higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

SYSTEM ANALYSIS AND DESIGN
NQF LEVEL 3

(10041003)

8 November 2022 (X-paper)
09:00–12:00

This question paper consists of 15 pages.

177Q1N2208

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TIME: 3 HOURS
MARKS: 200

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Start each section on a new page.
5. Use only a blue or black pen.
6. Diagrams should be clear and neat and may be done in pencil.
7. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

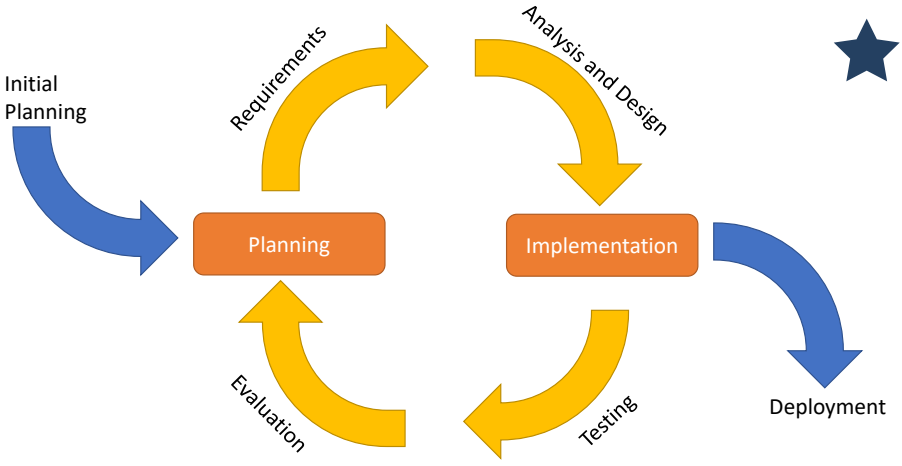
1.1.1 Rodger is working on *'Why build the system?'*. Based on this question we know that he is in the … phase of the SDLC.

A planning
B analysis
C design
D implementation

1.1.2 Which one of the following persons are not typically part of the information systems department of an organisation?

A Programmer
B Chief Financial Officer
C Systems Analyst
D IS Manager

1.1.3 Which one of the SDLC models listed below can be depicted in the diagram resembling the figure as shown below?



A Waterfall model
B Iterative model
C Spiral model
D V-shaped model

1.1.4 The technique where management, the project team, and the users work together for several hours, days or weeks, or until the needed information is collected, is called …

A document analysis.
B interviews.
C Joint Application Development (JAD) sessions.
D questionnaires/surveys.

1.1.5 A process model is …

A the output of the interviewing process.
B a formal way of representing how a business system operates.
C the model that is produced by extreme prototyping.
D the expanded and thoroughly balanced use case for a system.

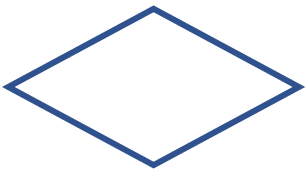
1.1.6 The Data Flow Diagram that does not have data stores is/are the …

A Context diagram.
B Level 1 diagram.
C Level 2 diagram.
D Level 3 diagram.

1.1.7 Lines on a crows-foot ERD indicates …

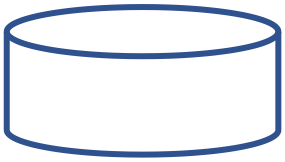
A hierarchies between processes.
B relationships among the data.
C plurality of data items.
D uniqueness of data items.

1.1.8 Which one of the following symbols represent a condition in a structured flowchart?

A 

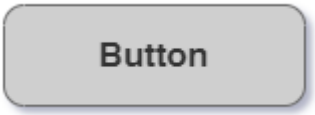
B 

C 

D 

1.1.9 Which one of the following GUI controls are best suited to allow a user to select a single option only, from a list of various potential options limiting any potential input errors?

