

MOCK EXAMINATIONS 2019

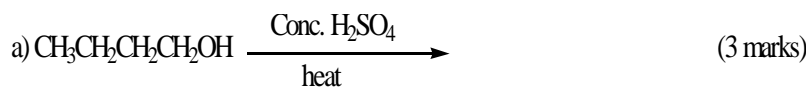
CHEMISTRY P525/1

Duration: 2½ hours

Attempt all questions

Name:

1. Complete the following reactions and write mechanism in each case.



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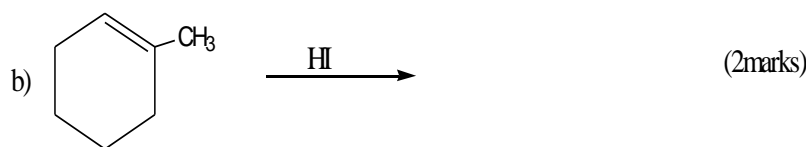
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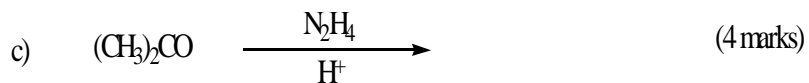
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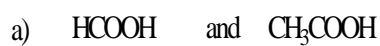


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2. Name a reagent that can be used to distinguish between the following compounds and state the observation in each case.

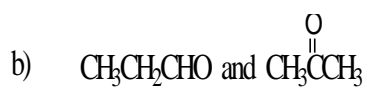


(3 marks)

Reagent.....

Observation

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(3 marks)

Reagent:

Observation

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(3 marks)

Reagent:

Observation

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3. Show how the following conversions can be achieved.



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b) CH_3COOH to $\text{CH}_3\text{C}\equiv\text{CH}$ (3½marks)

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c) $\text{CH}_3\text{CH}_2\text{Cl}$ to CH_3CHCl_2 (2½marks)

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4. Explain the observations;

a) Lead(II) chloride is insoluble in dilute hydrochloric acid but readily dissolves in concentrated hydrochloric acid. (4 marks)

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b) The boiling point of carbon tetrachloride is higher than that of methane. (2½marks)

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c) Carbon tetrachloride is immiscible with water.

(3½marks)

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5. a) Write balanced equations for the following reactions.

(1½marks each)

(i). Tin(II) chloride and water.

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(ii). Trileadtetraoxide and dilute nitric acid.

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(iii). Lead(IV) oxide and hot concentrated hydrochloric acid.

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(iv). Silicon(IV) hydride and sodium hydroxide solution.

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b) Tin(IV) chloride was left exposed to air. Explain what was observed.

(3 marks)

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6. a) State three chemical properties of copper as a transition metal giving one relevant example in each (3 marks)

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- b) Write equations involved in the extraction of copper from copper pyrites. (4 marks)

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- c) State what is observed when copper powder is added to moderately concentrated nitric acid. (2 marks)

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7. a) 1.07 g of ammonium chloride was dissolved in water to make 1 dm³ of solution. Calculate the pH of the resultant solution. (5 marks)

(K_b for ammonia = 1.7 x 10⁻⁵ moldm⁻³, K_w = 1 x 10⁻¹⁴ mol²dm⁻⁶, N=14, H=1, Cl=35.5)

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- b) What mass of sodium hydroxide should be added to 1 dm³ of the above solution to produce a solution of pH 8.5? (2 marks)

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8. Consider the reaction $A \longrightarrow B + C$.

[A] (mol dm ⁻³)	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Rate of reaction	0.02	0.08	0.18	0.32	0.50	0.72	0.98

- a) Plot a graph of log(Rate) against log [A]. (5 marks)

- b) Determine

- (i). The order of reaction with respect to A. (2marks)

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- (ii). The rate constant (2marks)

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- (iii). The rate of reaction when [A] = 1.0 mol dm⁻³ (2 marks)

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9. A) i) Sketch a graph of conductivity against volume of base added for titration of 25 cm^3 0.1M hydrochloric acid with 0.05M aqueous ammonia. Indicate clearly the end point.

(2 marks)

- ii) Explain the shape of the graph

(3 marks)

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- c) The molar conductivity at infinite dilution of barium nitrate, sulphuric acid and nitric are 12.6 , 34.1 and $23.5\Omega^{-1}\text{m}^2\text{mol}^{-1}$. Given that the electrolytic conductivity of a saturated solution of barium sulphate is $4.1\times 10^{-4}\Omega^{-1}\text{m}^{-1}$.

Determine the solubility of barium sulphate in mol dm^{-3} .

(4 marks)

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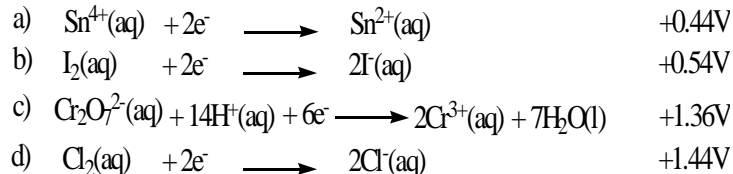
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10. Consider the following half-cell reactions.



i. State the strongest reducing agent. (1 mark)

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ii. State the strongest oxidising agent. (1 mark)

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iii. Write the cell notation of the cell that would be formed with the highest emf when two half cells are combined. (1 mark)

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iv. Identify the anode and the cathode for 10(iii). (2 marks).

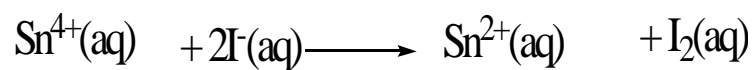
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v. Explain using electrode potentials why dichromate(VI) can't be acidified with hydrochloric acid. (2 marks)

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vi. Explain whether the following reaction is feasible or not from the above electrode potentials.

(2 marks)



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END