ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2011

තොරතුරු හා සන්නිවේදන තාක්ෂණය I தகவல், தொடர்பாடல் தொழிஙுட்பவியல் I Information & Communication Technology I	20 E I	පැය දෙකයි இரண்டு மணித்தியாலங்கள் Two hours

Instructions:

- * *Answer **all** the questions.*
- * *Write your **Index Number** in the space provided in the answer sheet.*
- * *Use of calculators is **not** allowed.*
- * *Instructions are given on the back of the answer sheet. Follow those carefully.*
- * *In each of the questions **1** to **50**, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct** or **most appropriate** and **mark your response with a cross** (×) in accordance with the instructions given on the back of the answer sheet.*

1. Who invented the Analytical Engine?
   (1) Blaise Pascal (2) Charles Babbage (3) John Von Neumann
   (4) John V. Atanasoff (5) John Presper Eckert

2. Which of the following technologies is used in the Second Generation Computers?
   (1) Integrated Circuits (ICs) (2) Large Scale Integration (LSI)
   (3) Microprocessors (4) Transistors
   (5) Vaccum tubes

3. Answer sheet of a multiple choice question paper can be read with
   (1) Digitizer. (2) Light pen. (3) MICR. (4) Scanner. (5) POS terminal.

4. Computerized medical imaging systems which use echoes of transmitted pulses are called
   (1) CAT scans. (2) CT scans. (3) PETT scans.
   (4) Ultrasound scans. (5) X-ray images.

5. The binary number equivalent to the 27_{10} is
   (1) 000111 (2) 111000 (3) 011011 (4) 101011 (5) 111010

6. The abbreviation GSM stands for
   (1) Global System for Mobile Access. (2) Global System for Mobile Communication.
   (3) Global System for Mobile Phone. (4) Global System for Mobile Transmission.
   (5) Global System for Mobile Interconnection.

7. Which of the following database types is widely used in computer applications?
   (1) Flat file (2) Hierarchical (3) Network (4) Relational (5) Object oriented

8. The main role of a "router" in computer network is
   (1) to broadcast data packets to all hosts in the network.
   (2) to monitor the network for malicious activities.
   (3) to retransmit the received signal at a higher power.
   (4) to allow hosts in two networks to communicate.
   (5) to allow load balancing between multiple separate networks.

9. A command that can be used to check network connectivity to a computer is
   (1) ipconfig (2) ping (3) traceroute (4) netstat (5) hostname

10. Which of the following best describes the order of the testing conducted in the software development process?
    (1) Acceptance testing, integrated testing, unit testing.
    (2) Integrated testing, acceptance testing, unit testing.
    (3) Integrated testing, unit testing, acceptance testing.
    (4) Unit testing, acceptance testing, integrated testing.
    (5) Unit testing, integrated testing, acceptance testing.

[see page two

11. Which of the following is a classification of systems?
(1) Close and hybrid (2) Natural and structured (3) Open and close
(4) Open and structured (5) Structured and hybrid

12. A banking system could be best considered as a/an
(1) embedded system. (2) enterprise resource planning system.
(3) expert system. (4) knowledge management system.
(5) transaction processing system.

13. Which of the following best describes the home page of a website?
(1) The index of the website (2) The welcome page
(3) A description of the website (4) The first page of the website
(5) A web page that presents short journal entries

14. A manager of an engineering manufacturing company is considering whether to recruit more people in the near future. What is the most relevant information in this case he has to consider?
(1) Personnel records of all the employees
(2) Previous reports of all the recruited people
(3) The attendance sheets of all the employees
(4) Detailed reports of engineering specifications and manufacturing orders
(5) Summary reports of present and projected personnel requirements

15. $C1A_{16} + 4A2_{16} =$
(1) 523_{16} (2) FBC_{16} (3) FBB_{16} (4) $0BC_{16}$ (5) $10BC_{16}$

16. What is the main function of a DHCP server?
(1) Allocating IP addresses.
(2) Resolving domain names from IP addresses.
(3) Providing directory services to users.
(4) Sharing an Internet connection among users.
(5) Protecting a computer network from virus attacks.

17. Consider the IP address 192.248.87.3 and the subnet mask 255.255.255.224. How many hosts can be directly connected to this network?
(1) 16 (2) 24 (3) 30 (4) 64 (5) 128

18. What is the most suitable media to transmit a high definition video over a distance of 5 km?
(1) Radio waves (2) Twisted pair copper cables (3) Fibre optics cables
(4) Coaxial cables (5) Open wire cables

19. The transport layer of the OSI reference model provides
(1) error correction. (2) routing of data packets.
(3) flow control. (4) process-to-process communication.
(5) error detection.

20. Which of the following Python program segment is syntactically correct?

(1)
```
total = 0
for i in range (1, 12):
total = total + i
```

(2)
```
total
    for i in range (1, 12):
    total = total + i
```

(3)
```
total = 0
for i in range (1, 12):
   total = total + i
```

(4)
```
total = 0
for i in range (1, 12)
   total = total + i
```

(5)
```
total = 0
  for i in range (1, 12):
     total = total + i
```

[see page three

21. Consider the given flow chart:

Which of the following statements about the algorithm represented by the flow chart is **incorrect**?

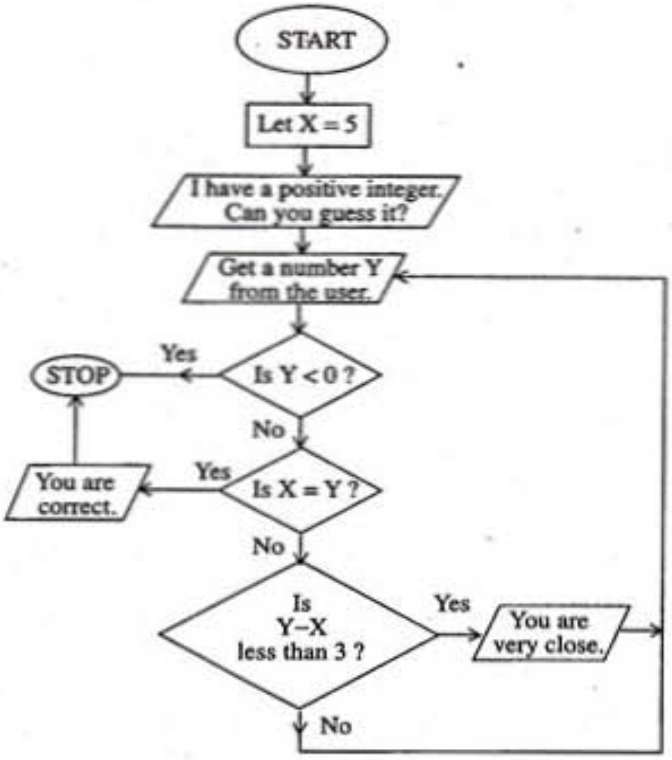
(1) It stops when the user enters the value −1.

(2) It stops when the user enters the value 5.

(3) It gives the message "You are very close." when the user enters the value 9.

(4) It gives the message "You are very close." when the user enters the value 6.

(5) If the value entered by the user is 8, it allows the user to enter another value.



22. Which of the following statements best describes the result of hard disk 'fragmentation'?

(1) Hard disk data access speed is reduced. (2) Network access speed becomes slow.
(3) Hard disk becomes totally inaccessible. (4) Some data will get erased from the hard disk.
(5) Number of bad sectors get increased.

23. Consider the following statements about computerized databases:

A - Need more human resources to manage the computerized database than a manual system.
B - Retrieval of data is efficient than a manual system.
C - No data duplications.
D - Need more space to store data than a manual system.

Which of the above statements are correct with respect to a properly designed database?

(1) A and B only. (2) A and D only. (3) B and C only.
(4) B and D only. (5) C and D only.

- Consider the following system description and the relations A, B, C and D given below to answer the questions **24**, **25** and **26**.

A principal of a National school wants to develop a database to maintain Admission Number, Student Name, Address, National Identity Card number (NIC) and the Date of Birth (DOB) of Advanced Level students. The principal also wants to know the marks obtained for each subject by the students. In addition to the above requirements, the principal needs to know the subjects assigned to the teachers.

Relations:

A - Student(admissionNo, studentName, address, DOB, NIC)
B - Subject(subjectCode, subjectName)
C - Mark(admissionNo, subjectCode, marksObtained)
D - Teacher(teacherNo, subjectCode, teacherName, subjectName, class)

24. Which of the above relations are in the third normal form?

(1) A and C only. (2) A and D only. (3) A, B and C only.
(4) A, C and D only. (5) B, C and D only.