A Button



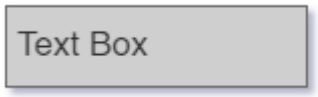
B Checklist box



C Radiogroup



D Text box



1.1.10 In a Gantt chart a … task cannot proceed until another task has been completed.

A dependency
B predecessor
C successor
D development

(10 × 1) (10)

1.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.2.1–1.2.10) in the ANSWER BOOK.

1.2.1 Scope creep is when new requirements are added to the project after the original project scope was defined and 'frozen'.

1.2.2 The Waterfall Methodology breaks the overall project into a series of release versions.

1.2.3 MIS is an acronym for Modular Information System.

1.2.4 Planned development is when the system is developed in response to an unexpected problem or opportunity.

1.2.5 Lease is similar to rental, but normally over a longer period of time and used for assets of higher value.

1.2.6 A software blueprint is a set of rules or standards that specifies how the information system in the organisation will work. It is the master plan.

1.2.7 In a database a record is sometimes also referred to as a row.

1.2.8 Data validation is the process of making sure that the captured or acquired data is useful, of best quality, without mistakes and of the correct type.

1.2.9 Prototyping delivers functionality to users quickly, even if not for immediate general use. This allows users to become comfortable with the new system.

1.2.10 Maintenance and support focus on the changes that need to be made to an information system once it has been implemented and is in use by an organisation.

(10 × 1) (10)

1.3 Write the following acronyms in full:

1.3.1 AIS

1.3.2 CKO

1.3.3 DFD

1.3.4 CPM

1.3.5 SA

1.3.6 SLA

1.3.7 GUI

1.3.8 ERP

1.3.9 EIS

1.3.10 DSS

(10 × 1) (10)

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1.4 Choose the correct option from those given in brackets. Write only the answer next to the question number (1.4.1–1.4.10) in the ANSWER BOOK.

1.4.1 (Data/Information) are facts about people, events, places, or things relating to the business of the organisation.

1.4.2 (Centralisation/Decentralisation) is the concentration of control of an activity or organization under a single authority.

1.4.3 A type of bar chart that shows all the activities in a project is called a (flow chart/Gantt chart).

1.4.4 (Tangible benefits/Intangible benefits) of the proposed new system are not easy to quantify but are seen as beneficial to the organisation.

1.4.5 (Offshoring/Counterfeiting) is the type of outsourcing that involves the use of an international third party to take advantage of lower prices elsewhere.

1.4.6 A/An (entity relationship diagram/network diagram) shows a set of related project tasks, the order in which they should be carried out, and the tasks that must be completed before others can start.

1.4.7 A (multiple predecessor/multiple successor) is when a task has to wait for several tasks to finish before it can start.

1.4.8 A/An (process decomposition diagram/organisational diagram) is useful for drawing lower-level data flow diagrams and shows a system broken down into logical functions.

1.4.9 (Schema/Scope creep) relate to how the project requirements grow over a period of time to include things that end users want to add.

1.4.10 A formal document that an organisation sends out to gather detailed information related to the potential project, is called a (request for information/request for a proposal).

(10 × 1) (10)

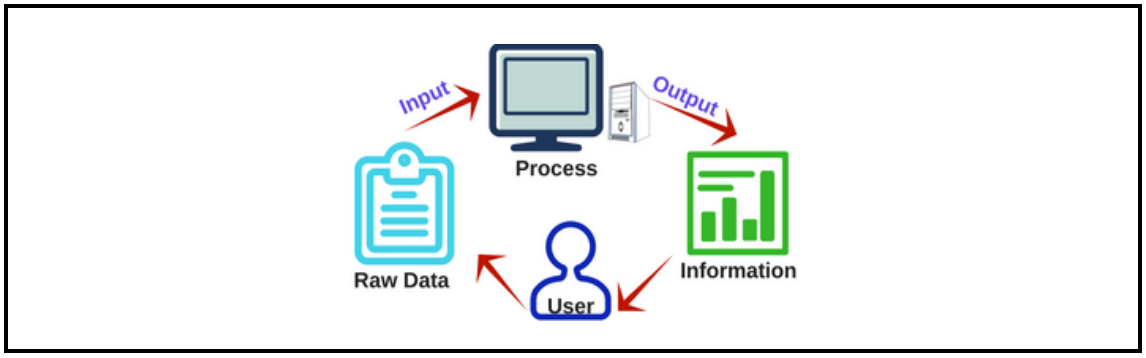
[40]

