

3 New syllabus: Paper I answers

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இலங்கைப் பரීටශைத் திணைக்களம்

අ.පො.ස. (උ.පෙල) විශාලය / ක.පො.ත. (හෝර් තර)ප් පරීටශේ - 2020

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20

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ICT

**ලකුණු දීමේ තටිපාටිය/ප්‍රතිඵලිත ප්‍රාග්ධන තිශ්‍රීම්
I පත්‍රය/පත්‍රතිරීම් I**

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| 01. | 1 | 11. | 3 | 21. | 1 | 31. | 3 | 41. | 1 |
| 02. | 5 | 12. | 4 | 22. | 5 | 32. | 3 | 42. | 2 |
| 03. | 2 | 13. | 1 | 23. | 1 | 33. | 1 | 43. | 4 |
| 04. | 4 | 14. | 3 | 24. | 5 | 34. | 1 | 44. | 2 |
| 05. | 4 | 15. | 5 | 25. | 2 | 35. | 3 | 45. | 2 |
| 06. | 4 | 16. | 5 | 26. | 4 | 36. | 4 | 46. | 1 |
| 07. | 2 | 17. | 2 | 27. | 5 | 37. | 3 | 47. | All |
| 08. | 2 | 18. | 1 | 28. | 3 | 38. | 4 | 48. | 5 |
| 09. | 4 | 19. | 4 | 29. | 4 | 39. | 3 | 49. | 5 |
| 10. | 3 | 20. | 3 | 30. | 2 | 40 | 3 | 50 | 4 |

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වත් පිළිගුරුවරි/ ඉரු එම්පාල විශාලකු ලැබු 01 මැණ්ඩ්/ප්‍රතිඵලිත මූල්‍යකම්
මුළු ලකුණු/මොත්තප් ප්‍රතිඵලිත 1 × 50 = 50

5 New syllabus: Paper II mark scheme

Note

1. Essential keywords sufficient for credit in some answers are underlined.
2. Acceptable alternatives for a given word or set of words are separated by slashes.
3. $\leftarrow A$ indicates that any credit for the item should be given only if A is correct.

1. (a) Draw the expected output of the HTML code segment.

[1]

The headings of the table must be in bold and center aligned. The data in the table must be left-aligned. Ignore border style.

| No | Type | City |
|----|------|--------|
| 1 | High | Galle |
| 2 | | Jaffna |

(b) (i) What are the colours of the text in line numbers 8 and 9?

[2]

1 mark for each:

Line number 8: green

Line number 9: blue

(ii) One advantage of defining styles as in lines 3,4,5 over 8

[1]

1 mark for any one of the following for a maximum of **1 mark**:

- the styles defined in the header can be used within the same html page more than once
- it will be easier to maintain consistency
- update will be easier
- file size will be lower
- code duplication/repetition is reduced
- cleaner/uncluttered code results

(iii) Content of the required external style sheet

[2]

Everything must be spelled correctly. Ignore case defects.

1 mark for each:

```
h1{color:green;}  
#appear{font-family:Arial;}
```

(c) (i) Write the labels of the four code blocks.

[2]

- D
- B
- A
- C

(ii) What is the expected output if the *Product* table had only the given values?

[2]

Proper case important. Ignore case defects.

1 mark for each:

Code:P1/Item:Pen

Code:P3/Item:Book

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2. (a) Fill the blanks in the six statements choosing from the list.

[6]

Ignore case, hyphens.

1 mark for each:

- (i) click and brick
- (ii) a shopping cart
- (iii) a web product catalogue
- (iv) cash-on-delivery
- (v) group purchasing
- (vi) an online marketplace

(b) (i) Write the output of the given python program if the first input (that creates L1) is “7 4 1 2 2 8” and second input (that creates L2) is “8 2 4 5 6”.

[2]

[2, 4, 8]

Marks allocated as follows:

- A: **1 mark** for any combination of the numbers 2, 4 and 8 in any order (ignore spaces and comma separators)
- B: **1 mark** for the exact answer which is [2, 4, 8]

(ii) What is the purpose of this program?

[2]

Given two input lists of integers L1 and L2, output a sorted list of unique integers that are present in both L1 and L2

1 mark for any two of the following for a maximum of **2 marks**:

- elements that are present in both L1 and L2
- unique elements / distinct elements / no duplicates
- output in sorted (or ascending or increasing, or non-decreasing) order

3. (a) (i) State **two** service models in *cloud computing*. [2]

Ignore any case defects in the abbreviations.

1 mark for any two of the following for a maximum of 2 marks:

- Software as a service / SaaS
- Platform as a service / PaaS
- Infrastructure as a service / IaaS
- Function as a service / FaaS

(ii) What are the **three** steps in the FETCH-EXECUTION cycle of a computer? [3]

1 mark for each correct line:

1. Fetch instruction
2. Decode instruction
3. Execute instruction

Correct order important. Other alternative words with similar meanings to those underlined are also accepted. If there are any meaningless entries along with correct ones, **reduce a maximum 1 mark** from the earned total mark.

(b) Match the given five sentences to terms. [5]

1 mark for each:

- (i) UDP
- (ii) HTTP
- (iii) Internet Layer
- (iv) Phishing
- (v) ADSL Connection

4. (a) (i) Give one reason for *Running* to *Blocked* transition of spreadsheet process.

[1]

1 mark for any one of the following for a maximum of 1 mark:

- Spreadsheet process requiring to read file
- Spreadsheet process requiring to write to file
- Spreadsheet process doing input
- Spreadsheet process doing output

Correct alternatives to *spreadsheet process* also accepted.

(ii) Why is it important to store the values for machine registers when moving from *Running* to *Ready*?

[2]

So that the when the process starts running again it can start from where it stopped

Marks allocated as follows:

A: **1 mark** for process can start again (resume)

B: **1 mark** for from where it stopped (correctly)

(b) (i) Write down the value of an important number in the directory entry for *maximum.py* file that will help an operating system locate the blocks in the file.

[1]

301

(ii) Size of *maximum.py* is increased to 20KB. What changes are needed in FAT for that purpose?

[2]

1 mark for each:

A: Entry in 304 changes to 302 (or another free block number)

B: Entry in 302 (or the free block number used in A) changes to -1

(c) (i) How many bits are required to store a page number in this computer?

[1]

4

(ii) Explain the mapping of the virtual address 0011 0000 0000 0010 to 110 0000 0000 0010.

[2]

1 mark for each:

A: 0011 0000 0000 0010 refers to page number 3 and offset 0000 0000 0010

B: It is mapped to frame 110 and thus the virtual address is 110 0000 0000 0010

(iii) What is the 15-bit physical address that the virtual address 0001 0000 0000 0000 will be mapped to?

[1]

111 0000 0000 0000

5. (a) Give the complete truth table for the given circuit.

[4]

| A | B | C | Z |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

Marks allocated as follows:

4 marks for all 8 rows correct

3 marks for maximum 5,6,7 rows correct

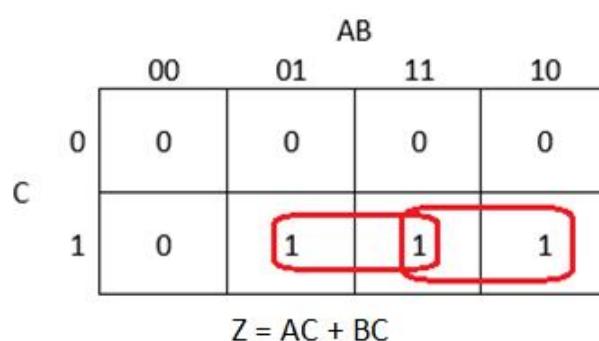
2 marks for maximum 3,4 rows correct

1 mark for maximum 1,2 rows correct

If the Z column is not labelled, **reduce 1 mark** from the earned total. However, having *Output* as the Z column title is acceptable.

