1.6 To which homologous series does the organic product formed in reaction III belong? (2)

[12]

Question 2: 10 marks 13 minutes*(Taken from the DoE Physical Sciences Feb – March Paper 2 2010)*

Consider the following terms/compounds in organic chemistry

aldehydes ketones oxidation haloalkane hydrolysis

ethyne hydrohalogenation but-1-ene water amines

hydration chlorine butane potassium hydroxide alkynes

Choose from the above terms/compounds: (Write down the question number only and next to each the correct term/compound.)

2.1 The homologous series that has a carbonyl group as functional group. (1)

2.2 A saturated hydrocarbon. (1)

2.3 The product formed when an alkane reacts with a halogen (1)

2.4 The homologous series to which propanal belongs (1)

2.5 The homologous series to which 2-bromobutane belongs (1)

2.6 The reaction of 2-bromobutane with water. (1)

2.7 The homologous series with a -NH_2 group as functional group. (1)

2.8 An unsaturated compound that has isomers. (1)

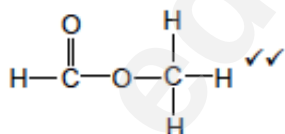
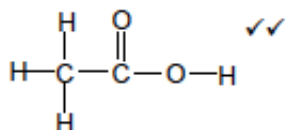
2.9 A compound which belongs to the homologous series with the general formula $\text{C}_n\text{H}_{2n-2}$ (1)

2.10 The type of organic reaction during which hydrogen chloride reacts with ethene. (1)

[10]**SECTION B: SOLUTIONS AND HINTS TO SESSION 37****Question 1**

1.1 Compounds that have the same molecular formula ✓ but different structural formulae ✓ (2)

1.2

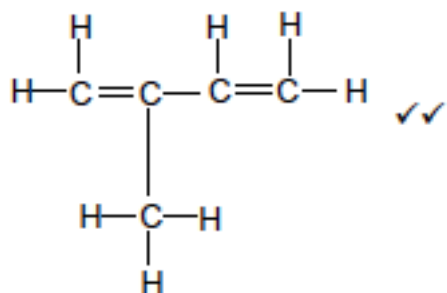
methylmethanoate ✓
metielmetanoaatethanoic acid ✓
etanoësuur

(6)

- 1.3.1 Ethanoic acid ✓. The hydrogen bonds/intermolecular forces between ethanoic acid molecules are stronger than the Van der Waals forces/intermolecular forces between the ester molecules ✓ More energy needed to break bonds between ethanoic acid molecules. ✓ (3)
- 1.3.2 Methylmethanoate ✓ The Van der Waals forces/intermolecular forces between the ester molecules are weaker than the hydrogen bonds/intermolecular forces between ethanoic acid molecules. ✓ Less energy needed to break bonds between the ester molecules. ✓ (3)
- 1.4 Decrease ✓ Van der Waals forces increase with molecular size ✓ (3)
- [17]

Question 2

- 2.1 Unsaturated ✓ ✓ Not all C-C bonds are single bonds ✓ OR Contains C-C double bonds (3)
- 2.2



(2)

- 2.3 Any TWO:

Destruction of indigenous forests (leading to global warming) ✓
 Rubber is not biodegradable – disposal impacts negatively on environment ✓
 Burning of rubber releases toxic gases ✓
 (2)

- 2.4 Any TWO:

Job creation ✓
 Tyres for cars/gloves for medical industry/raincoats etc ✓
 Protective devices – insulation ✓

(2)
 [9]