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Department:
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PROVINCE OF KWAZULU-NATAL

TRIAL EXAMINATION

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INFORMATION TECHNOLOGY P2

PINETOWN DISTRICT CLUSTER PAPER

MARKS: 150

TIME: 3 HOURS

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX sections:

Section A:	Short questions	(20)
Section B:	System Technologies	(25)
Section C:	Communication and Network Technologies	(25)
Section D:	Data and Information Management	(25)
Section E:	Solution Development	(25)
Section F:	Integrated Scenario	(30)

2. Read ALL the questions carefully.
3. Answer ALL the questions.
4. The mark allocation generally gives an indication of the number of facts/reasons required.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Write neatly and legibly.

SECTION A: SHORT QUESTIONS

QUESTION ONE

1.1 Multiple choice –

Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1–1.10) in your answer book.

- 1.1.1 The use of icons and windows are characteristics of _____ interface.
 A. command driven
 B. windows orientated
 C. menu driven
 D. graphical user (1)
- 1.1.2 Data Encryption Techniques are particularly used for _____.
 A. protecting data in Data Communication System
 B. reducing Storage Space Requirement
 C. enhancing Data Integrity
 D. decreasing Data Integrity (1)
- 1.1.3 Which of the following instruction steps, would be written within the diamond-shaped box, of a flowchart?
 A. $S = B - C$
 B. If $A < 10$
 C. PRINT A
 D. Delete(X,1,4) (1)
- 1.1.4 When linking a hardware device to a network, the IP Address 168.212.226.018 is represented as
 A. 10101000.11010100. 11100010. 00010001
 B. 10101000.11010100. 11100010. 00011010
 C. 10101000.11010100. 11100010. 00010010
 D. 10101000.11010100. 11100010. 00001100 (1)
- 1.1.5 A computer maintenance utility designed to free up disk space on a computer's secondary storage (1)
 A. Recycle bin
 B. Antivirus
 C. Disk Cleanup
 D. Defragmentation

- 1.1.6 Hacking technique where SQL statements are typed into an input field in order to gain unauthorised access to sensitive data.
- A. SQL queries
 - B. Data mining
 - C. Integrity checking
 - D. SQL injection
- (1)
- 1.1.7 This protocol allows you to access your email wherever you are, from any device.
- A. POP3
 - B. IMAP
 - C. SMTP
 - D. HTTP
- 1.1.8
- ```
var
 iDrinkPacks: integer;
begin
 iPassengers := 100;
 iDrinkPacks := Ceil(iPassengers / 6);
 if (iDrinkPacks mod 2 = 1) then
 iDrinkPacks := iDrinkPacks + 1;
```
- After the execution of the code, what will the value of iDrinkPacks be?
- A. 16
  - B. 17
  - C. 18
  - D. 19
- (1)
- 1.1.9 Which type of data validation CANNOT be done by means of programming code?
- A. Presence check
  - B. Correctness check
  - C. Range check
  - D. Format check
- (1)
- 1.1.10 Which design tool would best suit a software developer who wants to determine the output of an algorithm?
- A. Use case diagram
  - B. IPO diagram
  - C. Trace table
  - D. TOE chart
- (1)

**1.2 Give one word/term for each of the following descriptions. Write only the word/term next to the question number in your ANSWER BOOK.**

- 1.2.1 Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions. (1)
- 1.2.2 A remotely controlled network of zombie computers. (1)
- 1.2.3 The process where users are redirected to a different website than the one whose address was entered in the web browser. (1)
- 1.2.4 Using the collective processing power of many computers to work on a single, common task. (1)
- 1.2.5 A type of malware that blocks or limits access to a computing device or files or encrypts data until the victim pays a specified amount of money. (1)

**[5]**

**1.3 State whether each of the following statements are True and false. If False, rewrite the correct word for the underlined word.**

- 1.3.1 A table is a collection of fields on a single entity. (1)
- 1.3.2 Private key encryption uses a single 'secret' key for both encryption and decryption. (1)
- 1.3.3 Storing recently accessed web pages locally on the hard drive for quicker retrieval is called hard disk caching. (1)
- 1.3.4 A service pack can be downloaded to fix a specific bug in software (1)
- 1.3.5 A DDoS attack makes a website unavailable by using thousands or millions of computers to request data from the site at the same time. (1)

**[5]**

**TOTAL SECTION A: [20]**

**Scenario**

***“Community members have come to the aid of small and medium sized businesses”. This venture was a result of the recent events in KZN that had a negative impact on these business. The aim is to help boost the economy.***

***As an IT learner, your services are required to assist businesses make wise choices when purchasing new computers and other technological devices.***