- (b) Using a K map, derive a simplified SOP expression for Z.

[4]



$$Z = AC + BC$$

Marks allocated as follows:

A: **1 mark** for the correct Karnaugh map with proper labels, 0 **and** 1 entries

B: **2 marks** for correctly marking the two loops in the Karnaugh map (**1 mark** for each)

C: **1 mark** for correct, simplified final SOP expression as $Z = AC + BC$ ($\leftarrow B$)

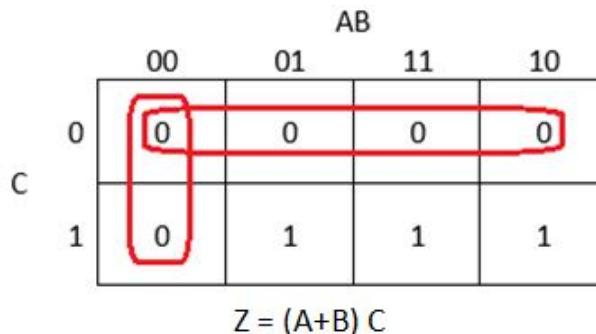
NOTES:

(A) Other **logically correct** Karnaugh maps are also acceptable for component A.

(B) For component C, the term **Z** is not compulsory.

- (c) Using a K map, derive a simplified POS expression for Z.

[4]

*Marks allocated as follows:*

- A: **1 mark** for the correct Karnaugh map with proper labels, 0 **and** 1 entries
 B: **2 marks** for correctly marking the two loops in the Karnaugh map (**1 mark** for each)
 C: **1 mark** for correct, simplified final POS expression as $Z = (A+B)C$ ($\leftarrow B$)

NOTES:

- (A) Other **logically correct** Karnaugh maps are also acceptable for component A.
 (B) For component C, the term **Z** is not compulsory.

- (d) Out of the two expressions which one is better to implement a more simplified logic circuit than the given logic circuit. Explain. [3]

The POS, $Z = (A+B) C$, is better than the SOP, $Z = AC + BC$.

Explanation:

The POS expression has fewer (3) literals than the SOP expression (4 literals). This means, we can implement a simpler logic circuit with one OR gate and one AND gate (only two gates) using the POS whereas the SOP leads to a logic circuit with two AND gates and one OR gate (three gates), same as the given circuit.

Marks allocated as follows:

- A: **1 mark** for correctly identifying that the POS is better than the SOP (\leftarrow correct SOP and POS expressions for 5(b) and 5(c))
 B: **2 marks** for correct explanation on why the POS is better than the SOP given as follows: ($\leftarrow A$)
1 mark: POS has fewer (3) literals and leads to a logic circuit with 2 gates
1 mark: SOP has more (4) literals and leads to a logic circuit with 3 gates
 or alternatively:

- B: 2 marks** for correctly showing the two correct circuit diagrams and identifying the better one **or** for indicating generally that POS results in a circuit that has fewer gates when compared to the circuit resulting from SOP ($\leftarrow A$)

IMPORTANT: Note the dependency in marking component A. This basically means **not** to give credit for part (d) if the student is not basing his/her argument using the expressions $Z = AC + BC$ and $Z = (A+B) C$.

6. (a) Which network topology is most suitable? Give **one** reason to justify.

[2]

Marks allocated as follows:

A: **1 mark** for star

B: **1 mark** for any **one** of the following reasons:

- high performance / speed (as no data collisions can occur)
- easy management / maintenance / fault detection / easy expansion of network / easy addition of devices / easy removal of devices (can be done without disturbing entire network)
- reliability (if one cable or device fails then all the others will still continue to work)

(b) Fill the IP address table.

[6]

| Department | Network ID | Broadcast ID | Subnet Mask | Usable IP Address Range |
|------------|----------------|----------------|-----------------|-------------------------------|
| Finance | 192.168.14.0 | 192.168.14.63 | 255.255.255.192 | 192.168.14.1-192.168.14.62 |
| HR | 192.168.14.64 | 192.168.14.127 | 255.255.255.192 | 192.168.14.65-192.168.14.126 |
| IT Unit | 192.168.14.128 | 192.168.14.191 | 255.255.255.192 | 192.168.14.129-192.168.14.190 |
| Marketing | 192.168.14.192 | 192.168.14.255 | 255.255.255.192 | 192.168.14.193-192.168.14.254 |

Marks allocated as follows:

6 marks for all 12 highlighted cells correct

5 marks for maximum 9,10,11 highlighted cells correct

4 marks for maximum 7,8 highlighted cells correct

3 marks for maximum 5,6 highlighted cells correct

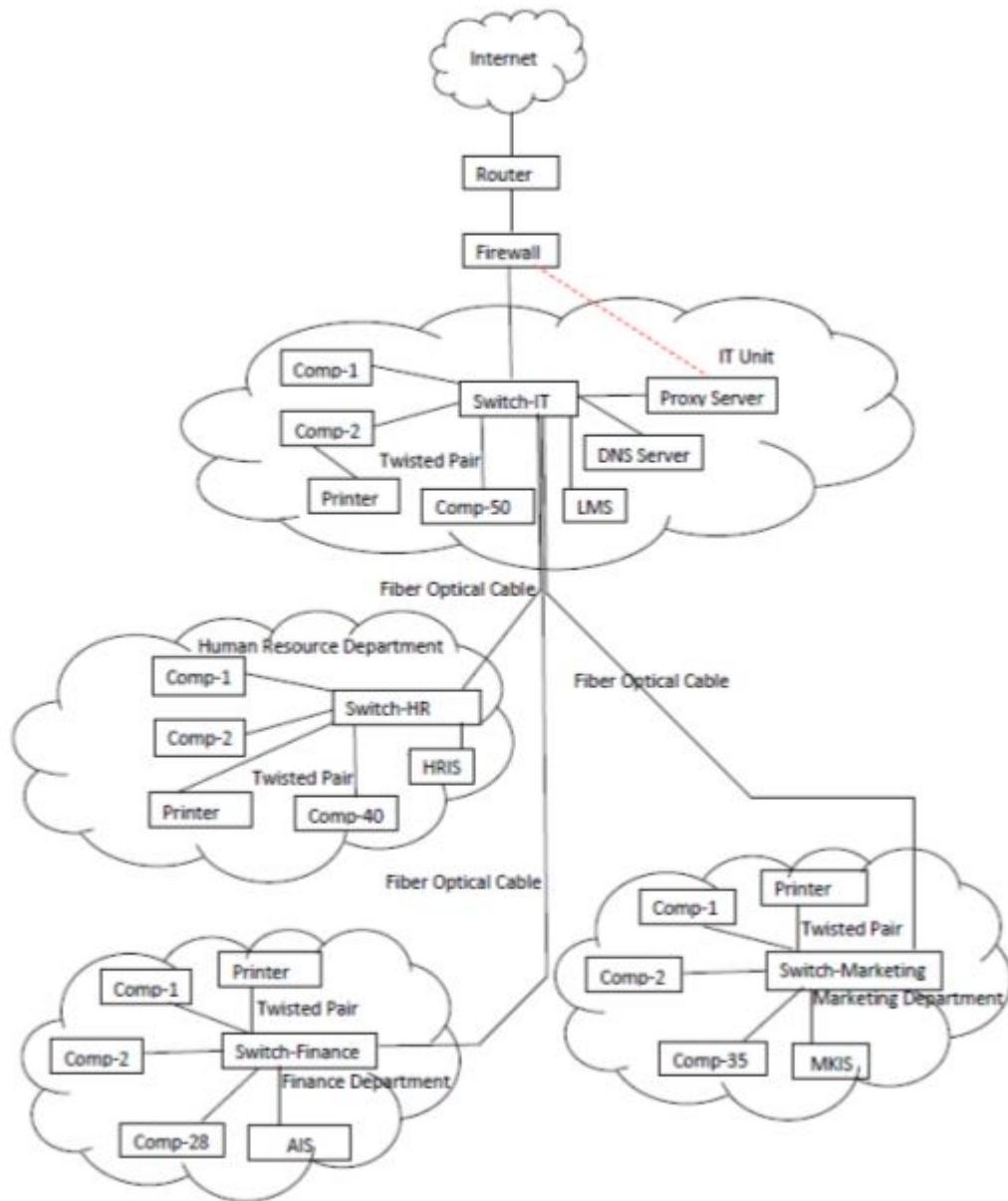
2 marks for maximum 3,4 highlighted cells correct

