

1. (a) (i) Define the term 'prototype' as applied in systems development.  
(ii) Outline **four** advantages of a prototype. (6 marks)
- (b) Describe **four** elements of a system. (8 marks)
- (c) Bizwise Company Ltd. has invested in a system at a cost of \$5,000. The details of the operational costs and benefits for a three year period is as shown below;

Year 0	Cash outflow	\$5,000
Year 1	Cash inflow	\$2,000
Year 2	Cash inflow	\$2,200
Year 3	Cash inflow	\$1,800

Assuming a discounting rate of 10% per annum, determine;

- (i) NPV;  
(ii) Project viability. (6 marks)
2. (a) Distinguish between open and closed systems. (2 marks)
- (b) Explain the following approaches as applied to system implementation:  
(i) phased changeover;  
(ii) pilot changeover;  
(iii) parallel changeover. (9 marks)
- (c) Read the following information and answer the question that follows;

The payroll of Baraka Kenya Limited is processed as follows:

Employees at the company are paid each week. Their working hours are recorded manually on timesheets. The hours consist of standard hours and possibly overtime hours. The time sheets are collected each week and the details are input into the system. The data is verified and validated by the accounts department then valid data is written to the payroll transactions file. Invalid entries are output to an error report. The transactions file is used to update the employee master file, and cheques and payslips are printed. A payroll summary report is also printed for the Accounts department.

Draw a level 1 DFD to represent the above scenario.

(9 marks)

3. (a) Define the term Normalization; (2 marks)
- (b) Explain the following normalisation techniques: (9 marks)
- (i) first normal form (1NF);
  - (ii) second normal form (2NF);
  - (iii) third normal form (3NF).
- (c) With the aid of diagrams, describe: (9 marks)
- (i) HIPO charts;
  - (ii) IPO charts;
  - (iii) Decision trees.
4. (a) (i) Explain **four** fact finding techniques a system analyst can use to gather Information. (12 marks)
- (ii) State **two** advantages of each fact finding technique.
- (b) Outline **four** roles of a systems analyst in the development of information systems. (4 marks)
- (c) Distinguish between serial file organisation and sequential file organisation. (4 marks)
5. (a) Describe **four** qualities of a good system. (8 marks)
- (b) During systems development, it is advisable for the system analyst to do a feasibility study to guide the organization in determining whether to proceed with the project or not. Describe **four** types of feasibility that the system analyst is likely to carry out. (8 marks)
- (c) State **four** benefits of the structured walkthrough technique in system design. (4 marks)
6. (a) Define the term 'system documentation'. (2 marks)
- (b) Explain the following types of documentation: (9 marks)
- (i) program documentation;
  - (ii) user documentation;
  - (iii) system documentation.
- (c) Describe the stages of the Jackson System Development (JSD). (9 marks)

- 7. (a) (i) With the aid of a diagram, describe the waterfall approach to systems development; (8 marks)
- (ii) Highlight **two** advantages of the waterfall approach. (6 marks)
- (b) Differentiate between 'black-box testing' and 'white-box testing' as applied in system testing. (6 marks)
- (c) Outline **three** causes of system failure. (6 marks)
- 8. (a) Distinguish between Rapid Application Development (RAD) and Joint Application Development (JAD). (8 marks)
- (b) Explain **three** types of maintenance that can be performed on a system. (6 marks)
- (c) When implementing a new system, the top level managers are likely to experience resistance at the operational level of the organisation:
  - (i) identify **three** causes of resistance to changes from the old system to the new system;
  - (ii) outline **three** ways that managers can use to reduce resistance to the implementation of the new system. (6 marks)