25. Which of the following combinations of attributes provides the minimal set of primary keys for the relations Student, Subject and Mark respectively?

(1) admissionNo and NIC, subjectCode, admissionNo.
(2) NIC, subjectCode, subjectCode.
(3) admissionNo, subjectCode, subjectCode.
(4) admissionNo, subjectCode, admissionNo and subjectCode.
(5) admissionNo, subjectName, admissionNo and subjectCode.

[see page four

26. Which of the following SQL statements would produce an output with admission number, name of the student, subject code and marks obtained?

(1) SELECT studentName, subjectCode, marksObtained
FROM Student, Mark
WHERE Student.admissionNo = Mark.admissionNo

(2) SELECT Student.admissionNo, studentName, subjectCode, Student.marksObtained
FROM Student, Mark
WHERE Student.admissionNo = Mark.admissionNo

(3) SELECT Student.admissionNo, studentName, subjectCode, marksObtained
FROM Student, Mark
WHERE Student.admissionNo = Mark.admissionNo

(4) SELECT Student.admissionNo, studentName, subjectCode, marksObtained
FROM Student, Mark
WHERE Student.admissionNo = admissionNo

(5) SELECT Student.admissionNo, studentName, subjectCode, marksObtained
FROM Student, Mark
WHERE admissionNo = Mark.admissionNo

27. Which of the following would be the result if the Boolean expression $F(x,y)=\left(\overline{x+y}\right).\left(\overline{\bar{x}+\bar{y}}\right)$ is simplified by using De Morgan's Law?

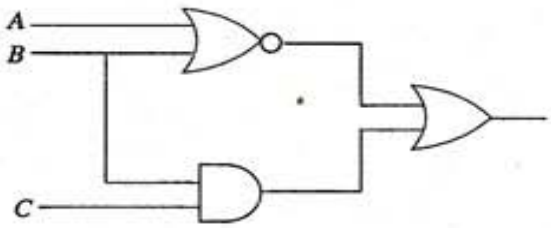
(1) x (2) y (3) 0 (4) 1 (5) $x.y$

28. Which of the following Boolean expressions represents the given logic circuit?

(1) $\left(\overline{A+B}\right)+\left(B+C\right)$ (2) $\left(A+B\right)+\left(B.C\right)$

(3) $\left(\overline{A+B}\right)+\left(\overline{B+C}\right)$ (4) $\left(\overline{A.B}\right)+\left(B.C\right)$

(5) $\left(\overline{A+B}\right)+\left(B.C\right)$



29. Consider the following properties:

A - Density
B - Capacity
C - Security
D - Cost
E - Access time

Which of the above are being used as the main properties to classify different types of memory?

(1) B and D only. (2) A, B and C only. (3) B, D and E only.
(4) A, B, C and D only. (5) A, B, D and E only.

30. Consider the following memory types:

A - Read Only Memory
B - Secondary storage
C - Cache memory
D - Flash memory
E - Random Access Memory

Which of the above can be considered as Volatile Memories?

(1) A and B only. (2) A and C only. (3) C and D only.
(4) C and E only. (5) D and E only.

31. Consider the following statements:

A - Customer can obtain the services while he/she is at his/her home or office.
B - Payments can be made without using currency notes.
C - Customer is open to a large international service provider base.
D - Service provider is open to a larger international customer base.
E - Security of payments are always guaranteed.

Which of the above are advantages in e-commerce compared to traditional commerce?

(1) A, B and C only. (2) A, B and D only. (3) A, C and D only.
(4) A, B, C and D only. (5) B, C, D and E only.

[see page five

32. Consider the following statements with respect to on-line services:
A - Customer should have access to on-line services.
B - Customer should possess an electronic mechanism to make payments.
C - At the time of placing the order for an item, the identify of the customer should be established.
D - Service provider should provide on-line services.
E - Both the customer and the service provider should be in the same geographical region.
Which of the above items are essential in on-line ordering?
(1) A and B only. (2) A, B and C only. (3) A, B and D only.
(4) A, C, D and E only. (5) B, D and E only.

33. Consider the following statements :-
A - Reading time from memory (latency) was assumed to be negligible.
B - Utilization of a hierarchical memory structure.
C - Inability to foresee the limitation of the processor clock frequency.
Which of the above prevented the technological advancement beyond the Von Neumann architecture?
(1) A only. (2) B only. (3) C only.
(4) A and B only. (5) A and C only.

34. Consider the following computer applications:
A - Guiding Tourists based on their current location.
B - Customization of automobiles.
C - Advertising via Internet.
D - Customization of domestic environments.
Which of the above applications are most favourably benefited from ubiquitous computing?
(1) A and B only. (2) B and C only. (3) A, B and C only.
(4) A, B and D only. (5) B, C and D only.

35. Consider the following items:
A - Object oriented
B - Rapid Application Development
C - Spiral
D - Structured
E - Waterfall
"....., ... and ..... are system development methodologies".
Which of the above are most appropriate respectively to fill the blanks in the above statement?
(1) A, B and C only. (2) A, C and D only. (3) B, C and D only.
(4) B, C and E only. (5) B, D and E only.

36. Consider the following statements about the Internet:
A - The Internet is a global network of networks.
B - People and organizations who are connected to the Internet can access its massive store of shared information.
C - W3C is in charge of the Internet.
D - Data can be downloaded only with File Transfer Protocol (FTP).
E - Anybody can publish information or create new services on the Internet.
Which of the above statements are correct?
(1) A, B and D only. (2) A, B and E only. (3) A, D and E only.
(4) B, C and D only. (5) B, C and E only.

37. Consider the following Python data items:
A - 15.2
B - [12, 'abc', 5.2]
C - {'name' : 'Nimal', 'age' : 18}
Python data types of the above data items A, B, C are respectively
(1) float, list, dictionary. (2) integer, tuple, dictionary. (3) float, list, tuple.
(4) integer, tuple, list. (5) float, tuple, dictionary.

[see page six

38. Select the correct layout corresponding to the following code segment of an HTML document.

```
<ul>
<li>Fruits
<ul><li>Mango
<ul>
<li>Gira amba</li>
<li>Dampara</li></ul></li>
<li>Pineapple</li></li></ul>
<li>Vegetables</li>
</ul>
```

(1)
- Fruits
  - Mango
    - Gira amba
    - Dampara
  - Pineapple
- Vegetables

(2)
- Fruits
  - Mango
    - Gira amba
    - Dampara
  - Pineapple
- Vegetables

(3)
- Fruits
  - Mango
  - Gira amba
  - Dampara
- Pineapple
- Vegetables

(4)
- Fruits
- Mango
- Gira amba
- Dampara
- Pineapple
- Vegetables

(5)
- Fruits
  - Mango
  - Gira amba
  - Dampara
  - Pineapple
- Vegetables

39. Consider the following items:

A - radio
B - textarea
C - select
D - checkbox
E - textbox

Which of the above can go as attributes of an input element in a form?

(1) A, B and C only. (2) A, B and D only. (3) A, D and E only.
(4) B, C and D only. (5) B, D and E only.

40. What is the correct syntax to be used to insert a JavaScript into an HTML page?

(1) <javascript> (2) <javascript language="text/javascript">
(3) <script type="text/javascript"> (4) <scripting language="javascript">
(5) <scripting type="javascript">

41. Consider the following XML scripts:

A -
```
<?xml version="1.0"?>
<students>
<name>Shashi Dias</name>
<age>18</age>
<regNo>A25849</regNo>
</students>
```

B -
```
<?xml version="1.0"?>
<students>
<name age="18">Shashi Dias</name>
<regNo>A25849</regNo>
</students>
```

C -
```
<?xml version="1.0"?>
<name>Shashi Dias</name>
<age>18</age>
<regNo>A25849</regNo>
```

D -
```
<xml version="1.0"?>
<students>
<name age=18>Shashi Dias</name>
<regNo>A25849</regNo>
</students>
</xml>
```

Which of the above scripts are syntactically correct?

(1) A and B only. (2) A and C only. (3) A and D only.
(4) B and C only. (5) C and D only.

[see page seven

42. Consider the following statements about operating systems:

A - Ubuntu is an open source operating system.

B - Windows XP is a proprietary operating system.

C - Linux is a proprietary operating system.

