## THE KENYA NATIONAL EXAMINATIONS COUNCIL

## DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

## MODULE II

SYSTEMS ANALYSIS AND DESIGN

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*This paper has **EIGHT** questions.*
*Answer any **FIVE** in the answer booklet provided.*
*All questions carry equal marks.*
**Candidates should answer the questions in English.**

This paper consists of 6 printed pages.

Candidates should check the question paper to ascertain that all the
pages are printed as indicated and that no questions are missing.

1. (a) (i) Outline **two** characteristics of decision support systems. (2 marks)

    (ii) Outline **two** limitations of an expert system. (2 marks)

   (b) Explain each of the following system development methodologies:

    (i) structured; (2 marks)

    (ii) traditional; (2 marks)

    (iii) object oriented. (2 marks)

   (c) Differentiate between structured and *unstructured* interviews as applied in systems analysis. (4 marks)

   (d) Raymond would like to apply risk management techniques to avoid derailment of the information system project. Explain **three** risk management techniques that he could use. (6 marks)

2. (a) State the function of each of the following data validation checks:

    (i) range check; (1 mark)

    (ii) validity check; (1 mark)

    (iii) format check. (1 mark)

   (b) Explain each of the following system design tools:

    (i) decision table; (2 marks)

    (ii) Structured English. (2 marks)

   (c) Ken intends to organize a *structured walkthrough* after system design.

    (i) Outline **three** members of the project team that should participate in the exercise. (3 marks)

    (ii) Explain **two** benefits of this exercise. (4 marks)

   (d) With the aid of a diagram in each case, describe **three** types of relationships used in ERDs. (6 marks)

3. (a) Outline **two** roles of each of the following information system stakeholders:

    (i) system owner; (2 marks)

    (ii) system analyst. (2 marks)

   (b) (i) The following describes elements of an examinations information system. Classify them as either process, outputs, environment or control:

     *Exam supervisors, mean score, examination room, marking scheme, grading criteria, ranking.* (3 marks)

(ii) Jackson System Development (JSD) is a linear development method. Describe **three** steps that could be followed when using the methodology. (3 marks)

(c) A certain Non Governmental Organization (NGO) based in Canada intends to use *online survey* technique to carry out a feasibility study in Kenya. Explain **three** advantages of using this technique. (6 marks)

(d) Explain **two** circumstances that would warrant changes to a newly implemented system. (4 marks)

4. (a) Differentiate between *data dictionary* and *data store* as used in systems analysis and design. (4 marks)

(b) For each of the following SDLC stages, outline **three** objectives that the system analyst strives to achieve:

(i) feasibility study; (3 marks)

(ii) system design. (3 marks)

(c) Table 1 shows net profits for projects X and Y where initial investment was Kes 150,000 and 198,000 respectively. Use it to answer the questions that follow.

| Year | Project X (Kes) | Project Y ( Kes) |
|------|-----------------|------------------|
| 1 | 45,000 | 51,000 |
| 2 | 55,000 | 51,000 |
| 3 | 50,000 | 45,000 |
| 4 | 45,000 | 51,000 |

Table 1

(i) Calculate the payback period for each of the projects. (4 marks)

(ii) Explain **three** limitations of using the payback technique on project evaluation. (6 marks)

5. (a) William intends to use *direct change over* during systems implementation stage. Explain **two** reasons for his choice of this method. (4 marks)

(b) Jack has been assigned the responsibility of acquiring an information system for his company. Explain **two** methods that he could use to achieve the objective. (4 marks)