1 mark for maximum 1,2 highlighted cells correct

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(c) Draw the logical arrangement of the network to implement company requirements.

[6]

**1 mark for each:**

- A: Internet - Router - Firewall - IT switch link
- B: Connecting HR, Finance and Marketing switches to the IT switch
- C: Connecting Proxy and the DNS servers to the IT switch
- D: Connecting AIS, HRIS, LMS and MKIS servers to *Finance, HR, IT Unit and Marketing* switches respectively
- E: Connecting the computers to the switches in each department
- F: Connecting the three *network printers* to *Finance, HR and Marketing* switches and *non-network printer* to a computer in the *IT Unit*

NOTE: The following standard symbols are also accepted in the diagram:

| Router | Firewall | Switch |
|--------|----------|--------|
| | | |

(d) Write down the mechanism that needs to be implemented to dynamically manage the IP addresses.

[1]

Allocate the IP addresses through a DHCP server

7. (a) (i) What is the ecommerce business type applicable in this scenario? [1]

B2C / Business to Consumer / Business to Customer

(ii) What is the revenue model used in this e-commerce offering of AB stores? [1]

online Sales / virtual storefront

(iii) Identify **two** possible reasons for most regular customers to prefer the physical outlet more than the e-commerce solution. [2]

Any **two** from the following reasons with **1 mark** each:

- Customer perception of selecting goods (products) with the ability to inspect the quality (fitness for their need)
- Possession (receipt of goods) at the point of sale (without the delay in delivery)
- Reluctance to switch from the purchasing methods they have used for a long period
- Lack of knowledge (confidence) on using e-commerce
- Lack of required resources/technology (or any one from computer, internet connectivity, online payment method)
- Ease of physically visiting the shop due to them being ''local'' customers

(iv) What is the ecommerce business type that AB stores implements when their ecommerce system is integrated with suppliers' systems to maintain its product stocks through automation? [1]

B2B / Business to Business

(v) What is the term used to identify the system when allowing local stores to have virtual stores within it [the system]? [1]

e-commerce marketplace / online marketplace

(vi) Write down **one** advantage that each of (1) customers, (2) AB stores and (3) other local shops will receive by having the proposed system in (v) above. [3]

(1) Customers: 1 mark for any of the following:

- Can compare products/their quality and prices across a number of vendors from a single marketplace
- Can fulfill all their purchasing needs through multiple sellers from a single place
- Can have higher confidence on their purchases from less popular/new sellers as the marketplace standard/assurance is in place (3rd party protection to some extent)

(2) AB Stores: 1 mark for any of the following:

- Attract a larger customer base to their e-commerce solution
- Obtain influential control over the online sellers who use its system
- Can obtain market/sales data for analysis and decision making
- Can use different types of online revenue models within the marketplace

(3) Other local shops: 1 mark for any of the following:

- Gets online presence without committing into a completely new e-commerce project
- Shared costs for having their online presence
- Readily available solution to start online business rapidly
- Brand association with other online businesses in the area
- Can increase customer base / ability to increase sales

(vii) What is your suggestion to enable most of the registered customers to make purchases successfully through the system and receive their goods at home without any restriction? Explain.

[1]

Give the mark if the *cash-on-delivery option* is suggested by the student **with any one** of the following explanations:

- This is a low risk method as the users are registered and nearby with a low delivery cost even if they refuse to honor the purchase/payment.
- Enables the remaining 88% of registered customers, who cannot pay online, to make successful e-commerce purchases.

(viii) Explain **two** advantages that AB stores can get by outsourcing the delivery of customer purchased goods to a third party delivery service.

[2]

Any **two** from the following at **1 mark** each:

- Ability to scale the operations to varying demands without wasting resources / Not needing to maintain separate sales force for delivery / Not needing to maintain separate vehicle fleet for deliveries
- Convenience of managing the orders as delivery function does not incur risks that need to be managed
- Advantage of getting into a reduced price contract with the outsource partner
- Ability to obtain specialized team of delivery professionals into the AB Stores business process

(b) (i) Draw a simplified agent diagram and name important entities.

[2]

Entities: Prospective Traveler/User, Chat-bot Agent/Chat-bot, Search-Agent, Flight Search/Flight Search Agent, Hotel Search/Hotel Search Agent, Taxi Search/Taxi Search Agent



Marks allocated as follows:

- A: **0.5 marks** for *User to ChatBot Agent interaction* (two-way arrow with or without text)
- B: **0.5 marks** for *ChatBot Agent to Search agent interaction* (single direction arrow with or without text)
- C: **0.5 marks** for *Search Agent to Flight Search Agent, Hotel Search Agent [and optionally Taxi Search Agent] interactions* (two-way arrows with or without text)
- D: **0.5 marks** for *Search Agent to User interaction to display tour packages* (single direction arrow with or without text) NOTE: For this, two-way arrows can be considered as well.

Important:

- 1 If the diagram has interactions between *ChatBot Agent and Flight Search / Hotel Search / Taxi Search Agents* then **DO NOT** give marks for **BOTH** B and C.
- 2 If the diagram has interactions between *Flight Search, Hotel Search and Taxi Search Agents* (i.e., among themselves) **DO NOT** give marks for C.

NOTE: If a student has included a *user interface*, ignore that additional information and mark as given in the scheme.

(ii) Which agent **cannot** be considered as self-autonomous?

[0.5]

Chat-bot Agent

(iii) Write a **disadvantage** of using a multi-agent system for the given example user requirement.