Which of the above statements is/are correct?

(1) A Only. (2) B Only. (3) C Only.
(4) A and B Only. (5) A and C Only.

43. Consider the following statements with respect to ER diagrams:

A - An ER diagram has entities and relationships.

B - Cardinality of all relationships should always be one-to-one.

C - Entities may have attributes.

D - There could be binary and tertiary relationships.

Which of the above statements are correct?

(1) A and D only. (2) B and C only. (3) B and D only.
(4) A, C and D only. (5) B, C and D only.

44. Consider the following statements about language translators:

A - Interpreters convert the entire source program into object program at once.

B - Compilers convert the entire source program into object program at once.

C - Programs written in high level languages do not need language translators to execute on a typical computer.

Which of the above statements is/are correct?

(1) A only. (2) B only. (3) C only.
(4) A and B only. (5) B and C only.

45. Consider the following statements about programming languages:

A - C programming language is a first-generation language (1GL).

B - Assembly language is a second-generation language (2GL).

C - Python is a second-generation language (2GL).

Which of the above statements is/are correct?

(1) A only. (2) B only. (3) C only.
(4) A and B only. (5) B and C only.

46. Consider the following statements in a program:

A - # This is a comment.

B - // This is a comment.

C - /* This is a comment. */

D - a=1 # This is a comment.

E - # Initial value of a=1

Which of the above are syntactically correct Python statements?

(1) A and D only. (2) C and E only. (3) A, D and E only.
(4) B, C and D only. (5) C, D and E only.

47. Consider the following assignment statements:

A - a = 'Nimal's address'

B - a = "Nimal's address"

C - a, b, c = 1

D - a, b, c = 1, 2, 'string'

E - a = b = 1

Which of the above are syntactically correct Python statements?

(1) A and C only. (2) B and D only. (3) A, C and E only.
(4) B, D and E only. (5) C, D and E only.

[see page eight

48. Consider the following **incomplete** Python program:

```
data = [5, 1, 23, 10]
datacount = len(data)
for i in range(datacount - 1):
 for k in range (i, datacount):
 ____________________
     temp = data[i]
     data[i],data[k] = data[k],temp
for  i  in range(datacount):
       print (data[i])
```

Which of the following Python statements should be included at the blank line to print the data items in the data structure named 'data' in the ascending order.

(1) if data[i] < data[k] : (2) if data[i] > data[k] : (3) if data[i] = data[k] :
(4) if data[i] < data[k] (5) if data[i] > data[k]

49. Consider the following Python program:

```
data = [5, 1, 23, 10, -3]
def fun(a):
     i, c = 1, a[0]
     while  i < len(a):
        if(a[i] > c):
                  c = a[i]
        i = i + 1
     return  c
print  (fun(data))
```

Which of the following is the output of this program?

(1) –3 (2) 1 (3) 5 (4) 10 (5) 23

50. Consider the following Python program:

```
f1 = open('input.txt','r')
f2 = open('output.txt', 'w')
line = f1.readline()
while (line) :
       data = (line.strip()).split(",")
       total = float(data[1]) + float(data[2])
       f2.write('{},{},{},{}\n'.format(data[0],data[1],data[2],total))
       line = f1.readline()
f1.close()
f2.close()
```

The content of the file "input.txt" is given below.

```
Nimal,30,60
Saman,80,45
Upali,100,80
```

After executing the program what would be the content of the file "output.txt"?

(1)
```
Nimal
Saman
Upali
```

(2)
```
Nimal,30,60
Saman,80,45
Upali,100,80
```

(3)
```
Nimal,30,60,90
Saman,80,45,125
Upali,100,80,180
```

(4)
```
Nimal,30,60,90.0
Saman,80,45,125.0
Upali,100,80,180.0
```

(5)
```
Nimal,30,60,90.0 Saman,80,45,125.0 Upali,100,80,180.0
```

* * *

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2011

තොරතුරු හා සන්නිවේදන තාක්ෂණය II தகவல், தொடர்பாடல் தொழினுட்பவியல் II Information & Communication Technology II	20 E II	පැය තුනයි மூன்று மணித்தியாலம் Three hours

Index No. : .....

Important :

- *This question paper consists of* **10** *pages.*
- *This question paper comprises of two parts, Part* **A** *and Part* **B.** *The time allotted for* ***both parts*** *is* ***three hours.***
- *Use of calculators is* ***not*** *allowed.*

PART A — Structured Essay :
(pages 02 - 07)

Answer ***all*** *the questions on this paper itself. Write your answers in the space provided for each question. Note that the space provided is sufficient for your answers and that extensive answers are not expected.*

PART B — Essay :
(pages 08 - 10)

This part contains ***six*** *questions, of which,* ***four*** *are to be answered. Use the papers supplied for this purpose. At the end of the time allotted for this paper, tie the* ***two parts together*** *so that* ***Part A*** *is* ***on top*** *of* ***Part B*** *before handing them over to the Supervisor.*

You are permitted to remove ***only Part B*** *of the question paper from the Examination Hall.*

For Examiner's Use Only

For the second paper		
Part	**Question Nos.**	**Marks Awarded**
A	1	
	2	
	3	
	4	
B	1	
	2	
	3	
	4	
	5	
	6	
Total		

Final Marks

In numbers	
In words	

Code Numbers

Marking Examiner 1	
Marking Examiner 2	
Marks checked by	
Supervised by	

[see page two

Part A - Structured Essay

Answer all the four questions on this paper itself.

Do not write in this column

1. (a) State the main technologies used in the first four generations of computers.

(b) Draw a diagram to depict the fetch-execute cycle used in program execution.

[see page three

(c) Show how the computation 5+ (-3) is done in 8-bit two's complement arithmetic. Explain how you deal with the carry generated from the most significant bit.

Do not write in this column

2. (a) Encircle the most suitable entry in the second and third columns corresponding to the properties listed in the first column of the following table with respect to FAT32 and NTFS file systems.

	FAT32	NTFS
Maximum file size	limited/unlimited	limited/unlimited
Maximum file name length	limited/unlimited	limited/unlimited
Security	yes/no	yes/no
Support of Unicode	yes/no	yes/no

(b) A computer has an 18-bit virtual memory address space where six bits are used for a page address.

(i) Calculate the total number of pages defined by the above addressing scheme.

(ii) Consider the following virtual memory address:

010111000000111100

What is the page and displacement (Offset) of this address?

[see page four

(c) Draw the operating system process transition diagram from process creation to termination.

Do not write in this column

3. Consider the following scenario.

Students in a school participate in different sports such as volleyball, track and field athletics, table tennis, etc. The principal wants to maintain a registry with **admission number**, **student name**, **home address**, **class**, and **sports** he/she participates. A student can participate in **more than one** sport. For a particular sport, there can be **more than one** student. Each student can participate pre-defined number of hours in a sport.

(a) Draw an ER diagram for the above scenario.

[see page five

Do not write in this column

(b) Classify with reasons whether the cardinality of relationship(s) identified in section (a) is one-to-one, one-to-many, or many-to-many.

Relationship	Cardinality	Reason

(c) "ER diagrams do not allow attributes to be assigned on relationships". State whether this statement is true or false. Explain your answer by using the given scenario.

[see page six

(d) A database designer suggested the following relation for the above system. State **two** weaknesses of this relation and suggest necessary modifications.

AdmissionNo	StudentName	HomeAddress	Class	SportName

Do not write in this column

[see page seven

Do not write in this column

4. (a) Classify the following software as either "system software" or as "application software".

Software	Classification
Linux	
Word Processor	
Web Browser	

(b) Computer storage devices can be categorized into three types based on the medium used to store / retrieve data. State the **three** types of media and give an example for each type.

(c) The transaction file in a company's payroll system includes employee number, hours worked, department code, and week number. Assume that the system maintains a Employee master table and a Department master table. Encircle the most appropriate validation check for each of the data elements given in the following table.

Data element	Validation checks
employee Number	Presence in Employee master table / Numeric value
hours worked	Presence in Employee master table / Range check
department code	Presence in Department master table / Range check
week number	Length / Range check

(d) Describe the terms "Video conferencing" and "Copyright".

* *

[see page eight

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2011

තොරතුරු හා සන්නිවේදන තාක්ෂණය II
தகவல், தொடர்பாடல் தொழினுட்பவியல் II
Information & Communication Technology II

20 E II

Instructions:

* *Answer any four questions only.*

Part B

1. (a) What are the three (3) main components of a Central Processing Unit (CPU) of a typical computer? List the main functions of these three components.

