higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

SYSTEM ANALYSIS AND DESIGN
NQF LEVEL 4

16 NOVEMBER 2023

This marking guideline consists of 13 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	D		
	1.1.2	C		
	1.1.3	B		
	1.1.4	D		
	1.1.5	C		
	1.1.6	B		
	1.1.7	A		
	1.1.8	D		
	1.1.9	C		
	1.1.10	B		
			(10 × 1)	(10)
1.2	1.2.1	True		
	1.2.2	True		
	1.2.3	False		
	1.2.4	False		
	1.2.5	False		
	1.2.6	False		
	1.2.7	False		
	1.2.8	True		
	1.2.9	False		
	1.2.10	False		
			(10 × 1)	(10)
1.3	1.3.1	Graphical User Interface		
	1.3.2	Integrated Development Environment		
	1.3.3	Program Evaluation and Review Technique		
	1.3.4	Customer Relationship Management		
	1.3.5	Structured Query Language		
	1.3.6	Relational Database Management System		
	1.3.7	Extreme Programming		
	1.3.8	Business Process Reengineering		
	1.3.9	Third Normal Form		
	1.3.10	Computer Aided Design		
			(10 × 1)	(10)

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1.4	1.4.1	G
	1.4.2	P
	1.4.3	Q
	1.4.4	N
	1.4.5	J
	1.4.6	R
	1.4.7	K
	1.4.8	L
	1.4.9	S
	1.4.10	O

(10 × 1) (10)

[40]

TOTAL SECTION A: 40

SECTION B

QUESTION 2

2.1 2.1.1 *Software piracy* is the act of illegally using, copying or distributing software without having ownership or legal rights.✓✓ (2)

2.1.2 BSA Software Alliance. (1)

2.1.3 Softlifting or softloading entail the purchasing of a single licensed copy of software and loading it on several machines.✓ (1)

2.2 2.2.1 Institute of IT Professionals South Africa ✓ (1)

2.2.2 A code of ethics is a guiding set of principles ✓ intended to instruct professionals to act in a manner that is honest and that is beneficial to all stakeholders involved. ✓ (2)

2.2.3
- Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing
- Avoid harm
- Be honest and trustworthy
- Be fair and take action not to discriminate
- Respect the work required to produce new ideas, inventions, creative works, and computing artifacts
- Respect privacy
- Honour confidentiality

(Any other acceptable answer) (4 × 1) (4)

2.2.2
- ITA/ ITUC - The Information Technology Association (ITA)
- SAICSIT - South African Institute for Computer Scientists and Information Technologists
- BITF – Black Information Technology Forum
- BUSA – Business Unity South Africa
- ICITP - The Institute of Chartered IT Professionals in SA

(Any other acceptable example) (1)

[12]

QUESTION 3

3.1 3.1.1 Risk assessment in IT projects is the process of:
identifying, analysing, and evaluating potential risks ✓ that may impact the project's success, and developing strategies to manage or mitigate those risks.✓ (2)

3.1.2
- ***Project Delays (Is it delivered on time):*** Risks and threats in an IT project can lead to unexpected issues that cause delays in project timelines. For example, technical challenges, resource constraints, or changes in requirements may result in missed deadlines, impacting the overall project schedule.

- ***Cost Overruns (Is it within budget):*** Risks and threats can also lead to cost overruns in IT projects. Unforeseen challenges or disruptions may require additional resources, investments, or emergency measures, leading to increased project costs beyond the initial budget.

- ***Reduced Quality:*** Risks and threats can compromise the quality of deliverables. Technical issues, resource constraints, or time pressures may result in rushed or suboptimal solutions, leading to defects, bugs, or inadequate performance in the final product.

- ***Not delivering all Functionality to Users' Satisfaction:*** This concept emphasizes delivering the IT project with all the intended functionality and features to meet users' requirements and expectations. Risks and threats that can hinder this objective include unclear user requirements, changes in scope, and technical challenges that impact functionality.

(Any 3 × 2) – where 1 mark is allocated for the risk and 1 mark for a simple elaboration or implication thereof. (6)

3.1.3 Risk = Probability × Consequence
is a simple formula used in IT projects to measure the overall risk level. ✓

Probability is the chance of a risk event happening, ✓
while Consequence is its potential impact. ✓

The result (Risk) helps prioritize risks for effective management and decision-making. (3)

3.1.4 A contingency plan is a course of action designed to help an organisation respond ✓ effectively to a significant future incident, event or situation that may or may not happen.✓ (2)

3.1.5 Chief Information Officer (1)

3.2 ***Physical security:*** Locks and key's, Burglar bars

Firewalls: Hardware firewalls are dedicated devices that monitor and filter network traffic, blocking unauthorized access and potential threats from entering the system.