TOTAL SECTION A: 40

SECTION B

QUESTION 2

Study the diagram below and answer the questions that follow.



2.1 Define the following terms:

2.1.1 Data processing

2.1.2 Enterprise computing (2 × 2) (4)

2.2 Name TWO data processing activities performed by an information system. (2 × 1) (2)

2.3 State TWO advantages of using an office automation system. (2 × 1) (2)

[8]

QUESTION 3

Study the following description and answer the questions that follows.

Progressive Logistics is a large logistics and distribution company situated in Randburg. Mr Alfred Nkadimeng is the CIO of the company, and he is supported by Mr Bonga Lekalakala as CKO, Mrs Claire Naidoo as CTO and Mr Jan Kemp as Chief network officer. Together the three of them form the IS department of Progressive Logistics. In this department there are several teams comprising of Programmers/Developers, Business Analysts, DBA's and Support and operations personnel.

3.1 Draw an organisational chart for Progressive Logistics based on the information provided above. Indicate all levels departments and the position of each team in the larger organisation. (7)

3.2 State the functions/roles of the following IT professionals:

3.2.1 Programmer / Developer (2 × 1) (2)

3.2.2 Database Administrator (2 × 1) (2)

[11]

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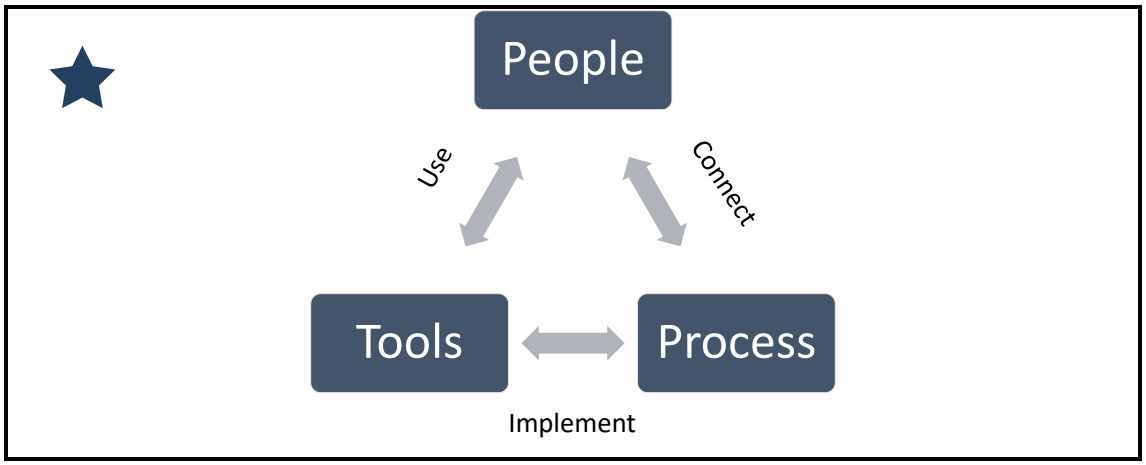
QUESTION 4

4.1 Joel is employed at Progressive Logistics as a system analyst. He manages people, tools, and processes to find balanced business solutions.