(c) Figure 1 shows part of a dataflow diagram. Use it to answer the question that follows.
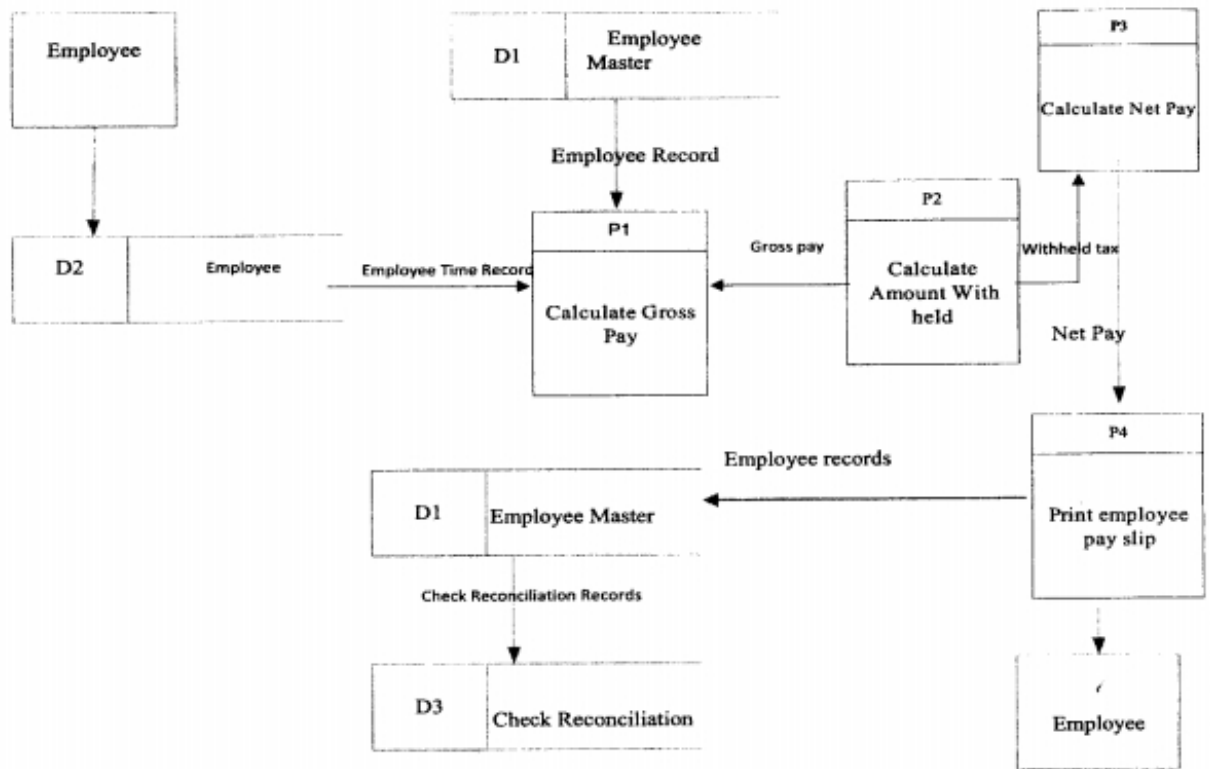


Figure 1

   (i)   Identify **four** errors in the DFD.     (4 marks)

   (ii)   Outline **two** advantages of using DFD's in system design.     (2 marks)

(d) Jacob intends to write a report on factors that influence system maintenance costs. Explain **three** such factors that he could include in the report.     (6 marks)

6.   (a)   Explain **three** performance criteria that could be used for system testing.     (6 marks)

    (b)   With the aid of a diagram in each case, describe the following functional decomposition elements of a system:

       (i)   the module;     (2 marks)

       (ii)   the connection;     (2 marks)

       (iii)   the couple.     (2 marks)

(c)   Table 2 shows activities that are to be carried out in an information system project. Use it to answer the questions that follow.

| Activity | Preceding activity | Duration (Weeks) |
|---|---|---|
| A | - | 7 |
| B | - | 3 |
| C | A | 4 |
| D | A | 5 |
| E | A | 4 |
| F | C | 5 |
| G | D | 6 |
| H | B, E | 4 |
| I | H | 3 |
| J | F, G, I | 3 |

Table 2

(i)   Draw the network diagram for the project.                                      (6 marks)

(ii)  Indicate the critical path in the network diagram drawn in (i)                 (2 marks)

7.   (a)   (i)   Explain the term *initial investigation* as used in systems analysis and design.
                                                                                      (2 marks)

(ii)  Steve intends to carry out *problem identification* for a proposed information system for his company. Outline **three** factors he is likely to consider during this process.
                                                                                      (3 marks)

(b)   Explain **two** criteria that should be considered when selecting a system development methodology.                                                              (4 marks)

(c)   Mercy intends to use CASE tools to design an information system for her company. Outline **five** reasons that could have influenced her decision.                    (5 marks)

(d)   Eassy Systems Ltd has installed multimedia tutorials to be used to train employees on the operations of a new system.

(i)   Identify the training method being used by the company.                        (2 marks)

(ii)  Explain **two** advantages of the training method identified in (i).            (4 marks)

8.   (a)   Differentiate between a *source* and a *sink* as used in dataflow diagrams.     (4 marks)

(b)   Sophie intends to develop an insurance information system. From the preliminary studies, the system had unidentified user requirements.

(i)   Identify the appropriate system development approach she could use.             (2 marks)

(ii)  Outline **four** advantages of the approach in (i).                             (4 marks)

(c)   One key document produced during systems development is program specification. Outline **four** contents of this document.                                       (4 marks)

(d)  Madhili Music store intends to automate its music library borrowing process in order to offer efficiency and quality service to its customers. The details of all the Music tapes in the shop are stored in the music store file. A customer makes a borrowing request by filling in a form showing the details of the music tape required. The request form is sent to the music store to retrieve the music tape information while the borrowing request information is stored in the borrowing data file. The customer is then issued with a borrower's card. When the customer returns the tape, he fills in a tape return form showing the details of the music tape returned. The tape and borrowing information are sent to music store file and borrowing information file respectively. The customer is issued with a music tape return receipt. At the end of every month, the manager prepares a report showing the borrowed music tapes.

Model the system using a level one data flow diagram.                              (6 marks)

**THIS IS THE LAST PRINTED PAGE.**