NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2025

INFORMATION TECHNOLOGY: PAPER II

MARKING GUIDELINES

Time: 3 hours 150 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

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SECTION A SHORT QUESTIONS

QUESTION 1 DEFINITIONS

Give the most appropriate term for each of the following expressions:

1.1 IRQ (Interrupt Request) (Accept Interrupt)

1.2 Thin Client

1.3 MAC Address (Media Access Control Address)

1.4 Multitasking

1.5 Lossy Compression

1.6 Blockchain

1.7 DoS (Denial of Service) attack

1.8 RAID Level 1

1.9 Runtime Error

1.10 AUP (Acceptable Use Policy)

10 marks

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SECTION B SYSTEM TECHNOLOGIES

QUESTION 2 THEORY

For each of the definitions in Column A below, select the **most appropriate term** in Column C by matching the letter to the question number. You should merely write down the appropriate letter in Column B.

Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Answer	B	J	G	O	L	C	H	A	D

9 marks

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QUESTION 3 APPLICATION

3.1 3.1.1 System clock

3.1.2 Twice

3.2 3.2.1 JPG, JPEG, HEIC, PNG, BMP. (Accept any correct format.)

3.2.2

Storage device		Connection to laptop
Device 1	External drive	USB port
Device 2	Cloud storage	Internet link

Accept any correct options, e.g. Memory stick (USB) SD Card (Card Reader), as long as the device and connection are correct and the connection for each chosen device is different, i.e. can't both use USB ports. Accept proprietary names for cloud storage, e.g. Google Drive.

3.2.3 (a) FALSE

(b) Virtual memory does not make more storage available to store files.
Virtual memory assists when RAM is running low by using secondary storage to swap data between RAM and secondary storage.

3.3 3.3.1 It is much quicker to access.

3.3.2 SRAM

3.3.3

Advantage	Faster, does not need to be refreshed.
Disadvantage	More expensive, low storage capacity.

3.3.4

Cache type 1	Disk cache
Cache type 2	Web cache

(Accept browser, proxy.)

3.4 3.4.1

Type of card	Part of the CPU	Uses system resources	Has its own RAM	Separate GPU
Integrated				
Dedicated				

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3.4.2

Integrated	Dedicated

Reason 1	There is nothing in the scenario suggesting the need for sophisticated graphics processing.
Reason 2	An additional graphics card will drain the battery, and a long battery life is useful when out on the farm all day.

(Accept any two valid reasons.) It is unlikely to accept a dedicated card as the answer – nothing in the scenario suggests it will be needed.

3.5 3.5.1 Per component: The CPU (for example) operates faster than the system clock by changing its own clock multiplication factor.
Whole system: The system clock is increased, affecting all the components that detect it and multiplying by a factor.

3.5.2

Risk	Overheating
How to avoid	Apply additional cooling

(Accept any valid risk, e.g. early component failure.) 'How to avoid' must match the risk.

31 marks

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SECTION C INTERNET AND COMMUNICATION TECHNOLOGIES

QUESTION 4 THEORY

Question	1	2	3	4	5	6
Answer	D	A	C	C	B	A

Question	7	8	9	10
Answer	C	A	C	B

10 marks

QUESTION 5 APPLICATION

5.1 5.1.1 A switch connects different devices on a network, allowing for data transfer.

5.1.2

Device 1	Network printer
Device 2	Router
Device 3	Security cameras

(Accept any devices connecting to a switch, i.e. transfer data across the network.)

5.1.3 FALSE
A switch works at the MAC address level, so it keeps a list of the MAC addresses of devices connected to it. If the candidate refers to OSI model layers, an accept switch is a layer 2 device.

5.2 Hybrid
The scenario suggests that the topology will be a star in the office, farmhouse, and packing area but will have a bus-type topology connecting them, especially for the long-distance run to the farmhouse. Must relate to the scenario.

5.3 5.3.1 A wireless access point. (Do not accept wireless router.)

5.3.2 Via a cabled connection to the switch.

5.3.3 Because each packet is encrypted with a different key.

5.4 5.4.1 Fibre optic cable. (Do not accept UTP/STP.)

5.4.2 The distance is too long for UTP/STP – the farmhouse is 1 km from the office, and a UTP has a limit of 100 m.

5.4.3

Disadvantage 1	Expensive form of cabling.
Disadvantage 2	Need special expertise to install it.

5.5 5.5.1

Advantage:	Allows for far faster download speeds, lower latency.
Disadvantage:	Not as good coverage, especially in rural areas.

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5.5.2 (a)

Connection type	A / B
Synchronous	B
Asynchronous	A

(b) NO. Most traffic is download traffic; the only upload traffic will be website requests and sending emails, which will not need a higher upload speed.

(c) YES. There will be considerably more data being uploaded, so that a higher upload speed would be useful. **OR**
NO. Efficient synchronisation will mean only small amounts of data are being uploaded at any one time, although there might be one or two large uploads to begin with. For YES/NO and reason.

5.6 5.6.1 Static

5.6.2 DHCP

5.6.3 Network Printer/Switch
These devices always need to have the same IP address because it is usually configured into software, and if it changes, there will be a configuration issue.