[0.5]

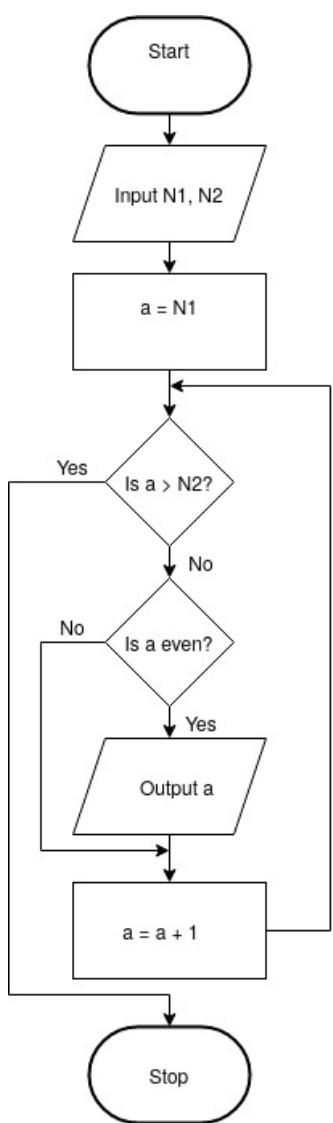
0.5 marks for any of the following:

- Lack of user control in the search process
- Lack of user interaction/fine tuning during the search
- Search recommendations may not provide the best solution to the user need
- Agent specific isolated search can be ineffective with lots of results not fitting into the common criteria once the results are combined to make the complete package offer

NOTE: Round-off the final mark obtained for part (b).

8. (a) Construct a flow-chart or pseudo-code to output the list of even numbers from given N1 to N2. ($N1 < N2$)

[5]



Begin
 input N1, N2
 for a = N1 to N2
 if (a is even)
 output a
 end-if
 end-for
 End

or

Begin
 input N1, N2
 a = N1
 while a <= N2
 if (a is even)
 output a
 end-if
 a = a + 1
 end-while
 End

Notes:

1. The even number check could be indicated in numerous ways which can all be considered correct.

Examples:

if (a%2 = 0)
 if (a modulus 2 = 0)
 if (a mod 2 = 0)
 if (remainder of a/2 = 0)
 if (a is not odd)
 if (a%2 not equal to 1)

2. The output list may exclude **both** N1 **and** N2 as well.

3. Acceptable synonyms (ignore case):
 (Start, Begin), (Stop, End, Finish),
 (Input, Get, Read),
 (Output, Print, Show, Display)

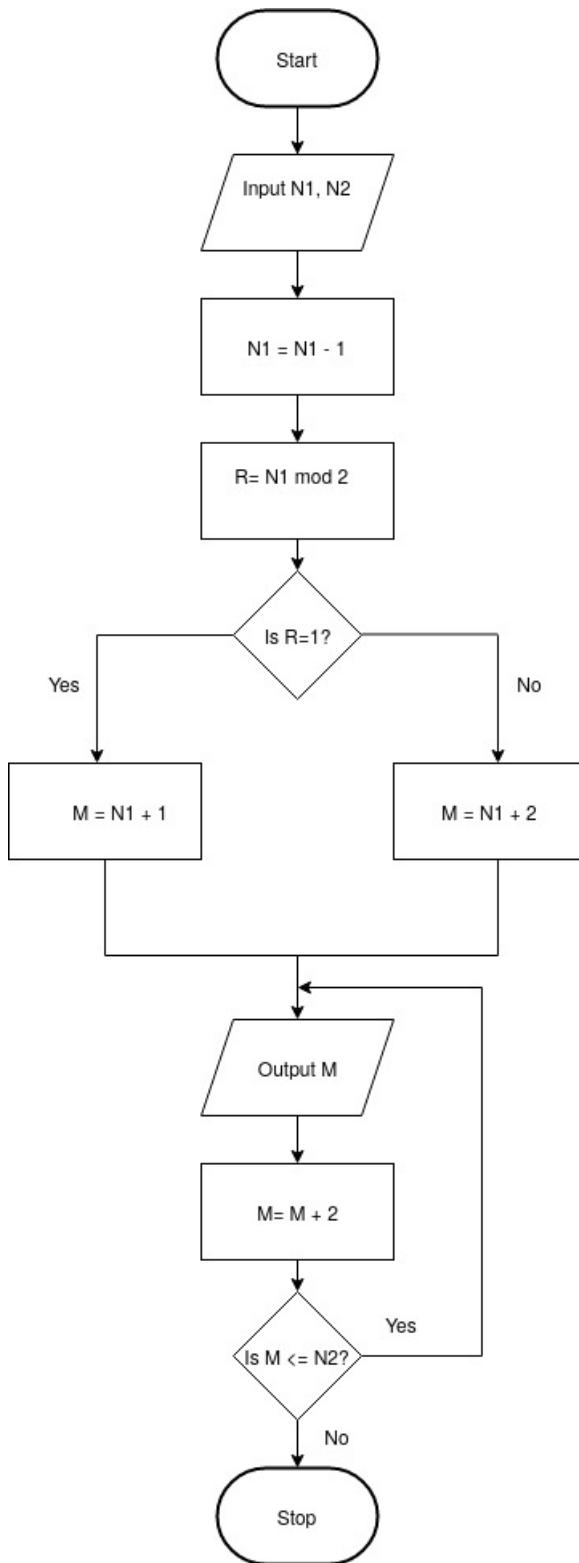
Marks allocated for either flowchart or pseudo-code as follows:

- A: **1 mark** for correct input action
- B: **1 mark** for correct $a \leq N2$ looping including the diamond symbol in the flowchart (--- A)
- C: **1 mark** for correctly checking even number (--- B)
- D: **1 mark** for correct output action (--- C)
- E: **1 mark** for completeness (--- D)

FLOWCHART: important arrows and correct symbols for start, stop, input/output, processes

PSEUDO-CODE: Begin-End, indentation

AN ALTERNATIVE:



```

Begin
  input N1, N2
  N1 = N1 - 1
  R = N1 mod 2
  if (R = 1)
    M = N1 + 1
  else
    M = N1 + 2
  end-if
  repeat
    output M
    M = M + 2
  until (M <= N2)
End
  
```

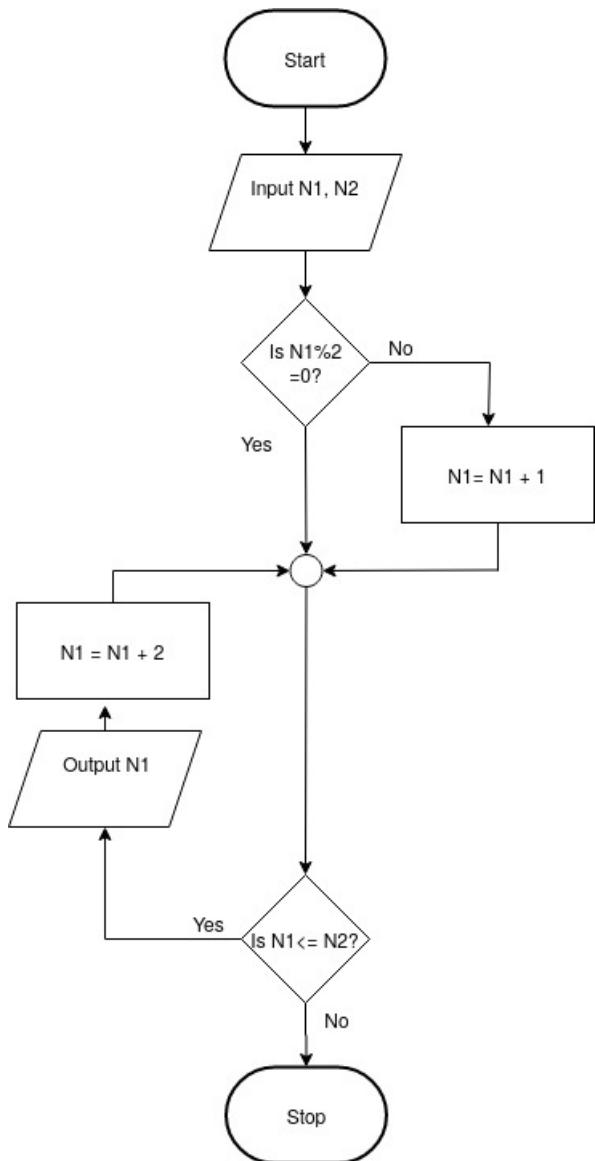
The marks allocation is similar to the first solution:

