T-LEVELS | Institute for Apprenticeships & Technical Education

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Learner ID

LL-

T Level Technical Qualification in Digital Production, Design and Development (Level 3)

Time 2 hours 30 minutes

Paper reference **19536**

Core

PAPER 1: Digital Analysis, Legislation and Emerging Issues

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or a ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and Pearson learner ID.
- There are two sections in this question paper. Answer **all** questions in Section A and Section B.
- Answer the questions in the spaces provided.
  – *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets.
  – *use this as a guide to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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SECTION A

Answer ALL questions. Write your answers in the spaces provided.

1 One way in which an individual may be discriminated against is indirect discrimination.

State **two other** ways in which individuals can be discriminated against.

1 .....

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2 .....

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(Total for Question 1 = 2 marks)

2 (a) In a college there are 20 students in a class. Each of these students sits six tests during a year.

Describe how an array can be used to store the class test marks.

(3)

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(b) Explain **two** reasons why a programmer would choose to use a top-down design approach.

(4)

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2 .....

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(c) State **two** guidelines or agreed standards that are used to ensure the accessibility and quality of IT systems.

(2)

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2 .....

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(Total for Question 2 = 9 marks)

3 Describe how a programmer would declare a new function in Python.

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(Total for Question 3 = 3 marks)

4 **Figure 1** shows a linear search algorithm that searches for a number in a list.

The algorithm contains errors.

```
1     SET results TO [6,12,4,23,17,19,4]
2     RECEIVE search_item FROM KEYBOARD
3     SET found TO FALSE
4     FOR I = 0 TO 6
5               IF search_item = results(I) THEN
6                         SET found=TRUE
7               ELSE
8                         SET found=FALSE
9               END IF
10    END FOR
11    IF found=TRUE THEN
12              SEND "Item Found" TO DISPLAY
```

Figure 1

(a) Explain why this algorithm would not work as intended.

(3)

(b) Explain why a linear search algorithm is used to search the array in **Figure 1**.

(2)

(Total for Question 4 = 5 marks)

5 A control system is being written for a new type of car.

(a) The control system for the car contains this line of code:

```
IF (door_open_sensor_reading = FALSE) AND (pin_entered=2102)
THEN start_motor()
```

Explain the purpose of the code.

(3)

(b) Explain **one** benefit of using automated test tools to test the new control system.

(3)

(Total for Question 5 = 6 marks)

6 An app is being written that will tell the user how many litres of water to drink in a day. The rules used to decide how many litres to drink are:

- Users that weigh less than 90 kg need to drink 2 litres of water a day.
- Users that weigh 90 kg or more need to drink 2.5 litres of water a day.
- Users that have exercised for 60 minutes or more need an additional 1 litre of water a day.

They require a program that will:

a. Allow the user to enter their weight.

b. Allow the user to enter the number of minutes exercised that day.

c. Calculate the number of litres of water to drink.

d. Output the result.

Draw a flowchart that meets the rules of the program.

(Total for Question 6 = 6 marks)

7 A food delivery company has a warehouse that is reliant on manual labour.

The company wishes to upgrade the technology used in the warehouse.

As a result of the upgrade, many of the processes in the warehouse will become automated.

Evaluate the ethical and moral effects that this upgrade will have on both the company and its employees.

(9)

(Total for Question 7 = 9 marks)

TOTAL FOR SECTION A = 40 MARKS

SECTION B

Answer ALL questions. Write your answers in the spaces provided.

8 A software developer has been asked to develop a new software system for a car hire company.

(a) One of the features in this system will be to calculate the cost of hiring a car.

The rules for calculating the cost are:

- Input the number of days the car was hired for (must be at least 1).
- Input the mileage reading at the start of the hire period.
- Input the mileage reading at the end of the hire period.
- Calculate the miles driven during the hire period.
- Charge £20 per day hired.
- Charge £0.05 for each mile driven.
- Output the total charge.

Develop a section of Python code that will calculate and output the cost of hiring a car.

(6)

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(b) The new system will allow the company to track the location of all hire cars, by using the GPS system.

Describe the ethical and moral issues the company faces when collecting and using this data.

(4)

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(c) All programmers who work for the company use PEP 8 as an accepted style convention.

Discuss how the use of style conventions helps programmers produce readable and maintainable code.

(6)

(Total for Question 8 = 16 marks)

9 A company is designing a new drinks vending machine.

(a) The machine must dispense the correct amount of change to a customer.

A section of Python code has been developed to do this, but it is incomplete.

The Python code is shown in **Figure 2**.

```
1     def calc_change(change):
2         pound_coins = change //1
3         change = change % 1
4         print ("pound coins : ", pound_coins)
5         fiftyp = change // 0.5
6         change = change % 0.5
7         print ("50p coins : ", fiftyp)
8         twentyp = change // 0.2
9         change = change % 0.2
10        print ("20p coins : ", twentyp)
11        tenp = change // 0.1
12        change = change % 0.1
13        print ("10p coins : ", tenp)
14
```

Figure 2

(i) Write a line of code that would be used to test the function with the value 3.60.

(2)

(ii) The value 3.60 is used to test the function.

Complete the table to show the value of the variables used in the function shown in **Figure 2**.

(4)

pound_coins	change	fiftyp	twentyp	tenp

(b) The vending machine will be sold in many countries.

Describe how international legislation could help prevent companies based in other countries from copying the design of the machine.

(3)

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(c) The vending machine comprises both hardware and software components.

Evaluate the importance of testing **all** components of the new system.

(9)

(Total for Question 9 = 18 marks)

10 Castellmain is a software development company.

It is developing a new app for a parcel delivery company.

(a) One function of the app will calculate if a parcel is a high cost delivery or not.

The function is shown in **Figure 3**.

```
1    def calc_package_cost(volume, weight):
2        if (volume > 4 and weight > 5) or (volume>10
         and weight>2):
3            return True
4        else:
5            return False
6
```

Figure 3

(i) Explain a suitable data type to store the result of this function.

(2)

(ii) Describe **two** test cases that a developer would use to test that the function works correctly.

(4)

Test Case 1

Test Case 2

(b) Describe how Artificial Intelligence (AI) can be used to improve the planning of delivery routes.

(4)

(c) Describe **two ways** that implementing guidelines from professional codes of practice can impact on the code written for this application.

(4)

1

2

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(d) Castellmain is developing the algorithms for the new app.

Evaluate the suitability of using pseudocode **and** flowcharts to express algorithms when planning a digital solution.

(12)

(Total for Question 10 = 26 marks)

TOTAL FOR SECTION B = 60 MARKS
TOTAL FOR PAPER = 100 MARKS

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