   (b) Briefly explain why storage compaction is needed in memory management.

   (c) For a file of size 10400 bits, calculate the wastage in file space due to incomplete filling of the last cluster (Assume that a cluster has a size of 512 bytes.)

   (d) A digital circuit takes four binary digits as an input, and produces 1 as its output if the decimal value represented by the four binary digits is a **prime number** (number which can only be divided by itself and 1), and 0 otherwise. Assume that all four binary digits represent positive decimal values (No bit is allocated for the sign).

   (i) The following truth table is designed to describe the above circuit, in which A, B, C and D represents the four binary inputs from the most significant bit to the least significant bit and F(A,B,C,D) as the output of the circuit. Copy the following truth table onto your answer sheet as it is and complete the output column.

A	B	C	D	F(A,B,C,D)
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	

   (ii) Write a Boolean expression to represent the logic function of the above circuit in the sum of products form.

   (iii) Design a logic circuit for the Boolean expression you have obtained for the above part (ii).

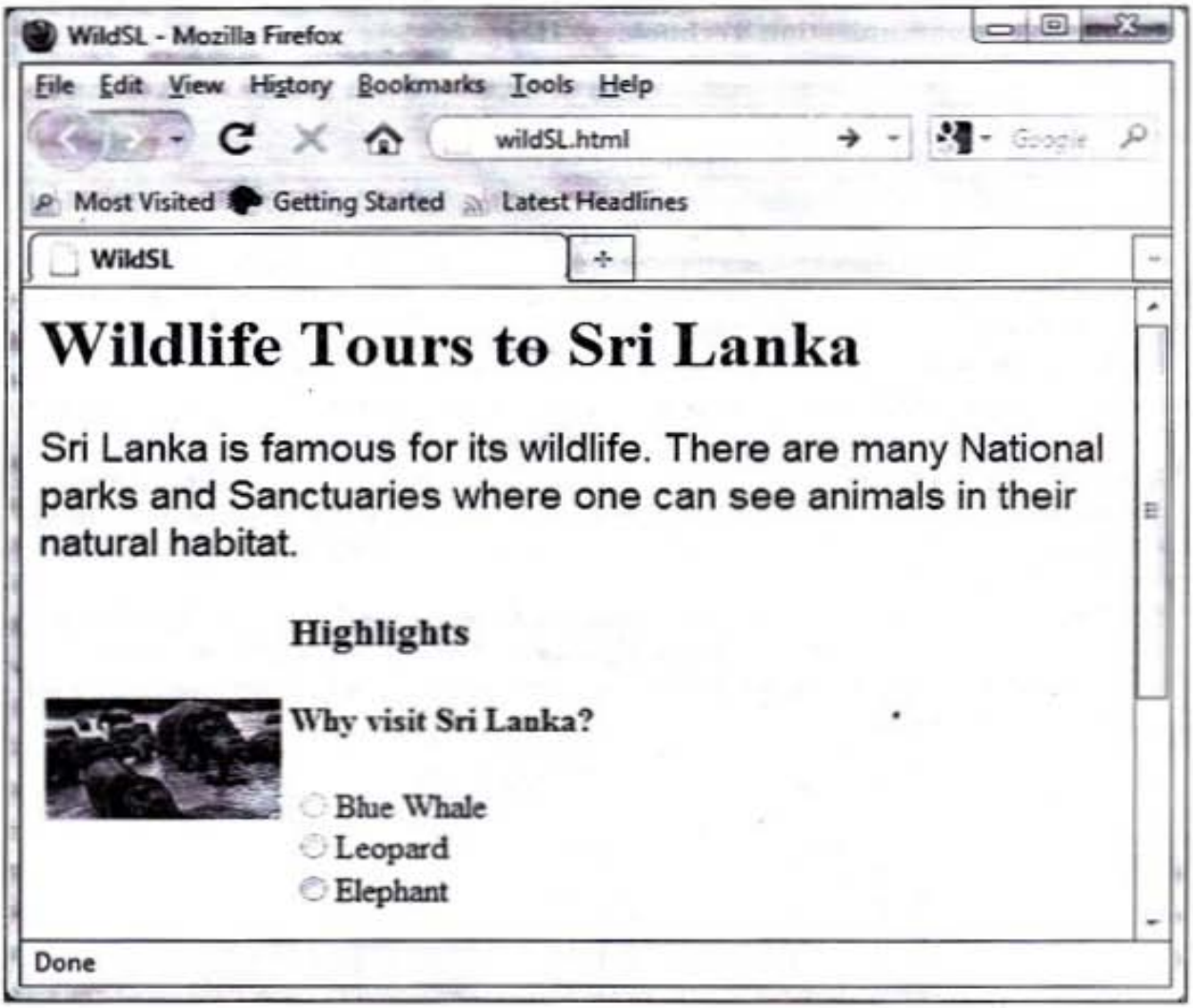
[see page nine

2. (a) Describe the terms "elements" and "attributes" with respect to an HTML document.

(b) Identify each of the following as either an element or an attribute and describe their functionlity.

(i) br (ii) href (iii) src (iv) html

(c) Consider the following figure which shows a section of a web page of a tour operating company in Sri Lanka.



Answer the following questions using the above figure.

(i) It is required to format all the paragraphs of the above HTML document in "**arial**" font, **14** font size and in **blue** colour. Write the required CSS code segment for the paragraph.

(ii) Explain the effect of having the following tag in the above HTML document.

```
<a href = "elephants.jpg"><img src = "elephants_tnl.jpg"
ALT = "Tour to Yala" width = "288cm" height = "156cm"
style = "border:none"/></a>
```

(iii) Write HTML code segment to create the collection of three radio buttons labelled as 'Blue Whale', 'Leopard' and 'Elephant' as appeared in the above HTML document.

(iv) The company wants to add a table showing the rates as given below with the caption 'Wild Sri Lanka', to the above HTML Document.

Days	Price
7	US$910
10	US$1220

Write HTML code segment to create the table.

[see page ten

3. (a) You have been asked to design two physically separated networks, namely A and B, each having exactly 10 computers. The IP addresses of A and B networks are **10.32.5.0** and **10.32.6.0** respectively. It is required that the computers in the two networks must be able to communicate with each other.
   (i) Suggest a suitable subnet mask for each of these networks.
   (ii) Name the device required to connect these two physical networks to communicate with each other.
   (iii) Draw a network diagram for the above network and assign suitable IP addresses for the devices in these two networks.

   (b) (i) Compare TCP and UDP protocols in terms of reliability.
   (ii) Peer-to-peer (P2P) and client-server models are distributed application architectures. State the difference between them.
   (iii) List the differences between hubs and switches in a network.

4. (a) Identify and describe the phases of the waterfall model in software development.
   (b) Describe functional and non functional requirements of a system. Identify **two functional** and **three non functional** requirements for a mobile phone.
   (c) Describe the purpose of unit, integrated and acceptance testing. Who are the people responsible for each testing process?
   (d) Suppose you are planning to buy a new mobile phone and would like to test its functionality. Describe how Black Box testing can be used in this process.

5. (a) Explain the necessity of program translators in computer programming.
   (b) Give **two** main features for each of the First-Generation and Second-Generation programming languages.
   (c) Give **three** main flow control structures used in a structured programming language. Show how these flow control structures can be represented in a flow chart.
   (d) The following Python program is intended to convert user given positive integers to their equivalent binary representations. The program should halt when the user inputs the value 0. The program has both syntactic and logical errors. The line numbers are not part of the program, but they are used to reference the lines.

```
1   x = int (input ("Enter an integer →)
2   while x != 0 :
3   bn = ""
4     while x > 1 :
5       quotient = int(x/2)
6       remainder == x % 2
7       bn = bn + str(remainder);
8           x = quotient
9       bn = str(x) + bn
10    print ("Binary Number ", bn)
11    x = int (input("Enter an integer →)
```

   (i) State the lines with syntactic errors and state the error.
   (ii) Which lines of the program should be changed and state how they should be changed to obtain the desired results. (You are **not** allowed to add new lines or to delete existing lines.)

6. (a) (i) Using an example for each category explain the **three** types of business: Business to Business (B2B), Business to Consumer (B2C) and Consumer to Consumer (C2C) in e-commerce.
   (ii) Chairman of a company is considering fax, e-mail and web as communication tools for a B2E (Business to Employee) application. Being an ICT student recommend the most appropriate tool with reasons.