Intrusion Detection and Prevention Systems (IDPS): IDPS hardware monitors network traffic in real-time and alerts administrators of suspicious activities or potential intrusions. Some advanced IDPS can also take automated actions to block malicious traffic.

Network Access Control (NAC): NAC hardware enforces access policies, ensuring that only authorized devices and users can connect to the network.

Biometric Authentication Devices: Biometric hardware, such as fingerprint scanners or facial recognition cameras, provide robust authentication, making it harder for unauthorized users to access the system.

Hardware Security Modules (HSM): HSMs are specialized hardware devices used to generate and manage encryption keys securely, safeguarding sensitive data.

Security Cameras and Surveillance Systems: Physical security measures, like security cameras, help monitor and deter unauthorized physical access to critical IT infrastructure.

(Any 2 × 2) 1 Mark for the example and 1 mark for the clarification (4)
[18]

QUESTION 4

4.1 4.1.1 Metadata is data that describes other data ✓, providing a structured reference that helps to sort and identify attributes of the information it describes. ✓
Or
Metadata is information stored within a document ✓ that is not evident by just looking at the file.✓

4.1.2 A structured interview is a data collection method that relies on asking questions in a set order to collect data on a topic.✓✓

4.1.3 An ambiguous question is a question that has more than one meaning ✓ and the intended answer is vague. ✓

Or

An ambiguous question is a question that can have multiple interpretations or meanings, ✓ asking for several responses, or not clearly defining the subject/object. ✓

(3 × 2) (6)

4.2
- ***Observer bias:*** The observer's own biases can influence their observations, which can lead to inaccurate data.
- ***Limited scope:*** Observation can only be used to collect data on what is happening in the present moment. It cannot be used to collect data on past events or on people's thoughts and feelings.
- **Difficult to quantify:** It can be difficult to quantify the data collected through observation. This can make it difficult to analyse and interpret the data.
- ***Time-consuming:*** Takes longer than some other information gathering techniques
- ***Expensive:*** Expensive way to collect data.
- ***Hawthorne effect:*** People may change their behaviour when they know they are being observed, which can make it difficult to get accurate data.

(Any valid 2 × 1) (2)

4.3
- It provides rich detailed facts.
- It provides complete responses.
- Body language can be interpreted.
- There is a chance to probe and clarify.
- The subject is involved and committed.
- The interviewer can build a relationship with the interviewee.
- If the wrong person is interviewed, the interviewer can be directed to the correct person. (Any 5 × 1) (5)

4.4 4.4.1
- Checkbox questions can be used so that a respondent can only tick/mark to show whether they agree with the statement or not.✓✓
- Rating scales can be used to give respondents more options to choose from. They are allowed to give a response on a scale (6)

from total agreement to total disagreement, for example, the Likert scale.✓✓

- Multiple-choice questions can be used to allow a respondent to make one selection from a list of options.✓✓ (3 × 2)

4.4.2 Checkbox question:

The system has sufficient help functions. ☐ YES ☐ NO

Multiple choice question:

Which one of the following functions of the system must be improved first? A) ☐The search options B) ☐The statistical component C) ☐The reporting tool D) ☐The data export facility

Rating scale question:

The system is very low to respond when working with a large set of data. Strongly agree☐ Agree☐ Neutral☐ Disagree☐ Strongly disagree☐

Allocate 1 mark for the design and 1 mark for the relevance.

(3 × (1 + 1)) (6)

[25]

QUESTION 5

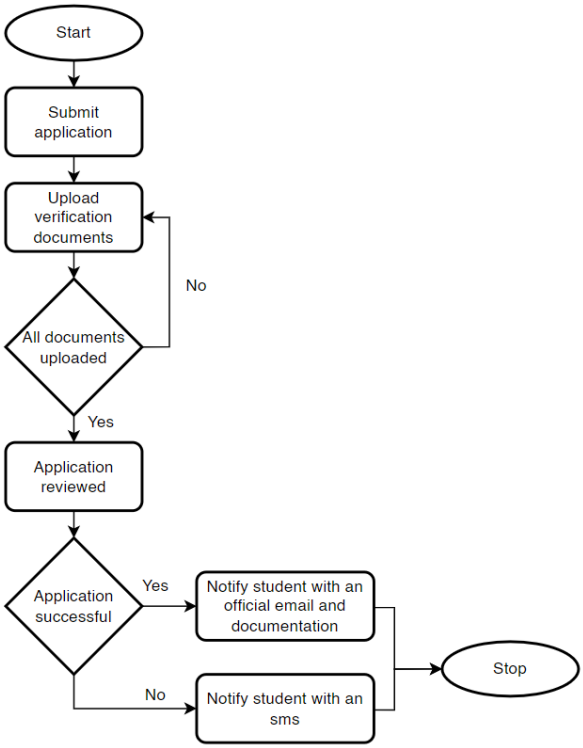
5.1 5.1.1 JAD, is a methodology that involves the client or end user in the design and development of a software application ✓ through a succession of collaborative workshops called JAD sessions ✓