4.1.1 State FIVE skills that Joel should possess to be an efficient systems analyst. (5 × 1) (5)

4.1.2 Discuss the role of a systems analyst as part of the Software Development Life Cycle (SDLC). (2 × 1) (2)

4.2 Give TWO reasons why the process of developing a system may fail. (2)

4.3 Discuss the FIVE phases of the Software Development Life Cycle (SDLC). (5 × 2) (10)

[19]

QUESTION 5

5.1 List the FOUR typical steps of the strategic planning process. (4 × 1) (4)

5.2 BEE GEE is a small fast-growing restaurant in the Louis Trichardt community. The owners and the manager decided to invest in a simple food ordering system that will assist the restaurant with orders.

The system comprises of the following three modules:

- Order placement module.
- Generate invoice module.
- Process payment module.

When an order is placed, the details of the order as items is provided and an order list is generated that is sent to the kitchen. The generate invoice module receives the data of the completed order and the data pertaining to the invoice is returned including the VAT payable. For the process payment module data relating to the invoice detail and the payment method is sent as well as the (13)

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tender amount. The process payment module also returns the details of a receipt.

Using the information above draw a structure chart that will represent the modules and the movement of data.

5.3 Read the following and study the table below and answer the questions that follow.

As stated previously, BEE GEE is a small fast-growing restaurant in the Louis Trichardt community, and as part of their ICT renewal process, a new Point of Sale (PoS) system is to be installed with a module to also facilitate the management of stock levels.

They are planning the installation and parallel implementation of the old system to the new one, over the span of a few days.

The following table shows the activities, predecessors and time estimates for the installation of the new PoS system.

Activity	Description	Immediate predecessor	Estimated time in days
A	Design server room layout and POS hardware installation	-	2
B	Install server room equipment POS hardware	A	1
C	Test network cabling and electrical installation	A	2
D	Install and configure the server	B	3
E	Install and configure the POS software	C	3
F	Test software installation	D, E	1

A PERT chart is a tool used to plan the execution of tasks within a project. A PERT chart works by visually representing a project's tasks and the dependencies connected to each one. With a PERT chart the activities (also referred to as tasks) are represented using arrows.

5.3.1 Expand the acronym PERT in full. (1)

5.3.2 Draw a PERT chart based on the information provided in the table above. Indicate all the activities and their durations. (10)

5.4 Define the following terms:

5.4.1 Dependent tasks (1)

5.4.2 Concurrent tasks (1)

[30]

QUESTION 6

Study the passage below and answer the questions.



PROJECT FEASIBILITY

As the name implies, a feasibility analysis is used to determine the viability of an idea, such as ensuring a project is legally and technically feasible as well as economically justifiable. It determines whether a project is worth the investment.

In some cases, a project may not be achievable. There can be many reasons for this, for example requiring too many resources, which may prevent those resources from performing other tasks as well as costing the organisation more than it can earn back. Such a project would not be profitable.

[Source: *https://www.simplilearn.com/feasibility-study-article*]

6.1 Define the term *feasibility assessment.* (2)

6.2 Differentiate between any THREE different types of feasibility. (3 × 2) (6)

6.3 Define the following concepts:

6.3.1 Net present value (2)

6.3.2 Payback period (1)

6.3.3 Cost-benefit analysis (1)

6.4 A project's purpose explains the reason for its existence, the meaning of what is done, the ambition or dream pursued by the project or the direction it takes and maintains.

List the FOUR different sections a purpose statement comprises of. (4)
[16]

QUESTION 7

7.1 Progressive Logistics is a large company with several departments. A department in the company each has a unique code and a name.

All employees at Progressive Logistics have a unique Employee ID. The name, surname, date of employment (i.e., hire date) and salary of each employee is stored. Every employee is also assigned a Job code and reports to his/her department.

The Job of an employee is also described as his/her position. For every job the job description, minimum and maximum salaries are stored. Various employees at the company may have the same job (i.e., position) such as a driver or a clerk etc.