   (b) (i) In the domain of Agent technology, explain the term 'Agent'.
   (ii) Give **two** main characteristics of an Agent.
   (iii) Briefly explain an example where Agent technology could be used effectively.

* * *

අ.පො.ස. (උ.පෙළ) විභාගය 2011
க.பொ.த.(உயர்தர)ப் பரீட்சை 2011

විෂයය පාඨම } Information & Communication Technology විෂයය අංකය } 20

ලකුණු දීමේ පටිපාටිය - I පත්‍රය
புள்ளி வழங்கும் திட்டம் - பத்திரம் I

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

Information and Communication Technology (Paper No 20)
Paper II – A
Marks Allocated 10 x 4 = 40
A -75,B – 65, C-55, S - 35

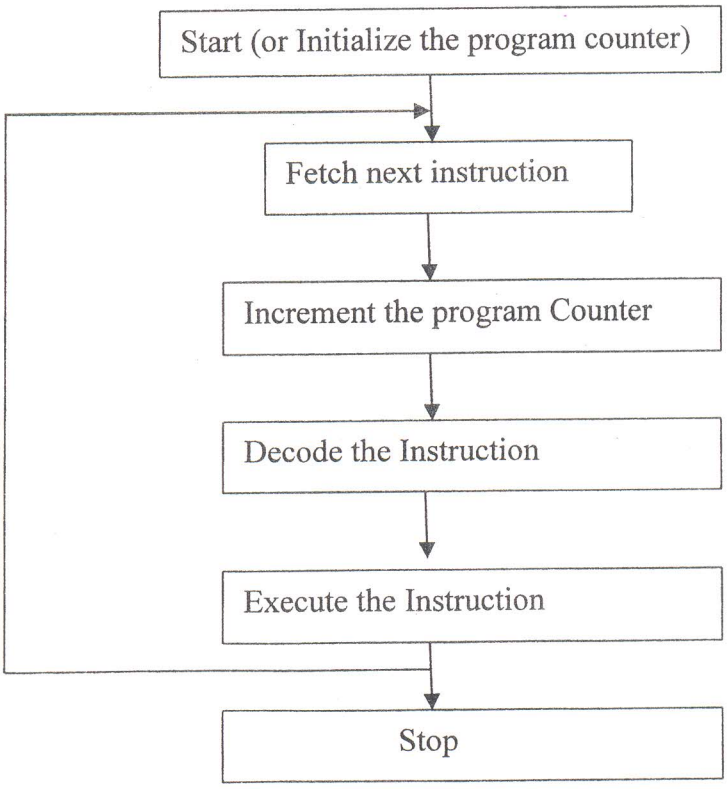
1.

a) First Generation (1GL) : Electronic valves or Vacuum Tubes
Second Generation (2GL) : Transistors
Third Generation (3 GL) : Integrated circuits(ICs)
Fourth Generation (4 GL) : Large Scale Integration (LSI) ,Very large scale Integration (VLSI), Microprocessors

Total 4 Marks

- **One marks for each correct answer**

b)



Total 2 Marks

- Three states **fetch, decode, execute** items in correct order 2 Marks (with cycle)
- Any two items fetch, decode, execute in correct order 1 Mark

without cycle – ½ mark
fetch, decode, execute without cycle 1 Mark

c)

c)

5 = > 0000 0101
3 => 0000 0011
-3 => 1111 1100 + 0000 0001 => **1111 1101**

Total 2 Marks

- **Correct representation of 5 1 Mark**
- **Correct representation of -3 in twos's complement 1 Mark**

0000 0101
1111 1101 +

1carry 0000 00 10

1 Mark

A carry out of the most significant bit is ignored in two's complement addition.

1 Mark

2)

a)

	FAT32	NTFS
Max file size	**limited**/unlimited	limited/**unlimited**
Max file name length	**limited**/unlimited	limited/**unlimited**
Security	yes/**no**	**yes**/no
Support of Unicode.	yes/**no**	**yes**/no

Total 3 Marks

- **All 8 answers are correct – 3 Marks**
- **4,5,6 or 7 correct answers – 2 Marks**
- **1,2,or 3 – 1 Mark**

b)

i) Total number of pages $= 2^6 = 64$

Total 2 Marks

- **$2^6 = 64$ 2 Mark**
- **2^6 1 Mark**

64 — 1 Mark

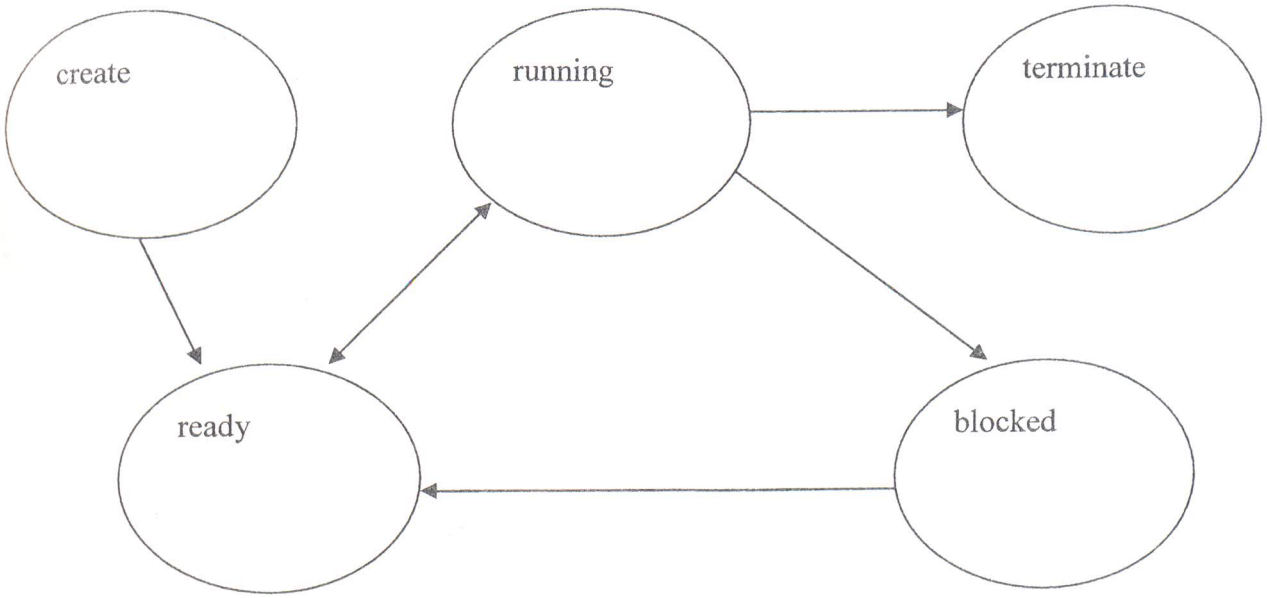
ii)

[010111 | 000000111100]
Page displacement

Total 1 Mark

- **Both page and displacements are correct 1 Mark (No marks for partial answers)**
- **If at least page and displacement is identified 0.5 Marks**

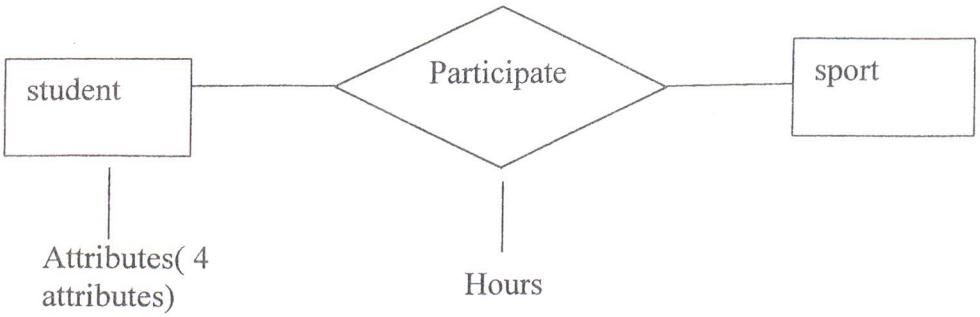
c)



Total 4 Marks

All 5 states with arrows in the correct directions– 4 Marks.
Create, Ready, Running, Terminate with arrows in the correct directions – 3 Marks.
All five states of ~~the above 4 state~~s (arrows in wrong direction or without arrows)– 2 Marks
Any two states – 1 Mark

3) a)