- A: **1 mark** for correct input action
- B: **1 mark** for correct $M \leq N2$ looping including the diamond symbol in the flowchart ($\leftarrow A$)
- C: **1 mark** for correctly checking even number ($\leftarrow B$)
- D: **1 mark** for correct output action ($\leftarrow C$)
- E: **1 mark** for completeness ($\leftarrow D$)

FLOWCHART: important arrows and correct symbols for start, stop, input/output, processes

PSEUDO-CODE: Begin-End, indentation

ANOTHER ALTERNATIVE:



```

Begin
  input N1, N2
  if (N1 is odd)
    N1 = N1 + 1
  end-if
  while (N1 <= N2)
    output N1
    N1 = N1 + 2
  end-while
End
  
```

The marks allocation is similar to the first solution:

- A: **1 mark** for correct input action
- B: **1 mark** for correct $N1 \leq N2$ looping including the diamond symbol in the flowchart ($\leftarrow A$)
- C: **1 mark** for correctly checking even number ($\leftarrow B$)
- D: **1 mark** for correct output action ($\leftarrow C$)
- E: **1 mark** for completeness ($\leftarrow D$)

FLOWCHART: important arrows and correct symbols for start, stop, input/output, processes

PSEUDO-CODE: Begin-End, indentation

- (b) (i) What would be the output if first input L was 2,4,7,9,3,5 and the next input K was 5?

[2]

7

- (ii) What is the purpose of this algorithm?

[2]

Find the smallest element in L that is larger than K

Marks given as follows:

2 marks if answer correct

1 mark for incomplete/partially correct answer (e.g., “find the smallest element in L” or equivalent)

0 marks for any other answer

- (iii) Develop a python program to implement the algorithm expressed by the flowchart.

[6]

```
# Inputs: L is a non-empty list of positive integers
#           K is a positive integer
# Every element in L is less than M, which is pre-defined large integer
# Output: the smallest element in L that is larger than K
#
inList = input("Enter the elements in L: ")
L = [int(x) for x in inList.split()]
K = int(input("Enter K: "))
M = 1000
for i in L:
    if i > K:
        if i < M:
            M = i
print("Smallest element in L that is larger than K is", M)
```

Allocate marks as follows rounding off the final total:

A: **0.5 marks** for correct input of the list L

B: **0.5 marks** for correct input of K

C: **1 mark** for correct initializing of M to a reasonably large value

D: **1 mark** for correct looping to process items in L one by one(--- A, B, C, colon)

E: **0.5 marks** for comparing each item with K inside the loop (--- D, indentation, colon)

F: **0.5 marks** for comparing items larger than K with M inside the loop (--- E, indentation, colon)

G: **1 mark** for setting value of M correctly to identified item inside the loop (--- F, indentation)

H: **1 mark** for correct output (print) of M (--- G, indentation)

Notes:

(A) The objective of the second line of code in the suggested solution is to transform the string received from built-in function input() into the list of integers, L. Note that input() gives us a single string. Therefore the following operations are performed to obtain L:

(1) Split the input string using “.split()” method which gives a list of strings, splitting the “words” that were separated by “space” in the input string. For example, if the input string was “2 4 7 9 3 5”, then the split() method would produce [“2”, “4”, “7”, “9”, “3”, “5”].

(2) Convert each string in the list of strings into an integer using int(). For example, the list [“2”, “4”, “7”, “9”, “3”, “5”] will be converted into the list [2,4,7,9,3,5].

The two step process above for (input string) → (list L of integers) conversion can be done in multiple ways.

One way is, as shown in the suggested solution, in a single line of code (2nd line):

```
L=[int(x) for x in inList.split()]
```

Another way (which is also correct) is to separate the use of split() and int(). First use split() to obtain a list of strings. Next go in a loop converting each string into an integer using int(). The four lines of Python code is as follows:

```
strList = inList.split()      # this will produce a list of strings
L = []                      # let L be an empty list
for s in strList:
    L.append(int(s))
```

There can be other correct ways to do this. Students may write such code. Therefore in marking, we should check for such possibilities also.

- (B) Instead of 1000, M could be set to a reasonably large integer.

e.g., $M=\max(L)+1$ # or $M=2^{31}-1$

Also, M can be obtained as an input as well.

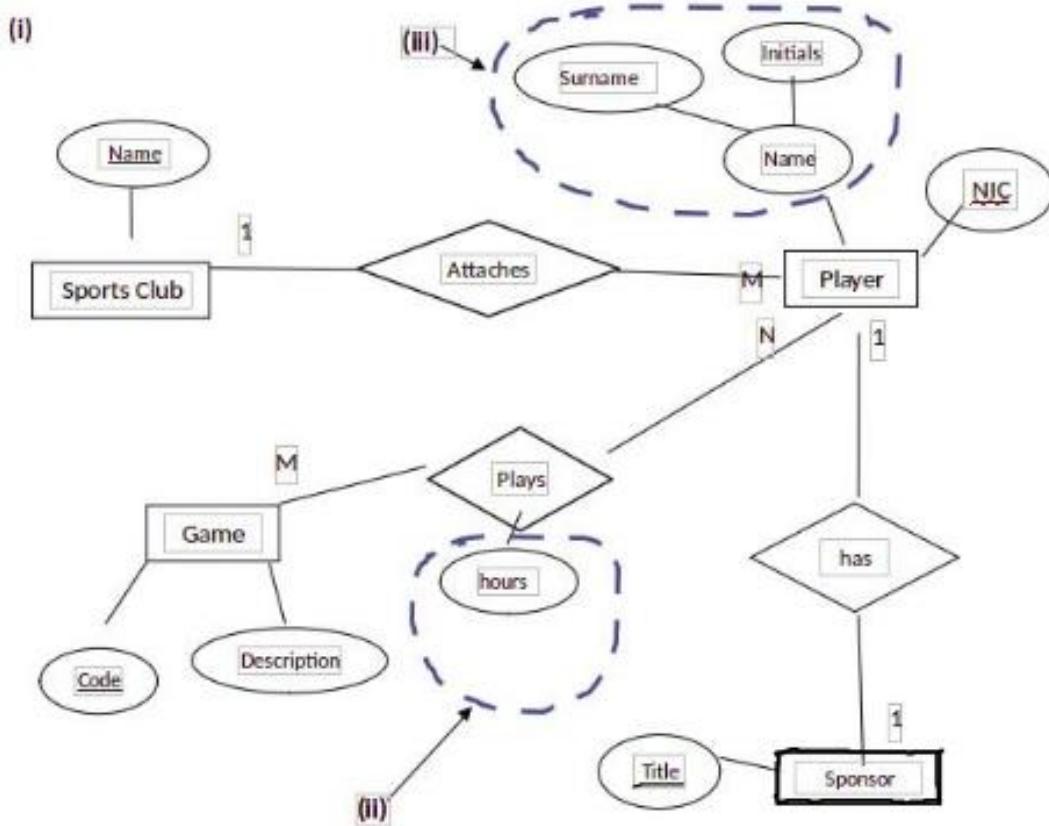
- (C) A *while* loop can also be used as follows:

```
L = [int(x) for x in input("Input elements in L:").split()]
K = int(input("Input K: "))
N = len(L)
X = 1000 # or a reasonably large integer
a = 0
while a < N:
    if L[a] > K:
        if L[a] < X:
            X = L[a]
    a = a + 1
print("Smallest element in L that is larger than K is", X)
```

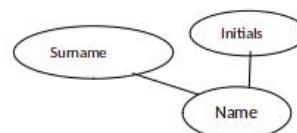
THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.