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Draw an entity relationship diagram (ERD) using the Crows-foot notation based on the scenario above. Indicate entities, non-key attributes, relationships, primary keys, foreign keys, and cardinalities. (15)

7.2 Differentiate between the following:

7.2.1 Primary key attribute

7.2.2 Non-key attribute

(2 × 2) (4)

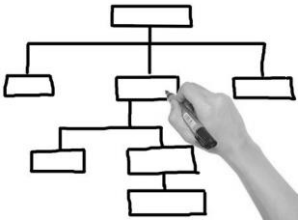
7.3 Differentiate between THREE types of events. (3 × 2) (6)

[25]

QUESTION 8

Study the passage below followed by a scenario description and answer the questions.

A process hierarchy diagram or functional decomposition diagram (FDD) provides a graphical view of the functions of a system and helps you decompose them into a tree of sub-processes. A FDD is defined as a top-down representation of process or function where a process decomposition diagram (PDD) (often called a decomp) explains the breakdown of processes within a project or business area or functional area. The purpose is to show all the processes and identify relationships and dependencies among them.



[Sources: *https://binaryterms.com/functional-decomposition.html, https://answersblurb.com/, https://www.dummies.com/article/business-careers-money/, https://infocenter.sybase.com/*]

The BEE GEE restaurant PoS system is comprised of 3 modules, namely:

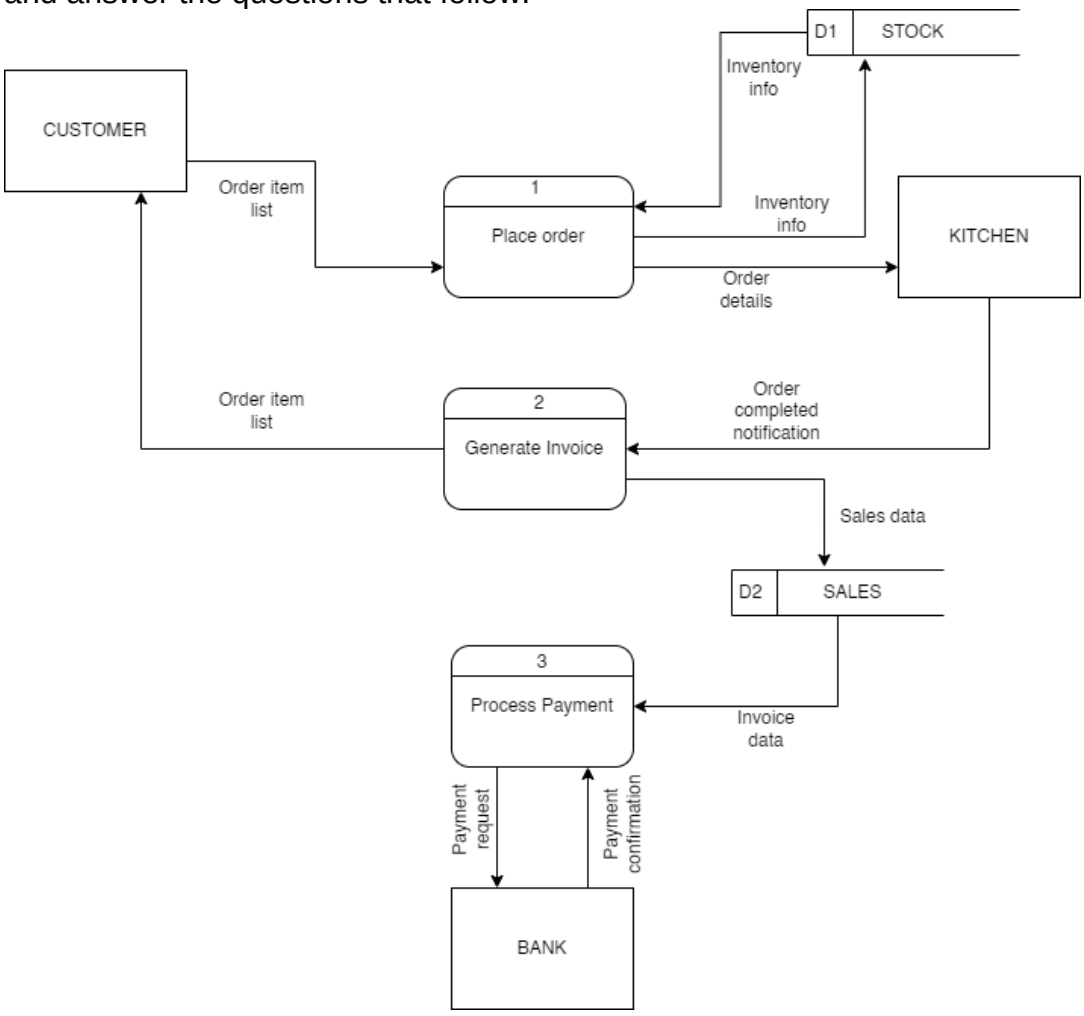
- Customer management,
- Orders and Sales,
- Stock management.