Total 2 Mark

- **Complete diagram with attributes – 2 Marks**
- **Diagram without attributes – 1 Mark**
- **Two entities and one relationship (names may not be correct) – 1 Mark**

b)

Relationship	Cardinality	Reasons
Participate	**Many-to-many**	**One student can participate for more than one Sport.** **More than one student for a sport.**

Total 1 Mark

- **All correct**

c) False or not correct

1 Mark

True

0 Marks for the section, No marks for explanation

Reason :
No of hours is defined as an attribute on the participate relationship

1 Mark

d)

Two weaknesses

1) **Data duplication or any statement implying this.**
2) **Attribute 'Hours' on the relationship 'Participate' is excluded in the table**

Total 2 Marks

- **1 Mark for each**

St

Student table with the attributes Admission No, Name, Address, Class

Total 1 Mark

Sp

Sport table with attribute – Sport Code, Sport Name

arks

Total 1 Mark

Pa

Participate relationship with attributes Admission No, Sport Code, No of Hours

Total 1 Mark

rks

rk

5

k

4)

a)

Linux – System Software
Word Processor – Application Software
Web Browser – Application Software

Total 2 M

- **All three correct – 2 marks**
- **Any two correct – 1 Marks**

b)

Magnetic – Hard disk, Diskette, Tape Drive (Any one)
Optical – CD, DVD,VCD , Blueray Disk
Solid State – Flash Drive, Memory cards

Total 3 M

- **All six correct – 3 marks**
- **All 3 types without any examples – 2 Marks**
- **Any four or five correct – 2 Marks**
- **Any one, two or three correct - 1 Mark**

Only Examples without media will not be given any marks

c)

Data Element	Validation Check
Employee Number	Presence in Employee Master Table
Hours worked	Range check
Department code	Presence in Department Master
Week number	Range check

Total 3

- **All 4 correct – 3 marks**
- **Two or three – 2 Marks**
- **One correct - 1 Mark**

d)

Video Conferencing : This is the process by which **two or more individuals**, located in **different places** carry out a **discussion(communication)** through network by transmitting audio and video.

1 - Mark

Copyright : The right of the author to copy, print and market his/her material.

1 - Mark

03/09/

Information and Communication Technology (Paper No 20)
Paper II – B
Marks Allocated 15 x 4 = 60
A -75,B – 65, C-55, S – 35

a) Three components
- ALU
- CU
- Registers

[0.5 Marks * 3 = 1.5 Marks]

ALU
- Performs mathematical calculations.
- Perform comparisons of data.

CU
- Performs all the functions of a computer system.
- Decodes instructions in the memory.
- Sends signals to the relevant components.

Registers
- Temporarily store data and instructions until they are send to the ALU.
- Stores processed data (results) until sends to the main memory (storage device)

[For any answer from each category 0.5 Marks * 3 = 1.5 Marks]

b) Storage compaction is needed to bring **all used storage** to **one end of the storage** in order to **claim unused/usable storage** space for **efficient use**.

[0.5 Marks * 4 = 2 Marks]

/20

c) File size = 10,400 bits = 1,300 bytes
Size of a cluster = 512 bytes.
Therefore number of clusters needed for the file = 3

[1 Mark]

Total size of 3 clusters = 512 x 3 Bytes = 1,536 bytes
Wastage of space = 1,536 – 1,300 = 236 Bytes

[0.5 marks x 2 = 1 Mark]

1. (d).

(i). solution 1

A	B	C	D	F(A,B,C,D)
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

OR

Solution 2

A	B	C	D	F(A,B,C,D)
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

[0.25 x 16 = 4 Mar

(ii)

solution 1

$F(A,B,C,D) = \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D} + \bar{A}BCD + A\bar{B}C$

~~$F(A,B,C,D) = \bar{A}BC\bar{D} + \bar{A}BCD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D}$~~

OR

~~$F(A,B,C,D) = \bar{A}BC\bar{D} + \bar{A}BCD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D}$~~

solution 2 $F(A,B,C,D) = \bar{A}\bar{B}\bar{C}\bar{D} +$

[2 Marks

(iii) Logic Circuit

- ~~$F(A,B,C,D) = \bar{A}BC\bar{D} + \bar{A}BCD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D}$~~

~~OR~~

- ~~$F(A,B,C,D) = \bar{A}BC\bar{D} + \bar{A}BCD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}C\bar{D} + AB\bar{C}\bar{D} + AB$~~

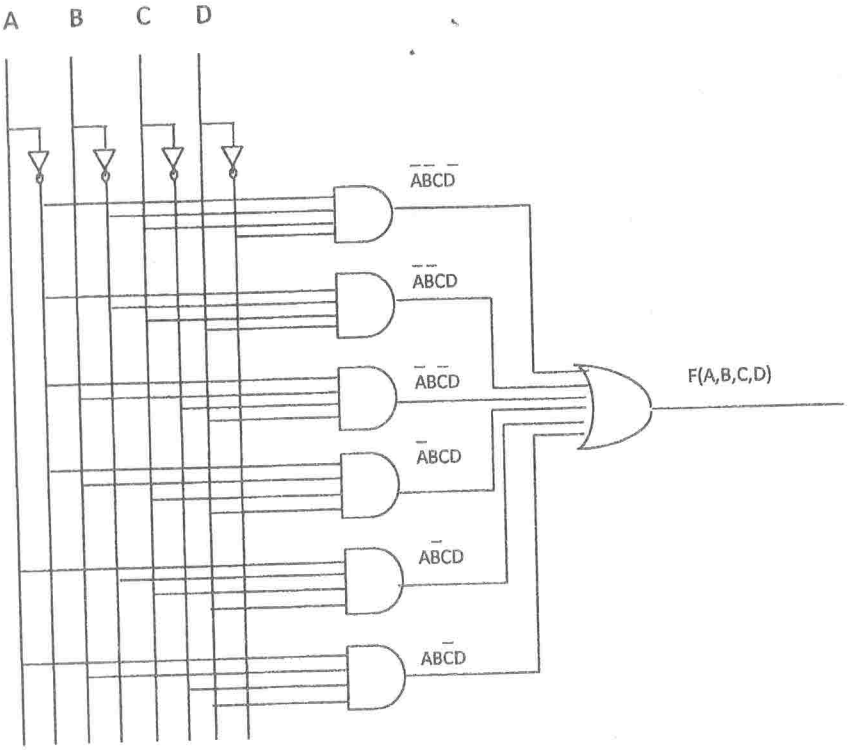
~~OR~~

- Simplified Boolean Expression [2 Marks]

(As given below)

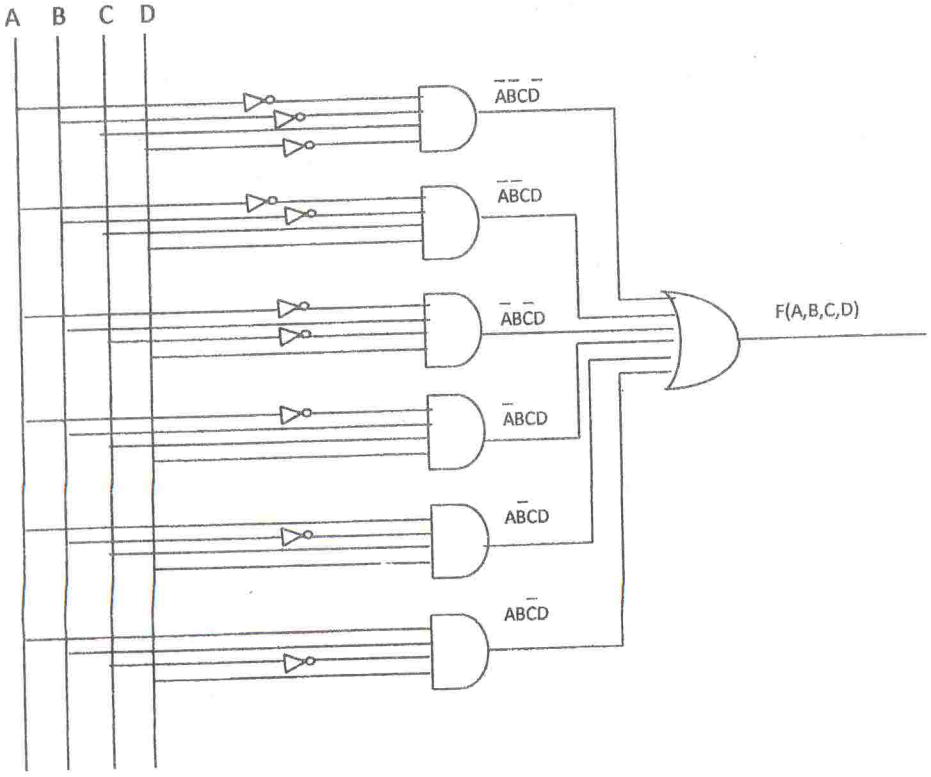
Logic circuirt for • $F(A,B,C,D) = \bar{A}\bar{B}\bar{C}D+\bar{A}\bar{B}C\bar{D}+\bar{A}B\bar{C}\bar{D}+A\bar{B}\bar{C}\bar{D}+A\bar{B}CD+AB\bar{C}D$