5.1.2 Agile modelling a methodology for modelling and documenting software systems based on best practices ✓ and on iterative development approaches. ✓

5.1.3 Object-oriented refers to a programming language, system or software methodology ✓that is built on the concepts of logical objects. ✓

(3 × 2) (6)

5.2



Mark allocation - Allocate marks only if the correct symbols are used:

1 mark for indicating the start and the stop	(1)	
1 mark for indicating all processes	(5 × 1)	
2 marks for each condition	(2 × 1)	
2 marks for indicating the flows (yes and no)	(2 × 1)	(10)

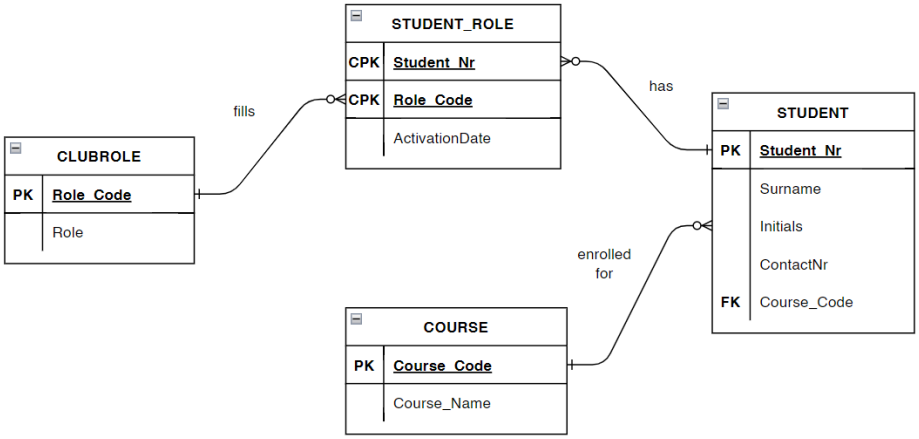
5.3 5.3.1 Lecturer Code
5.3.2 Class ID
5.3.3 Lecturer Code
5.3.4 1:1 (One to One)

(4 × 1) (4)

5.4 A primary key uniquely identifies each row in a table.✓✓ (2)

5.5 5.5.1 Database normalisation is the process of structuring a relational database to reduce data redundancy and improve data integrity. ✓✓ (2)

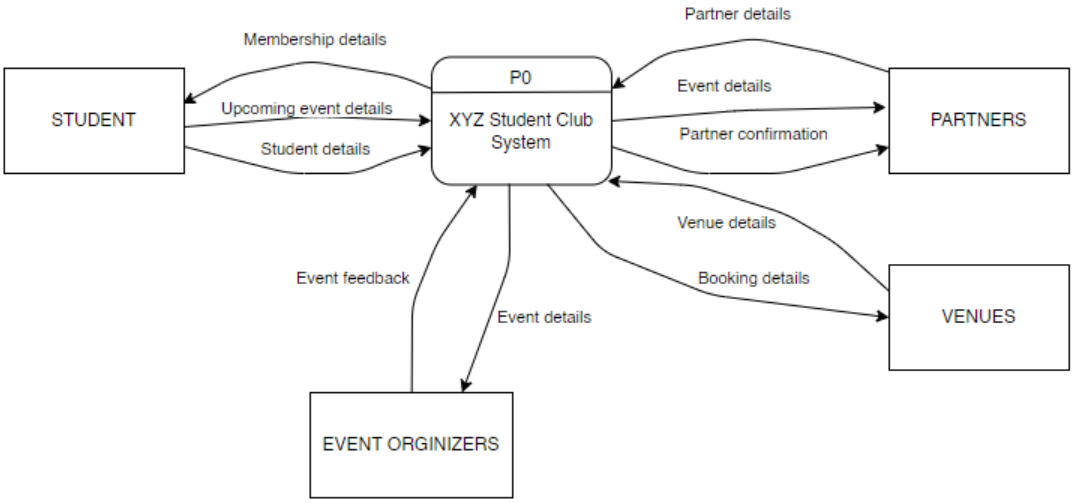
5.5.2 (20)



Mark allocation -

1 mark for each entity (4 × 1)
1 mark for each PK in the ClubRole, Student and Course entities. (3 × 1)
2 marks for the composite key in the StudentRole associative entity (2 × 1)
1 mark for indicating the FK in the Student table (1 × 1)
1 mark for indicating all the other fields in each entity (Activation date field in the associative entity is not required) (4 × 1)
1 mark for indicating the relationships (description) (3 × 1)
1 mark for indicating the cardinalities correctly (3 × 1)

5.6



Mark allocation
1 mark for indicating a single process P0 (1 × 1)
1 mark for each entity (4 × 1)
Maximum of 5 marks for indicating the information flows with relevant descriptions and an indication of the direction of the information flow. (5 × 1) (10)

5.7 5.7.1 Use case diagram (1)

5.7.2 Three (1)

5.7.3 Two (1)

5.7.4 It is the system boundary. ✓
It distinguishes the border between use cases and actors (use cases are inside the borders of the system boundary box and actors are outside of it). ✓ (Any 2 × 1) (2)

5.7.5 In the diagram <<extend>> and <<include>> are both relationship connectors that show how use cases are related to each other.