**SECTION B: SYSTEM TECHNOLOGIES****QUESTION TWO**

- 2.1 Instead of buying new computers, it was suggested that upgrading would be a better and more feasible option as many computers were capable of being upgraded.
- 2.1.1 Name TWO necessary factors that need to be considered when upgrades are to be employed. (2)
- 2.1.2 What is the term is used to describe the design of computers that allow for upgrading and replacing of hardware components instead of buying a new computer? (1)
- 2.2 Upon inspection of some computers it was found the computers have **SSD only**, or **SSD and HDD** or **HDD only**.
- 2.2.1 Tabulate 2 differences between SSD and HDD. (2)
- 2.2.2 State TWO advantages of having both SSD and HDD drives on a computer. (2)
- 2.3 Sometimes, when working with video files, or working with very large files, the message “**Virtual memory is low**” appears.
- 2.3.1 What is the reason for the operating system using virtual memory? (1)
- 2.3.2 Explain the concept “virtual memory”. (2)
- 2.3.3 Besides increasing the Virtual Memory allocation on the Hard disk, what other hardware solution can fix the error? (1)

- 2.4 It was also noticed that computers were poorly managed by staff and the necessary maintenance tasks were not carried out.
- 2.4.1 Firstly, there was no backups found.  
Why are backups necessary? (2)
- 2.4.2 Explain the process of **archiving**. (2)
- 2.4.3 Name one example of an on-line backup service. (1)
- 2.4.4 Backups are important because hard drives could fail.  
Give one reason why a hard disk drive could fail. (1)
- 2.4.5 Name a device that could protect data from being destroyed during a power failure. (1)
- 2.4.6 Explain how a firewall may protect your data. (2)
- 2.5 It was also noticed that the Operating System indicated that upgrades were available.
- 2.5.1 State an advantage of allowing your operating system to be updated at regular intervals. (1)
- 2.5.2 ***“Allowing the Operating System to be automatically updated is a bad idea.”***  
Give two reasons why you think the statement above is correct. (2)
- 2.6 During an audit, it was also found that many of the employees were using tablets to conduct business.
- 2.6.1 List TWO advantages that tablets have over desktop computers. (2)

**TOTAL SECTION B: [25]**

**SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES****QUESTION THREE**

The businesses wish to have all their computing devices in their office connected to a network. They would also require this computer network to be connected to the internet.

- 3.1 Networking of devices makes the sharing of hardware and communication between the devices possible. When setting up a network we have to decide between connecting the network using UTP cables or connecting it wirelessly.
- 3.1.1 Give TWO advantages of connecting the network wirelessly, in other words, by using a WLAN. (2)
- 3.1.2 Give TWO possible disadvantages of connecting the network wirelessly. (2)
- 3.2 We often have to decide whether we want to implement the LAN as a client-server network as opposed to a peer-to-peer network.
- 3.2.1 In a client-server network, how does a server differ from any of the other computers connected to the network? (2)
- 3.2.2 What is the difference between 'fat clients' and 'thin clients' in a networked environment? (2)
- 3.3 Cloud computing refers to the use of resources that are offered as services over the internet.
- 3.3.1 Explain what Software as a Service (SaaS) refers to. (2)
- 3.3.2 A common feature of online storage systems is the ability to synchronise files. Briefly describe what this means. (2)
- 3.4 Networks make it possible to transfer data, information and software. Many more users are now using BitTorrent.
- 3.4.1 What is BitTorrent? (2)
- 3.4.2 Why is it usually quicker to use BitTorrent to download a file rather than downloading it from a server? (2)
- 3.5 We find that many people are preferring to use various IM systems such as WhatsApp instead of email to send and receive documents. Give a reason why there may have been a swing away from using e-mail. (1)
- 3.6 Give ONE reason why it might not be a good idea to use a webcam during a Skype session. (1)

- 3.7 Give ONE reason why having digital records stolen can present more of a problem than the theft of physical records (hard copies). (1)
- 3.8 Multimedia on the web and video on demand are becoming increasingly popular.
- 3.8.1 Explain the difference between downloading and streaming by commenting on their respective benefits and drawbacks. (4)
- 3.8.2 Multimedia files are often saved in compressed file formats. Digital compression can be either lossy or lossless. Explain the difference between these two types of compression techniques. (2)