**



OR

**



OR

1st solution

Simplified Boolean Expression using Boolean algebra or Karnaugh map

$F(A,B,C,D) = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}CD + AB\bar{C}D$

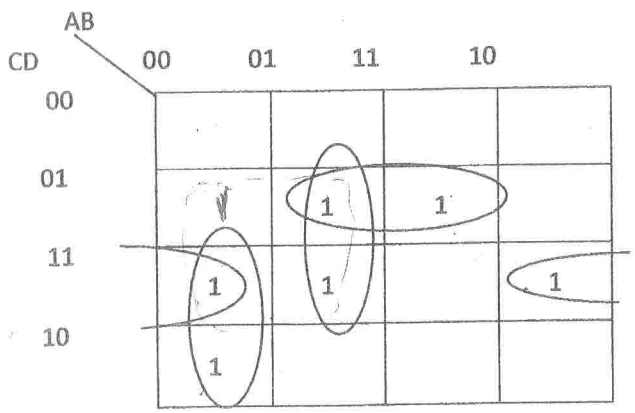
$= \bar{A}\bar{B}C(\bar{D}+D) + \bar{A}BD(\bar{C}+C) + A\bar{B}CD + AB\bar{C}D$

$= \bar{A}\bar{B}C + \bar{A}BD + A\bar{B}CD + AB\bar{C}D$

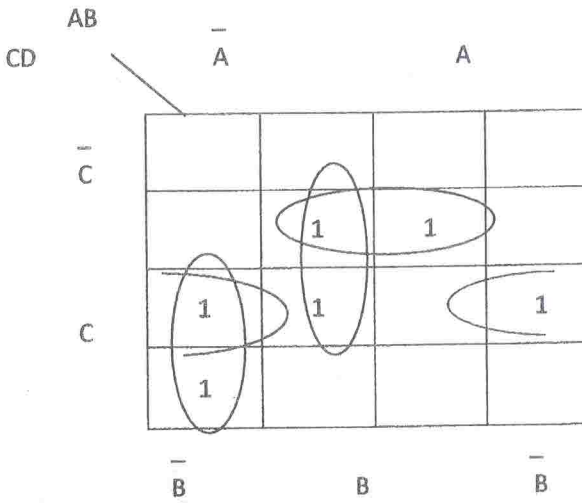
$= \bar{B}C(\bar{A}+AD) + BD(\bar{A}+A\bar{C})$

$= \bar{B}C(\bar{A}+D) + BD(\bar{A}+\bar{C})$

$= \bar{A}\bar{B}C + B\bar{C}D + \bar{A}BD + B\bar{C}D$ **(or any correct simplification)**