The customer management module provides the restaurant with the functionality to add customers, update existing customer data and delete a customer record. The Orders and Sales Module allows the staff to capture a new order/sale, modify a captured order/sale, cancel an order/sale, and process the payment. The stock management module allows the managers to track stock levels and to order new stock.

8.1 Draw a process decomposition diagram for the BEE GEE restaurant PoS system based on the scenario above. (14)

8.2 Study the following DFD diagram for the BEE GEE restaurant ordering system and answer the questions that follow:



Identify one of each of the elements in the given diagram and redraw ONE of each for every sub question. You need to select any correct symbol and its accompanying description (only one each).

8.2.1 External entity

8.2.2 Data store

8.2.3 Data flow

8.2.4 A process

(4 × 1) (4)

8.3 Still referring to the DFD as presented for QUESTION 8.2, answer the questions that follow:

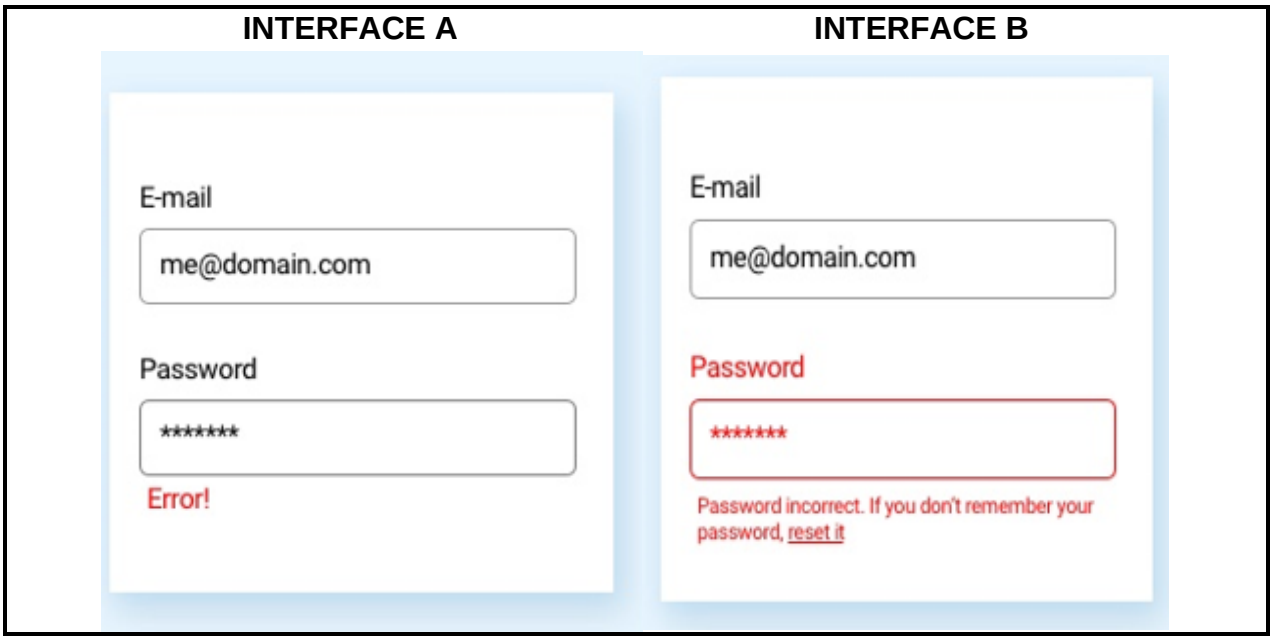
8.3.1 Identify the type of DFD diagram, depicted as part of QUESTION 8.2. (1)