9. (a) (i) Draw an ER diagram for the given description.

[10]

*Marks allocated as follows:*

- A: **1 mark** for the *SportsClub/Club* entity with *Name* attribute marked as the primary key
(\leftarrow correct entity and attribute symbols)
- B: **1 mark** for the *Game* entity with *Code* and *Description* attributes with *Code* marked as the primary key (\leftarrow correct entity and attribute symbols)
- C: **1 mark** for the *Sponsor* entity with *Title* attribute marked as the primary key
(\leftarrow correct entity and attribute symbols)
- D: **1 mark** for the *Player* entity with *NIC* and *Name* attributes and *NIC* marked as the primary key (\leftarrow correct entity and attribute symbols)
- E: **1 mark** for the composite attribute *Name* which consists of “Surname” and “Initials”
(\leftarrow correct attribute symbols)



- F: **1 mark** for “hours” attribute in *Plays* relationship
(\leftarrow correct attribute symbol)
- G: **1 mark** for *attaches* [or other meaningful word] relationship
(\leftarrow correct relationship symbol, cardinality)
- H: **1 mark** for *plays* [or other meaningful word] relationship
(\leftarrow correct relationship symbol, cardinality)
- I: **1 mark** for *has* [or other meaningful word] relationship
(\leftarrow correct relationship symbol, cardinality)
- J: **1 mark** for completeness (spelling, non-display of additional incorrect content) [ignore case]

(ii) Extend the ER to include the number of hours played by each player for each game.

See above.

(iii) Extend the ER to include sponsor's details.

See above.

(b) (i) Write an SQL statement to display the number of players who won gold medals.

[1]

```
Select count (*) from Winner where MedalType='Gold';
```

NOTES:

(A) Although not perfect, the use of a valid field name from the *Winner* table is acceptable as a replacement of * in above.

(B) Semicolon is not essential for credit.

(ii) In which normal form does the above table exist? Justify.

[2]

Marks allocated as follows:

A: **1 mark** for any **one** of the following:

- 2nd NF
- 1st NF and 2nd NF

B: **1 mark** for

All the non-key attributes are fully functionally dependent on the primary key / No partial dependencies

(iii) Convert the above table to the next normal form. (It is not required to write the data in the tables.)

[2]

1 mark for each:

A: Winner (NIC, MatchID, MedalType)

B: Medal (MedalType, Prize)

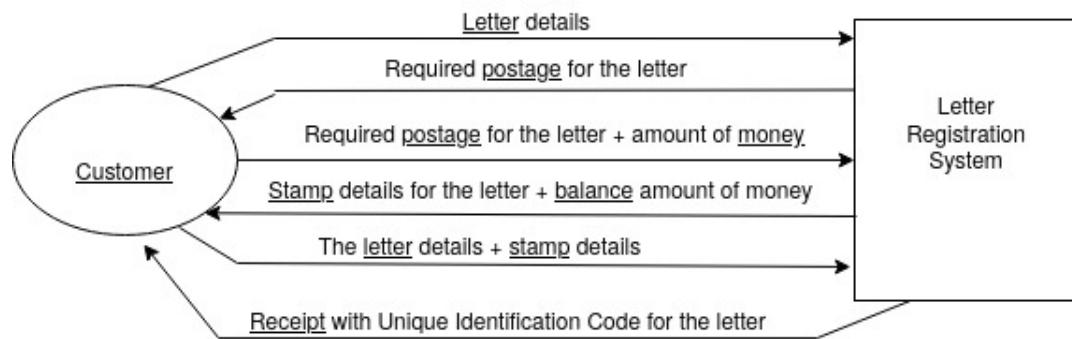
MARKING GUIDELINES:

A: The primary keys should be marked. The *Winner* table name and *NIC* and *MatchID* attribute names should be as given. The other attribute must match the primary key of the second table.

B: The primary key should be marked. The *Prize* attribute name should be as given.

10. (a) (i) Draw context diagram.

[4]



Marks allocated as follows:

- A: **1 mark** for *Letter registration system* high-level process. (←-- correct symbol)
[Other meaningful names such as *Post office system* also acceptable.]
- B: **1 mark** for *Customer* external entity (←-- correct symbol)
- C: **2 marks** for correctly labelled *data flows* with proper directions. (←-- A,B)

The 2 marks for C are given as follows:

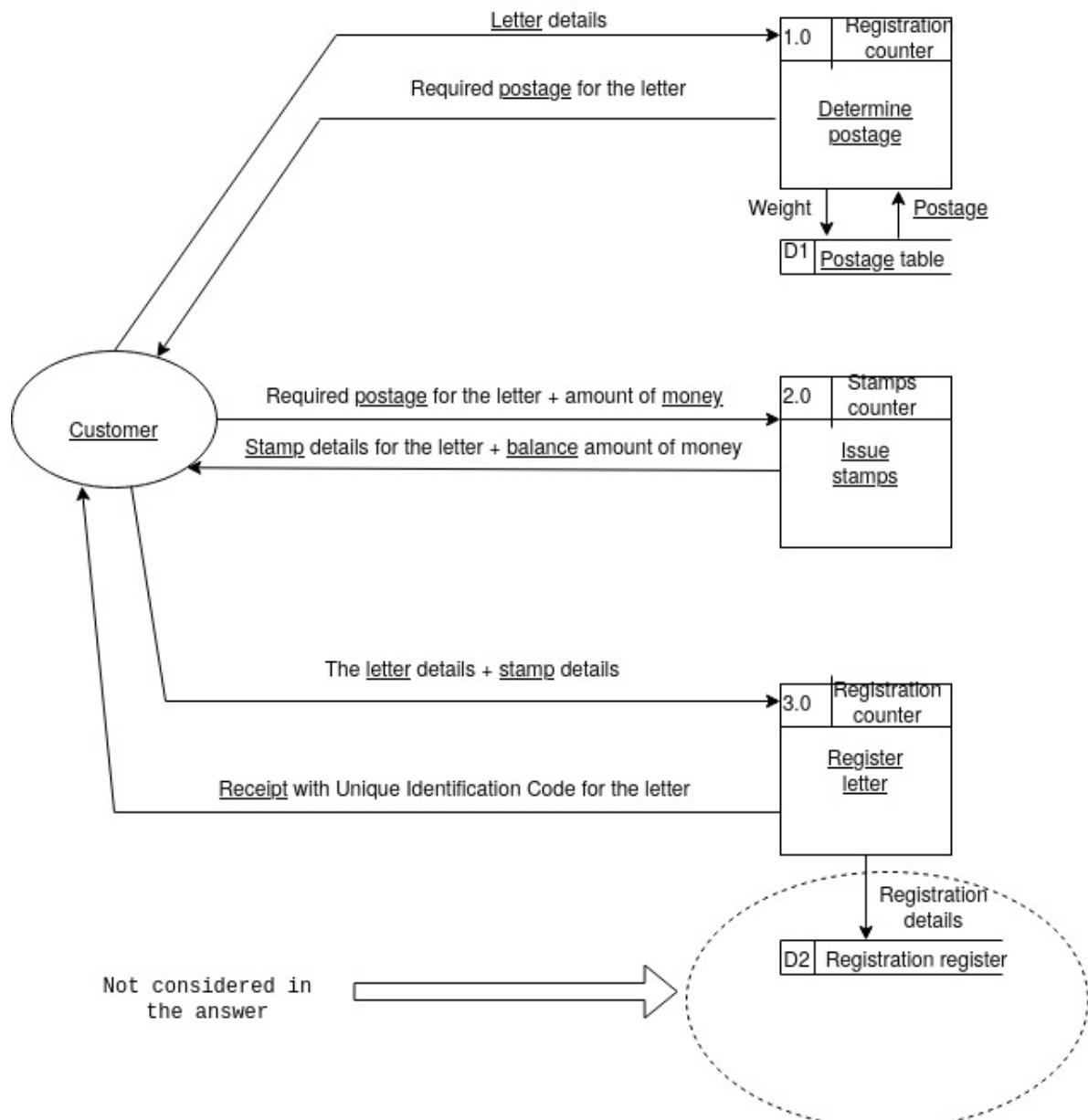
If **all six** data flows correct, give the full 2 marks.