29 marks

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SECTION D SOCIAL IMPLICATIONS

QUESTION 6

6.1 A type of malicious software designed to block access to a computer system until a sum of money is paid.

6.2 Greater understanding of the problem of ransomware; there is a lot of information about ransomware on the news and social media, and a lot of awareness. (Any valid reason suggesting a greater AWARENESS and, therefore, fewer attacks.)

6.3 Loss of business, new hardware might have to be bought, cost of rebuilding systems and data. (Any valid example.)

6.4 6.4.1 Bitcoin/ Ethereum/ Ripple. (Any valid name.)

6.4.2

Characteristic 1	Difficult to counterfeit.
Characteristic 2	Not subject to regulation.

Other options: Not controlled by central bank/government, uses blockchain to verify transactions. (Accept any two valid options.)

6.4.3 Because they are difficult to trace and are anonymous, the person demanding a ransom is less likely to be caught. (Any valid reason.)

6.5

Tip 1	Keep antivirus updated.
Tip 2	Use a firewall.
Tip 3	Use email protection.

Other acceptable answers: Do not click on links or download files you are not sure of, backup data, application whitelisting, limit user access privileges.

6.6 SSL encrypts all data sent between user and web server – if this is trapped, it is meaningless.

6.7

Task 1	Crop spraying.
Task 2	Videoing/photographing of remote areas.

(Accept any two correct answers that relate to the scenario and would save time/labour.)

14 marks

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SECTION E DATA AND INFORMATION MANAGEMENT AND SOLUTION DEVELOPMENT

QUESTION 7

7.1 7.1.1 Accessor: To provide access to private fields of an object.

Mutator: To change the value of a private field of an object
(NB: Candidate must mention private in their answer.)

7.1.2

Characteristic	Accessor method	Mutator method
Returns a single value		
Are void methods		

7.2 Encapsulation is the practice of bundling related data into a structured unit, along with the methods used to work with that data.
Alternative: Encapsulation is a fundamental concept in OOP that combines data (attributes) and methods that work with that data into a single unit known as a class.

7.3.1

Crop
Fields: -name : string -seedCost : real -packsBought : integer <u>+GROWINGCOST = 2850 : integer</u>
Methods: +Constructor () +Constructor (inN : string, inSc : real, inPb : integer) +getSeedCost() : real +getPacksBought() : integer +totalCost() : real +toString() : string

Mark allocation:
- all fields set to private
- all fields named and typed correctly
- static field named, typed, assigned a value and underlined
- all methods set to public
- both constructors shown, parameters all correct
- all other methods shown and typed correctly

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Farm
Fields: - farmName : string - area : integer - dam : boolean - cropOne : Crop - cropTwo : Crop
Methods: +Constructor (inFn : string, inA : integer, inD : boolean, inC1 : Crop, inC2 :Crop) + getFarmName() : string + setDam(chD : boolean) + farmCost() + toString() : string

Mark allocation:
- cropOne and cropTwo typed correctly
- constructor correct with all parameters named and typed correctly
- mutator method correct with correct parameter and type
- all other methods shown correctly

7.4 NO. The method would only be overridden if there was an inheritance relationship between the two classes.

7.5 Constructor method of the Crop class. This is an example of overloading, as there are two methods with the same name in the same class with different parameter lists.

7.6 7.6.1 Composition

7.6.2 The two fields, cropOne and cropTwo in the Farm class, which are of type Crop.

7.7 7.7.1

D	P	S	D.S	P.S	D.S + P.S	RESULT True / False
0	0	0	0	0	0	F
0	0	1	0	0	0	F
0	1	0	0	0	0	F
0	1	1	0	1	1	T
1	0	0	0	0	0	F
1	0	1	1	0	1	T
1	1	0	0	0	0	F
1	1	1	1	1	1	T

Mark allocation:
- for the D.S and the P.S column
- for the D.S + P.S column
- for the RESULT column to match the D.S + P.S column

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7.7.2 F(D,P,S) = (D'PS) + (DP'S) + (DPS)

Mark allocation:
- for THREE correct elements of function matching to RESULT column
- for correct AND, NOTs, ORs

7.8.1

Line	FarmName	fCost	bCost	i	c1Cost	c2Cost	fCost > bCost
1	Happy Farm						
2		0.00					
3			0.00				
4					0.00		
5						0.00	
6				0			
7					31850.00		
8						100350.00	
9		132200.00					
10							True
11	Happy Farm						
12		0.00					
6				1			
7					46830.00		
8						362850.00	
9		409680.00					
10							True
11	Moonshine Farm						
12			0.00				
6				2			
7					292850.00		
8						21850.00	
9		314700.00					
10							True
11	Green Glades						
12		0.00					
13	Green Glades (RETURN)						

Mark allocation:
- for assigning values in lines 1, 2, 3, 4, 5
- for correct fCost value in line 9 (times 3)
- for correct farmName values in line 11 (times 3)
- for fCost being set to 0.00 in line 12 (times 3)
- for column i, correct (0, 1, 2) in line 6 each time
- for True value in condition test, in line 10 each time
- for correct return value in line 13 and shown as return

7.8.2 Line 12

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7.8.3 The variable biggestCost should hold the cost of the most expensive farm, but this is never given a value. The line should be corrected as follows:

```
biggestCost ← farmCost
```

7.8.4 `farmCost ← fArr[i].farmCost()`

47 marks

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