The included use case:
- represents a sub-functionality that is called upon by the including use case;
- is not mandatory; it may or may not be executed during the execution of the including use case. (Any 1 fact)

E.g., When the Chairperson manages the Member information it is not mandatory for him to send notifications.
(Plus 1 mark for an appropriate example from the use case)
The extend use case:
- show optional functionality or system behaviour;
- adds itself to the base use case, often has a condition attached to it where extended use case executes only when the condition is true. (Any 1 fact)

E.g., A student may browse the App but the register use case will only trigger if the student decide to register.
(Plus 1 mark for an appropriate example from the use case)
((1+1) × 2) (4)

5.7.6 Unified Modelling Language (1)

5.8 A CRC card, in the context of object-oriented programming and design, is a small index card used to represent a Class, its Responsibilities, and the Collaborators it interacts with. ✓ It is a visual tool used for collaborative design discussions and brainstorming in which each card captures essential information about a class's behaviour and relationships with other classes. ✓ (2 × 1) (2)

[66]

QUESTION 6

6.1 Front-end system. (1)

6.2 The user is allowed to interact with the data stored and processed in a separate database ✓ on a server and perform operations using components that are linked to actions. ✓ (2)

6.3 An information system (IS) is an interconnected set of components ✓ used to collect, store, process and transmit data and digital information ✓ (2)

6.4
- An information system is a broader concept that encompasses all components, processes, and resources involved in managing and processing information within an organization or a specific context.
- GUI (Graphical User Interface) is a specific user interface that allows users to interact with an information system through visual elements like icons, buttons, and menus.
- GUI is a key component of an information system as it enables users to easily access and manipulate data and functionality.
- The GUI serves as a bridge between users and the underlying information system, facilitating intuitive and user-friendly interactions.

(Any valid 2 × 2) (4)

6.5 Yes (1)

6.6 It is connected to the active DB named ROKruProd (1)

Take note, just because it is connected to a server it does not mean it is connected to a database.

6.7
- Data Navigator
- Data Binding Navigator
- Navigation keys

(1)

6.8 No (1)

6.9 The active record pointer already points to the first record. (1)

6.10 To add / insert a new record. (1)

6.11
- Combobox
- NumericUpDown
- Datetimepicker/Calendar control
- DataGridView

(Any 2 × 1) (2)

6.12 RangerID (1)

6.13 Boolean
or
Yes/No (1)

6.14
- Vehicle management
- Zone inspections
- Route management

(1)

[20]

QUESTION 7

7.1 Phased implementation (1)

7.2 ***Direct cutover / Bing bang adoption***
Changing over from the old information system to a new one by turning off the old system when the new one is turned on.

Parallel Installation
Running the old information system and the new information system at the same time until management decides the old system can be turned off.

Pilot operation
Single location installation involves trying out a new information system at one site using the experience decide how the new system should be installed throughout the organization.

Allocate 1 mark for the type and 1 mark for a short explanation for each.
(3 × 2) (6)

7.3
- Regular communication during ICT system implementation keeps employees informed about progress, changes, and expectations, fostering transparency, and reducing uncertainty.

- This helps build employee confidence and minimizes resistance, contributing to a smoother and more successful implementation process.

TAKE NOTE: This question is deliberate, as the answer is provided in the paragraph. It tests whether the candidates really read the given scenarios.
(2 × 1) (2)

7.4
- Risk of adoption
- Difficulty of adoption
- Cost of the adoption

(Any TWO) (2 × 1) (2)

7.5
- Decide if their system has met all its objectives and satisfied all the user requirements.
- Decide if the system is working as smoothly and efficiently as it should.
- Decide if there are any lessons learnt from the design and development of this system that will benefit them (specialists) when working on future systems. (3 × 1) (3)

[14]

QUESTION 8

8.1	Scrum	(1)
8.2	Extreme programming	(1)
8.3	• It is possible for team members to misinterpret the information shown on the Kanban Board, especially when it is shown as outdated. • Since there are no timeframes in Kanban, you can face time-related problems, such as delays, at each stage. **Any acceptable (2 × 1)**	(2)
8.4	Feature-Driven Development	(1) **[5]**

TOTAL SECTION B: 160
GRAND TOTAL: 200