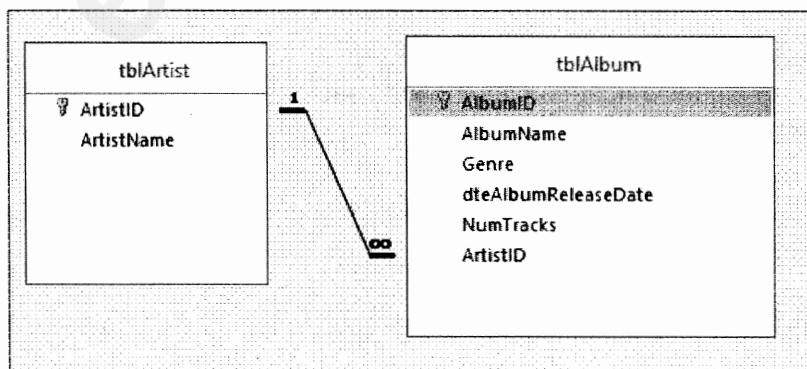
**TOTAL SECTION C: [25]**

## SECTION D: DATA AND INFORMATION MANAGEMENT

### QUESTION FOUR

- 4.1 **Dragon Studio Ltd** is a music label company that has a relational database keeping record of all albums they have produced and the artists who worked on it.
- 4.1.1 Describe two characteristics of a relational database. (2)
- 4.1.2 Record locking is a mechanism used in most databases. Explain why record locking is necessary when different staff members are working on the same table in the database. (2)
- 4.2 The database of the library has two tables: **tblArtist** and **tblAlbum**. The table **tblArtist** keeps record of the artists who created the albums. The table **tblAlbum** keeps record of the albums the music label produced.

The relationship between the tables is given below.



4.2.1 The **ArtistID** in the **tblArtist** table is the primary key. Explain what a *primary key* is in this context. (1)

4.2.2. What is the **ArtistID** field in the **tblAlbum** table called in terms of the relationship between the tables? (1)

4.3 Data in a table **tblAlbum** is indicated below.  
The data in this table is not normalised.

| AlbumID | AlbumName                             | AlbumReleaseDate | NumTracks | ProducerName      | ProducerContactNum | ProducerLocation |
|---------|---------------------------------------|------------------|-----------|-------------------|--------------------|------------------|
| 2       | Now That's What I Call Music! Vol. 52 | 2002/07/22       | 32        | EMI               | 0712456789         | Durban           |
| 3       | Heathen Chemistry                     | 2002/07/01       | 12        | Island            | 0785426999         | Jeffrey's Bay    |
| 4       | Fever                                 | 2001/10/01       | 16        | Parlophone        | 0331456988         | Pietermaritzburg |
| 5       | The Best Bands in the World...Ever    | 2002/11/04       | 27        | EMI               | 0712456789         | Durban           |
| 6       | Reloaded Vol.4                        | 2002/01/21       | 18        | Interscope        | 0112525555         | Midrand          |
| 7       | The Joshua Tree                       | 1987/03/01       | 19        | Parlophone        | 0331456988         | Pietermaritzburg |
| 9       | The Eminem Show                       | 2002/05/27       | 17        | Universal Music T | 0641258796         | Knysna           |
| 10      | The Marshall Mathers LP               | 2000/09/11       | 21        | Universal Music T | 0641258796         | Knysna           |
| 11      | Forget About Dre [CD Single]          | 2000/05/29       | 24        | Island            | 0785426999         | Jeffrey's Bay    |

4.3.1 What is the general aim of normalisation? (1)

4.3.2 Normalise the above table indicating the primary and foreign keys and the relationship between them. (6)

4.3.3 Use the tables in QUESTION 4.3.2 to design an ERD and show the relationship that exists between all entities. (3)

4.4 Staff members at the music studio have made enquiries about their personal information being used to send them messages from an unknown source. Management at the studio responded that 'it is invisible data capturing'.

What is meant by the term *invisible data capturing*? (2)