If **three to five** data flows correct, give only 1 mark.

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(ii) Draw level 1 DFD.

[5]



NOTE: Internal recording of *customer details with unique registration number* is not included.

Marks allocated as follows:

- A: **1 mark** for the *Determine postage* process (--- correct symbol, process id, location)
- B: **1 mark** for the *Issue stamps* process (--- correct symbol, process id, location)
- C: **1 mark** for the *Register letter* process (--- correct symbol, process id, location)
- D: **1 mark** for *Postage table* data store (--- correct symbol, data store id, correct data flow(s) [at least *postage*] linking it with the *Determine postage* process)
- E: **1 mark** for the *Customer* external entity and all six correctly labelled *data flows* with proper directions connecting properly with the three *processes*. (--- correct symbol)

NOTES:

- (A) Other equivalent and a meaningful names for the *processes*, *locations* and the *data store* are also acceptable.
- (B) The process and data store ids have to be *unique* and may be different to the ones shown.

(b) (i) List **three** significant reasons why requirement analysis is important for this COTS project too.
 (Answer must be specific to COTS use.)

[3]

1 mark each for any **three** of the following for a maximum of **3 marks**:

- To define the useful feature set for the COTS system to be selected
- There can be a gap between the business processes used by the existing practices and those supported by the COTS software system. It is essential to understand this gap through a requirement analysis phase. For each such gap, organizations have to decide whether to:
 - ignore it (remove the requirement and just use the tool as it is),
 - change how they do something outside the solution (i.e., modify the business process) or
 - build something to bridge the gap (extend the solution).
- If the COTS software system is to be extended, it is required to specify completely the requirements for those new capabilities.
- If the current practices are changed according to the selected COTS, requirement analysis helps to understand the required changes, training needs, resource requirements etc.
- To compare and benchmark a set of identified COTS to select the most fitting COTS product for the need.

(ii) Write down the labels (A-G) of all the functional requirements.

[2]

A, C, E

Marks given as follows:

2 marks if all three correct

1 mark for either one or two correct

NOTE: For each incorrect label reduce one mark for a minimum total mark of zero.

(iii) What is the most appropriate testing strategy for your team to evaluate the selected COTS system?

[1]

black-box testing

(user acceptance test, system test can also be accepted)

6 Old Syllabus: Paper I pages containing the changed questions

24. Three software development projects X, Y and Z have the following characteristics:

Project X:

- The project risk is medium to high and requirements are complex
- In this project, significant changes are expected during the development

Project Y:

- Requirements of this project are clear and stable
- New requirements are not expected in the near future

Project Z:

- All possible requirements of the proposed project were captured during the requirement analysis phase
- There are no ambiguous requirements

What system development model/s is/are more suitable for the projects X, Y and Z?

- (1) Spiral model for project X and Waterfall model for projects Y and Z
- (2) Waterfall model for project X and Spiral model for projects Y and Z
- (3) Spiral model for projects X and Z and Waterfall model for project Y
- (4) Spiral model for all projects X, Y and Z
- (5) Waterfall model for all projects X, Y and Z

25. Which of the following statements on Data Flow Diagrams (DFD) is **incorrect**?

- (1) Context diagram is a DFD with the highest level of abstraction.
- (2) All data stores in a system must be represented in the context diagram.
- (3) Data flows are used to link the other components in DFDs.
- (4) Elementary processes are not decomposed further.
- (5) External entities in DFDs act as sources or recipients of data.

26. What is the correct SQL statement to delete a database called ‘ALdb’?

- | | | |
|-------------------------|---------------------------|----------------|
| (1) delete ALdb; | (2) delete database ALdb; | (3) drop ALdb; |
| (4) drop database ALdb; | (5) remove database ALdb; | |

27. Which of the following statement/s about a relation in the Second Normal Form (2NF) are true?

- A – It can have a composite key.
 B – It should be in the First Normal Form (1NF) as well.
 C – All non-key attributes are fully functionally dependent on the primary key.
- | | |
|--------------------|------------------|
| (1) B only | (2) C only |
| (3) A and B only | (4) B and C only |
| (5) All A, B and C | |

28. Which of the following statement/s regarding the *logical database schema* are true?

- A – It is a blueprint for a database.
 B – It contains data and information.
 C – It formulates all the constraints that are to be applied on the data.
- | | |
|--------------------|------------------|
| (1) A only | (2) A and B only |
| (3) A and C only | (4) B and C only |
| (5) All A, B and C | |

29. Consider the following SQL statement:

Alter table subject add primary key (Subject_Id);

Which of the following is **incorrect** about the above SQL statement?

- (1) It adds a primary key constraint to the table named *subject*.
- (2) The table named *subject* should already exist.
- (3) The field *Subject_Id* should not be null.
- (4) A table named *subject* is created with a primary key named *Subject_Id*.
- (5) The values of the field *Subject_Id* should not be repeated in *subject* table.

{See page six}

40. What would be the output of the following Python code?

```
x = 1
y = 100
while (x < 100):
    y = y - x
    x = x + 1
    if (x + y) < 90:
        break
print(y)
```

- (1) 100 (2) 85 (3) 79 (4) 72 (5) 7

41. Consider the following Python program:

```
f1 = open("inFile.txt", "r")
f2 = open("outFile.txt", "w")
checkString = "No"
for line in f1:
    if (checkString not in line):
        f2.write(line)
f1.close()
f2.close()
```

Which of the following statements are correct about the above program?

- A – The content of the input file (inFile.txt) is checked in a loop, one line at a time.
- B – The total content of one file is written onto another file.
- C – If either of the two files does not exist, the program will stop and exit while executing the first two lines of the code.

