

SECTION B

Answer *three* questions.

11. An office has 10 personal computers networked together, forming a LAN (local area network). One of the computers is the server and the other nine are clients.

2.3.4 (a) Possible hardware links include:

- microwave transmissions
- fibre optic cable
- coaxial cable
- telephone lines with modems.

State which **two** of these would be suitable for this office. For **one** of these two, explain why it would be an appropriate choice.

[4 marks]

2.3.4 (b) Outline **one** function of the specialist network software required by the client computers.

[2 marks]

(c) Explain **two** ways in which the system can try to prevent data corruption during transmission.

[4 marks]

12. Criminal justice agencies (for example, local police forces or drug enforcement agencies) require a lot of information about crimes and people. Rather than using a manual system, information can be computerised and accessed through a criminal justice information system.

5 (a) Outline **two** disadvantages of computerising such a large system. [4 marks]

1 (b) Explain **two** advantages for the criminal justice agency if the system is computerised. [4 marks]

(c) Discuss **one** concern members of the public might have about such a system. [2 marks]

13. Suppose that `TITLE` is a string variable which contains "Examination."

There are various functions that can be applied to strings. Recall the following information:

`length(S)` returns the number of characters in `S`;

`copy(S, START, COUNT)` returns the substring starting at subscript `START` for `COUNT` characters;

`concat(S1, S2)` returns the concatenation (joining together) of the two strings.

- (a) State what `copy(TITLE, 4, 4)` would return. [1 mark]
- (b) State what `length(copy(TITLE, 2, 5))` would return. [1 mark]
- (c) State what `copy(TITLE, 6, length(TITLE) - 8)` would return. [1 mark]
- (d) State what `concat(copy(TITLE, 1, 4), copy(TITLE, 7, 2))` would return. [1 mark]
- (e) Explain how the function `length` might work. [2 marks]
- (f) Explain why `string` is a useful data structure. [2 marks]
- (g) Explain why the following function call will generate an error:

`copy(TITLE, 13, length(TITLE))`

[2 marks]

14. The following algorithm fragment has been designed to analyse temperatures (in ° C) at a tourist resort.

```

1  COUNT ← 0
2  TOTAL ← 0
3  input TEMP
4  while TEMP # 0 do
5      TOTAL ← TOTAL + TEMP
6      COUNT ← COUNT + 1
7      input TEMP
8  endwhile
9  AVERAGE ← TOTAL/COUNT
    
```

- (a) Copy and complete the following trace table for the data:

15, 7, 23, 9, 0

Line	COUNT	TOTAL	TEMP	TEMP # 0	AVERAGE
1	0	-	-		-
2		0			-
3			15		-
4				true	-
5					-

[5 marks]

- (b) The loop uses zero (0) to terminate the iteration. Suggest a better value, and explain why it is more suitable.

[2 marks]

- (c) Identify the type of error that might occur at line 9 and explain when this would occur.

[3 marks]

14. The following algorithm fragment has been designed to analyse temperatures (in ° C) at a tourist resort.

```

1  COUNT ← 0
2  TOTAL ← 0
3  input TEMP
4  while TEMP # 0 do
5      TOTAL ← TOTAL + TEMP
6      COUNT ← COUNT + 1
7      input TEMP
8  endwhile
9  AVERAGE ← TOTAL/COUNT
    
```

(a) Copy and complete the following trace table for the data:

15, 7, 23, 9, 0

Line	COUNT	TOTAL	TEMP	TEMP # 0	AVERAGE
1	0	-	-		-
2		0			-
3			15		-
4				true	-
5					-

[5 marks]

(b) The loop uses zero (0) to terminate the iteration. Suggest a better value, and explain why it is more suitable.

[2 marks]

(c) Identify the type of error that might occur at line 9 and explain when this would occur.

[3 marks]