4.5 Name and briefly describe TWO characteristics of quality data. (2)

4.6 Access control is an essential part of protecting data. List TWO methods of controlling access to data. (2)

4.7 Maintaining the data is an essential part in the management of data. What is involved in data maintenance? (1)

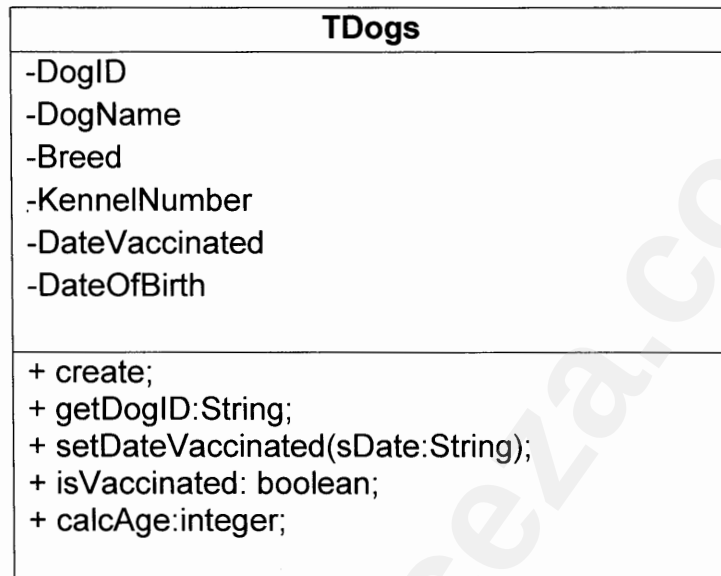
4.8 4.8.1 Why is it important to keep data independence in mind when tables are designed? (1)

4.8.2 Give ONE type of data independence. (1)

TOTAL SECTION D: [25]

**SECTION E: SOLUTION DEVELOPMENT****QUESTION FIVE**

5.1 Study the UML diagram below and answer the questions that follow:



5.1.1 Give an example of each of the following:

5.1.1.1 An accessor method (1)

5.1.1.2 A mutator method (1)

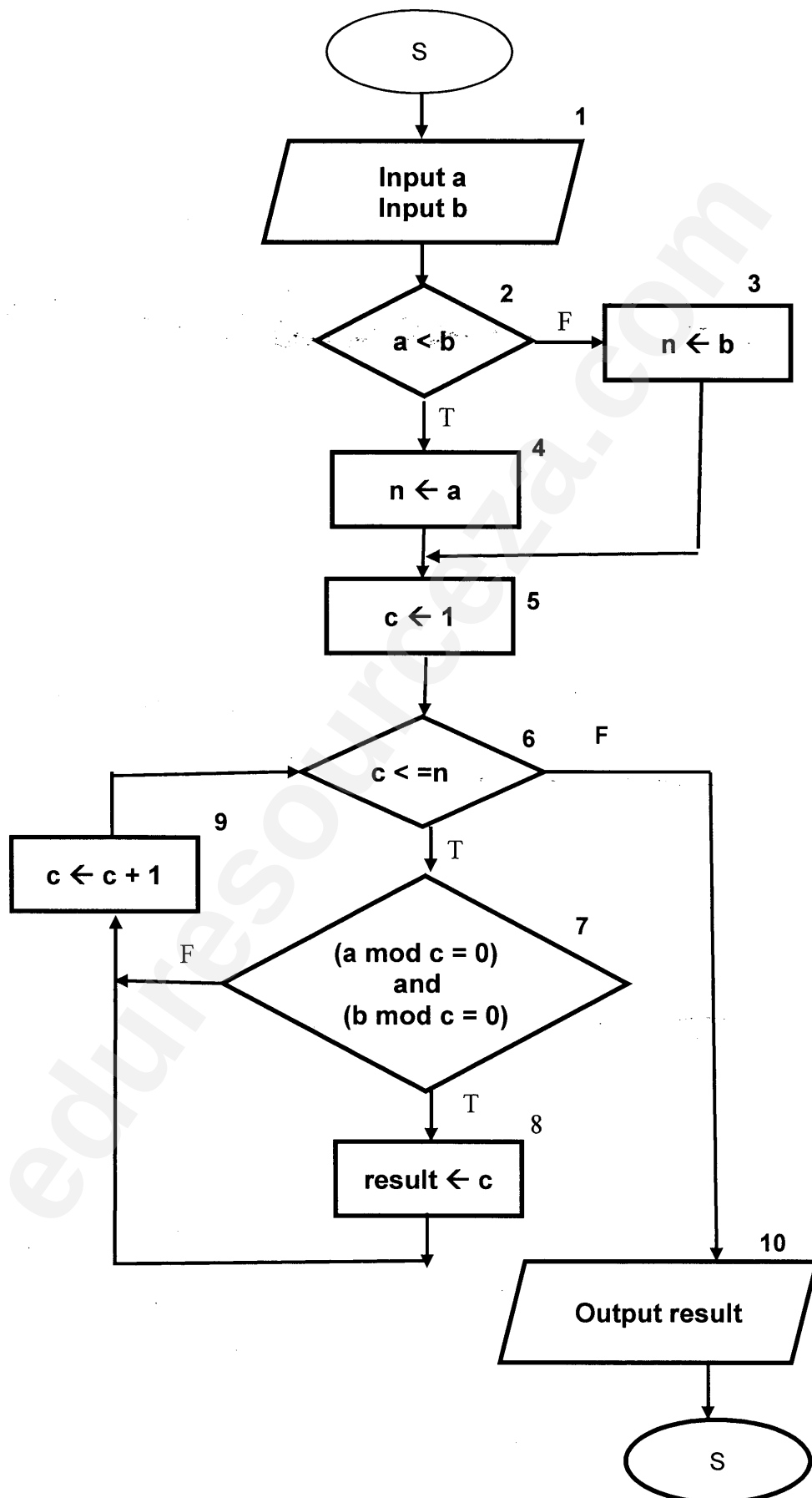
5.1.2 The UML diagram has the field attributes using negative (-) signs and the methods using positive(+) signs