- (1) Only A (2) Only B (3) Only A and B
 (4) Only A and C (5) All A, B and C

42. Which of the following HTML tags are used to define a *definition* list?

- (1) <dl>, <dd>, (2) <dl>, <dt>, <dd> (3) <dl>, <td>, <dd>
 (4) <dl>, <th>, <dd> (5) <dl>, <th>, <td>

43. Which HTML tag is used to include a caption for a *fieldset* grouping in a form?

- (1) <caption> (2) <head> (3) <label> (4) <legend> (5) <title>

44. Consider the following statements with regard to radio buttons in HTML:

- A – The label of the radio button can be defined using the value of the name attribute.
- B – The default selection of radio button can be defined using attribute ‘selected’.
- C – Radio buttons allow to choose only one option from the given options in a group.

Which of the above statement/s is/are correct?

- (1) A only (2) C only
 (3) A and C only (4) B and C only
 (5) All A, B and C

45. Which of the following affects **least** to the downloading speed of a web page?

- (1) capability of the web browser
 (2) number of hyperlinks in the web page
 (3) number and size of images in the web page
 (4) processing power of the server computer that stores the web page
 (5) the bandwidth of the internet connection which is used to access the web page

[See page ten]

7 Old syllabus: Paper I answers

මි ලකෝ විහාර දෙපාර්තමේන්තුව
இலங்கைப் பரිෂ්‍යාத் தිணුණුකளாம்

අ.පො.ක. (උ.පෙල) එහාගේ / ක.පො.ත. (මූල්‍ය තු) පරිශීලක - 2020

ரூபாவி கிரந்துகை/ பழைய பாடத்திட்டம்

විභය අංකය
පුද්‍ර තීක්ෂණ

20

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ICT

எல்லா குடும்பத்தினரைக் குறிப்பிட்டு நிறைவேண்டும் என்று சொல்வது

| පුද්ගලික භාෂය | පිළිඳුරු භාෂය |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| විශාල මිල. |
| 01. | 1 | 11. | 3 | 21. | 1 | 31. | 3 | 41. | 1 |
| 02. | 5 | 12. | 4 | 22. | 5 | 32. | 3 | 42. | 2 |
| 03. | 2 | 13. | 1 | 23. | 1 | 33. | 1 | 43. | 4 |
| 04. | 4 | 14. | 3 | 24. | 1 | 34. | 1 | 44. | 2 |
| 05. | 4 | 15. | 5 | 25. | 2 | 35. | 3 | 45. | 2 |
| 06. | 4 | 16. | 5 | 26. | 4 | 36. | 4 | 46. | 1 |
| 07. | 2 | 17. | 2 | 27. | 5 | 37. | 3 | 47. | 5 |
| 08. | 2 | 18. | 1 | 28. | 3 | 38. | 4 | 48. | 5 |
| 09. | 4 | 19. | 4 | 29. | 4 | 39. | 3 | 49. | 5 |
| 10. | 3 | 20. | 3 | 30. | 2 | 40 | 3 | 50 | 4 |

• డాక్టర్ రఘువేంద్ర / విజయ అమృతార్థ :

ஈசு பிரேரணை/ ஒது ஏற்பாடு விடைக்கு தேவை 01 லினீஸ்/புதுவி விடும்
கீடு மூலம்/Quarantine பாதிகள் 1 X 50 = 50

8 Old syllabus: Paper II pages containing the changed question

- (iii) Write only the content of an **external style** sheet to include the following:
- the style defined in line number 8 and
 - a CSS Id named ‘appear’ to define the style of the font as ‘Arial’
-
.....

Do not
write
in this
column

- (c) (i) Consider the following HTML code line and the statement that follows:

`<h1 style="color:Blue;">Hello World</h1>`

“The text ‘Hello World’ will be printed on a Blue background.”

Does this statement correctly explain the output of the above code? Explain your answer.

.....
.....

- (ii) The following HTML code segments A, B and C have been extracted from a correctly rendering HTML code. Explain in your own words the expected outcomes of each of them. (**Note:** It is **not** required to present the exact output)

A: ``

.....
.....
.....
.....
.....

B: `Sri Lanka Government`

.....
.....
.....
.....
.....

C: `<audio controls>
<source src="test.mp3" type="audio/mpeg">
</audio>`

.....
.....
.....
.....

- (iii) Show the expected output of the following HTML code fragment:

```
<form>
    <label for="fname">First name:</label><br>
    <input type="text" id="fname" name="fname"><br>
    <p>Gender:</p>
    <input type="radio" id="male" name="gender" value="male">
    <label for="male">Male</label><br>
    <input type="radio" id="female" name="gender" value="female">
    <label for="female">Female</label><br>
</form>
```

Do not
write
in this
column

2. (a) In an emergency health problem where people have to stay at home for a long period, the shops within the area remain closed for regular business activities. Under such circumstances the shops within a village or nearby town can help their community by practicing their business through e-commerce.

Considering the above scenario, fill the blanks in the following statements with suitable phrases from the given list of phrases.

- (i) In this emergency situation, shops follow the business model.
- (ii) Shops must use to allow customers to purchase more than one type of product in a single transaction.
- (iii) The e-commerce site for each shop can implement to display their products to the customers.
- (iv) For business owners who cannot use payment gateway through online fund receipts and for the customers who do not have any online mode of payments can still be supported through
- (v) is one of the best ways to reduce the overhead costs of delivery within a local area such as a lane, street or housing scheme.
- (vi) The local shop owners can establish to serve their community better by enabling access to each shop's services through a common portal.

List of phrases: {advertising banners, an online marketplace, a shopping cart, a web product catalogue, cash-on-delivery, credit-cards, discount pricing, group purchasing, payment gateways, click and brick, pure click, subscription as a revenue model}

9 Old syllabus: Paper II mark scheme for the changed question

1. (a) Draw the expected output of the HTML code segment.

[1]

The headings of the table must be in bold and center aligned. The data in the table must be left-aligned. Ignore border style.

| No | Type | City |
|----|------|--------|
| 1 | High | Galle |
| 2 | | Jaffna |

- (b) (i) What are the colours of the text in line numbers 8 and 9?

[2]

1 mark for each:

Line number 8: green

Line number 9: blue

- (ii) One advantage of defining styles as in lines 3,4,5 over 8

[1]

1 mark for any one of the following for a maximum of **1 mark**:

- the styles defined in the header can be used within the same html page more than once
- it will be easier to maintain consistency
- update will be easier
- file size will be lower
- code duplication/repetition is reduced
- cleaner/uncluttered code results

- (iii) Content of the required external style sheet

[1]

Everything must be spelled correctly.

```
h1{color:green;}
#appear{font-family:Arial;}
```

(c) (i) Does the statement correctly explain the output of the given code? Explain.

[1]

No. The colour of the *Hello World* text would be blue.

(ii) Explain the expected outcomes of each of the three HTML code segments labelled A, B and C.

[3]

1 mark for each:

A: sigiriya.jpg image will be displayed on the web page.

If the image not existing, the word 'Sigiriya' will be displayed on its place.

B: There will be a hyperlink named Sri Lanka Government that will be displayed on the page which when clicked will take the user to the www.gov.lk site.

C: Displays an *audio controls* interface on the web page which will let the user play the test.mp3 audio file.

(iii) Show the expected outcome of the given HTML code fragment.

[1]

First name:

Gender:

- Male
- Female