8.3.2 State TWO reasons to motivate your answer for QUESTION 8.3.1 (2 × 1) (2)

[21]

QUESTION 9

Study the following and answer the questions.



9.1 Define the term: *user interface*. (2)

9.2 Which interface do you consider incorrect in terms of design? (1)

9.3 Motivate your answer to QUESTION 9.2. (2)

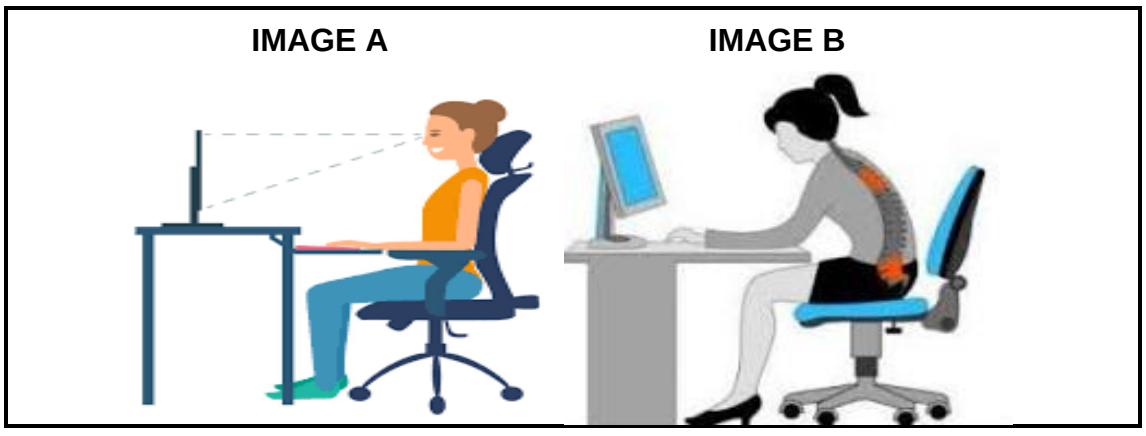
9.4 Discuss any FIVE good UI design principles. (5 × 2) (10)

[15]

QUESTION 10

10.1 Ergonomics is one of the important aspects that need to be considered when setting up a workstation and when buying hardware.

Study the diagrams below and answer the questions:



10.1.1 Define the term: *ergonomics* in terms of computing, (2)

10.1.2 State whether image A or image B indicates a good application of ergonomics. (1)

10.1.3 Motivate your answer to QUESTION 10.1.2. (2)

10.1.4 Name FOUR other important aspects that should be considered when setting up a workstation. (4 × 1) (4)

10.2 Study the following hardware component



[Source: *https://www.rollingstone.com/*]

Explain why the component is regarded as being ergonomically designed. (1)

10.3 There are several options available to organisations when it comes to acquiring computer technology. There are different options for hardware and software.

10.3.1 Name THREE different hardware acquisition options. (3 × 1) (3)

10.3.2 State TWO disadvantages of buying in-house applications. (2 × 1) (2)

[15]

TOTAL SECTION B: 160
GRAND TOTAL: 200

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