BINDURA UNIVERSITY OF SCIENCE EDUCATION
SCIENCE AND MATHEMATICS EDUCATION DEPARTMENT
DIPLOMA IN SCIENCE EDUCATION

COURSE: DC003/DCH005 PHYSICAL CHEMISTRY

Time   2 HOURS

ANSWER QUESTION ONE AND TWO QUESTIONS FROM SECTION A AND ANOTHER TWO
QUESTIONS FROM SECTION B. EACH QUESTION CARRIES 20 MARKS
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1 .   (a)   Define the following terms:
              (i)   Ideal gas   APR 2025
              (ii)   standard enthalpy change for reaction
              (iii)   bond energy
              (iv)   Rate determining step
              (v)   Activation energy   [5x2 marks]

       (b)   Calculate pH for the following solutions:
              (i)   0.1 M HCl   [2 marks]
              (ii)   0.1 M H_2SO_4 [3 marks]
              (iii)   0.2 M KOH   [3 marks]

       (c)   Describe the function of a salt bridge in an electrochemical cell.
                                                            [2 marks]

              SECTION A: ANSWER ANY TWO QUESTIONS

2   (a)   Explain how the following factors affect the nature of the product
              discharged at the electrodes during electrolysis;

              (i)   Concentration.   [3 marks]
              (ii)   Nature of the electrode.   [3 marks]

       (b)   Give an outline of the electrolysis of brine using a diaphragm cell.
                                                            [8 marks]

       (c)   Use appropriate data from the Data Booklet to predict the feasibility of
              the following chemical reactions;

              (i) $Cu(s) + 2V^{3+}(aq) \longrightarrow Cu^{2+}(aq) + 2V^{2+}(aq)$ [3 marks]
              (ii) $2K^{+}(aq) + Pb(s) \longrightarrow 2Na(s) + Pb^{2+}(aq)$ [3 marks]

3   (a) $500cm^3$ of methane has a pressure 40kPa at 27°C.
              Calculate
              (i)   Number of moles of gas present   [5marks]

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