5.1.2.1 What does the negative (-) sign and positive (+) sign imply in the UML diagram? (2)

5.1.3 5.1.3.1 Is the method isVaccinated a procedure or function? (1)

5.1.3.2 Provide an explanation for your response in 5.1.3.1. (1)

- 5.2 Study the flowchart below and then answer the questions that follow:  
NB: The flowchart symbols (boxes) are numbered for reference purposes.



- 5.2.1 Draw a trace-table for the flowchart using the input values of  $a = 4$  and  $b = 8$ .  
Use the following headings and create the columns in your answer book.

(6)

| Box | a | b | $a < b$ | n | c | $c \leq n$ ? | $(a \bmod c = 0)$<br>and<br>$(b \bmod c = 0)$<br>? | result | Output |
|-----|---|---|---------|---|---|--------------|----------------------------------------------------|--------|--------|
|     |   |   |         |   |   |              |                                                    |        |        |

- 5.2.2 What is the objective of the flowchart? (1)
- 5.2.3 How will the removal of box 8 affect the output? (1)
- 5.2.4 Convert the flowchart into pseudocode. (9)
- 5.2.5 When converting the above algorithm into Delphi code, one may experience a syntax or logical error if not coded correctly. Differentiate between a syntax and a logical error. (2)

**[25]**

**SECTION F: INTEGRATED SCENARIO****QUESTION SIX**

You have applied for a Junior Software Development position at a local Web and Software Company. The company specializes in dynamic web content development. This includes using scripting languages, development of API and cloud services.

**6.1 Answer the following as technical questions for the job interview**

6.1.1 What is the difference between a dynamic website and a static web site? (2)

6.1.2 State TWO advantages associated with the use of cloud computing and services. (2)

6.1.3 State the function of an API? (1)

**6.2 The internet is used to search for products by the search term and user profile.**

6.2.1 Explain what profiled searches entails. (2)

6.2.3 Search engines also use social networking profiles to generate content. This use of social networks can expose one to social engineering.

6.2.3.1 Explain what the term social engineering refers to. (1)

6.2.3.2 Provide one example of how social engineering takes place when online. (1)

6.2.5 When accessing a website, it notifies you of its usage of cookies to assist you in your site usage and shows an option to view its cookie policy.

6.2.5.1 Clearly state what a cookie is and the function that it performs. (2)

6.2.5.2 Which programming language is used to program web storage specifications? (1)

6.2.6 Explain the concept of 'semantic search' (1)

**6.3 The company want you to assist in developing an app for a client who deals with web store purchases online.**

- 6.3.1 Give **TWO** advantages of having an App version of the client's site for sales. (2)
- 6.3.2 A client wants to offer an e- magazine to subscribers.  
You are required to ensure that DRM is setup with the devices using the App correctly.  
What does DRM stand for? (1)
- 6.3.3 Give **ONE** reason that you would recommend that they do NOT use a site whose URL starts with http://. (1)
- 6.3.4 Online businesses need to be aware of cybercrime.  
Name **TWO** negative effects that cybercrime can have on businesses. (2)
- 6.4 The company wants to use AR (Augmented Reality), VoIP and Rfid devices for marketing in property sales.
- 6.4.1 Give **TWO** advantages of having an AR device for sales. (2)
- 6.4.2 Name **ONE** main requirement to use AR that would need to be available on site. (1)
- 6.4.3 Name **ONE** main reason why VR (virtual reality) would NOT be a suitable option for most clientele. (1)
- 6.4.4 The client wants to use RFID tags to control access to premises  
What medium of communication is used by RFID to identify objects? (1)
- 6.4.5 An RFID tag may be passive or active.  
Differentiate between the passive tag and the active tag. (2)
- 6.4.6 State **TWO** potential disadvantages of using RFID to control access rather than bio-metric technology to secure the premises. (2)
- 6.4.7 State **TWO** possible disadvantages of relying on VoIP to communicate with customers. (2)

**TOTAL SECTION F: [30]**

**GRAND TOTAL: 150**