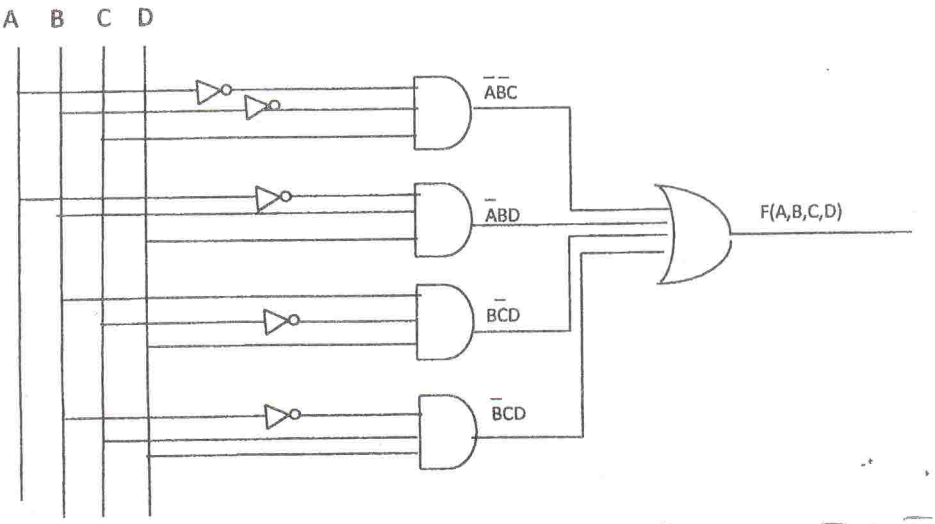
OR



* $\bar{A}D$

$F(A,B,C,D) = \bar{A}\bar{B}C + \bar{A}BD + B\bar{C}D + B\bar{C}D$

**



$\bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}CD + AB\bar{C}D$

$= \bar{A}\bar{B}C(\bar{D}+D) + \bar{A}BD + (C+\bar{C})$

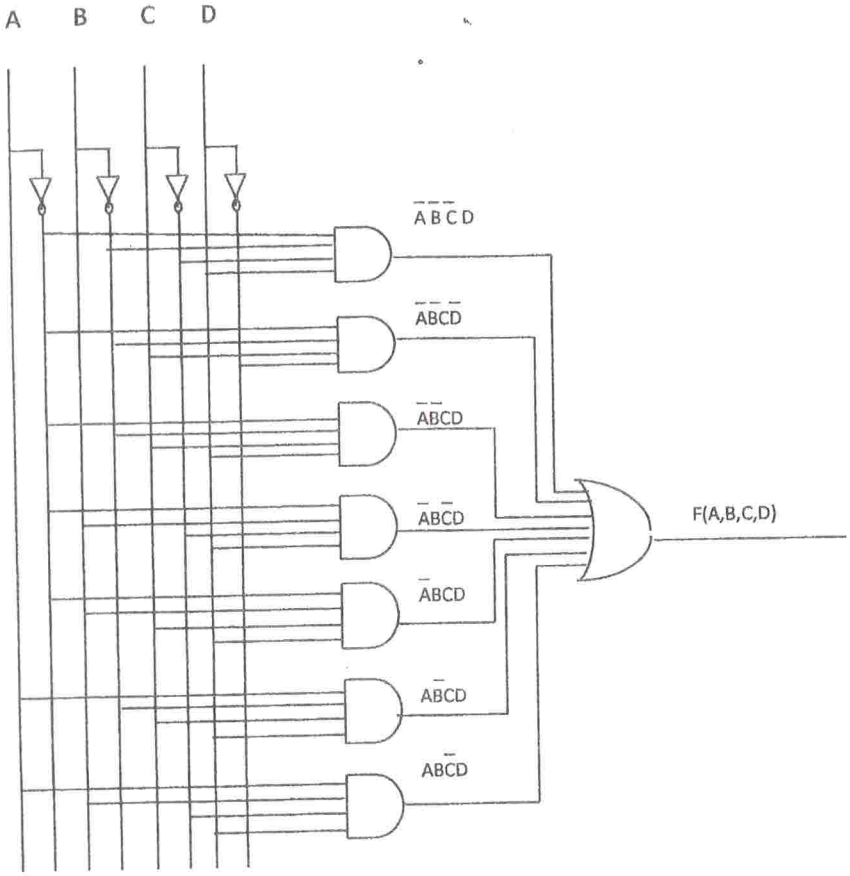
Logic

**

Logic circuirt for

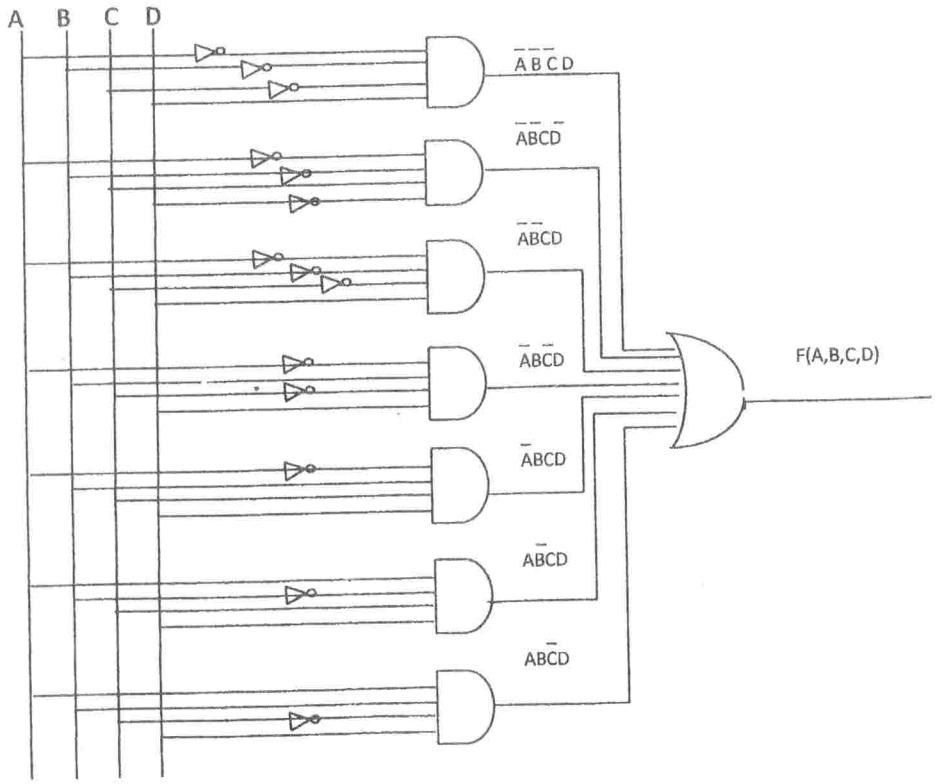
- $F(A,B,C,D) = \bar{A}\bar{B}\bar{C}D+\bar{A}\bar{B}C\bar{D}+\bar{A}B\bar{C}\bar{D}+\bar{A}BC\bar{D}+A\bar{B}\bar{C}\bar{D}+A\bar{B}CD+AB\bar{C}D$

**



**

OR



OR

Simplified Boolean Expression using Boolean algebra or Karnaugh map

$F(A,B,C,D) = \underline{\bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD} + \underline{A\bar{B}\bar{C}D + A\bar{B}CD} + A\bar{B}CD + AB\bar{C}D$

$= \bar{A}\bar{B}(\bar{C}D + \underline{C\bar{D} + CD}) + \bar{A}BD(C+\bar{C}) + A\bar{B}CD + AB\bar{C}D$

$= \bar{A}\bar{B}(\bar{C}D + C(\bar{D}+D)) + \bar{A}BD(C+\bar{C}) + A\bar{B}CD + AB\bar{C}D$

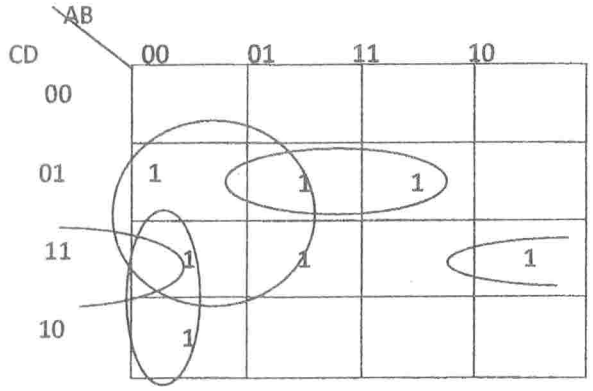
$= \bar{A}\bar{B}(\bar{C}D + C) + \underline{\bar{A}BD} + A\bar{B}CD + \underline{AB\bar{C}D}$

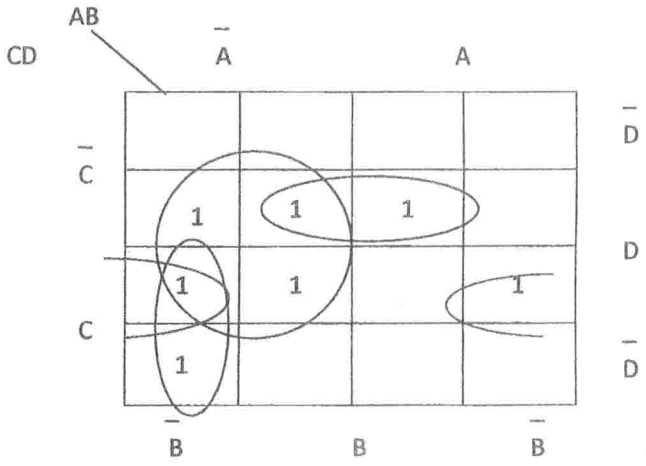
$= \bar{A}\bar{B}(C+D) + BD(\bar{A}+A\bar{C}) + A\bar{B}CD$

$= \underline{\bar{A}\bar{B}C} + \underline{\bar{A}\bar{B}D} + \underline{\bar{A}BD} + B\bar{C}D + \underline{A\bar{B}CD}$

$= \underline{\bar{A}D(\bar{B}+B)} + B\bar{C}(\bar{A}+AD) + \underline{B\bar{C}D}$

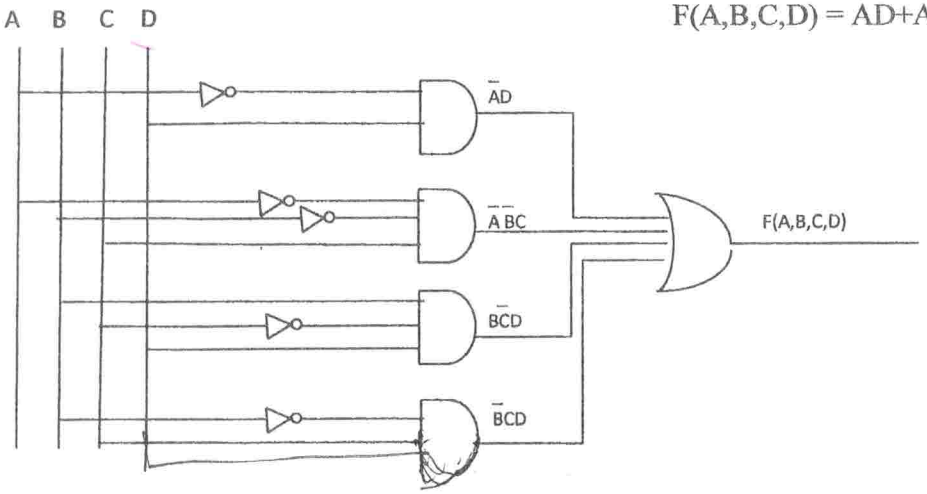
$= \bar{A}D + \bar{A}\bar{B}C + B\bar{C}D + B\bar{C}D$ **(or any correct simplification)**





**

$F(A,B,C,D) = \bar{A}D + \bar{A}\bar{B}C + B\bar{C}D + B\bar{C}D$



2. (a)

Elements :

- HTML documents are defined by HTML elements.
- Content starts with a valid tag and terminated with a valid corresponding tag.

[Any answer - 1 mark]

Attributes :

- Attributes provide additional information about elements.

[1 marks]

(b)

(i) br: element - forces a line break wherever you place it.
(ii) href: Attribute defines the link "address".
(iii) src: attribute specifies the location of the image file
iv) html: element defines the whole HTML document

~~**[0.5 mark for each = 2 Marks]**~~

[0.25 Mark for each element and functionality x 8 = 2 Marks]

(c) (i) p{ color:blue; font-family:arial; font-size: 14pt}

[2 marks]

If the complete answer is not given sub-sections of the written answer can be given marks as below.

- p{ color:blue; font-family:arial; font-size: 14pt}
  [If both underlined component are given - .5 mark]
- p{ color:blue; font-family:arial; font-size: 14pt}
  [For each underline component - .5 mark for each]

(ii) Creates

- an anchor link
- when the user clicks on the image icon, "elephants_tnl.jpg", an image named "elephants.jpg" is loaded in a different web page.
- If the browser can't load the image "elephants_tnl.jpg" it displays the alternate text "Tour to Yala".
- The width and height of the image"elephants_tnl.jpg" are 288cm and 156 cm respectively.
- Turns off the border.

[0.5 marks for each = 3 Marks]

Note: The 2nd bullet contains two correct segments.

8

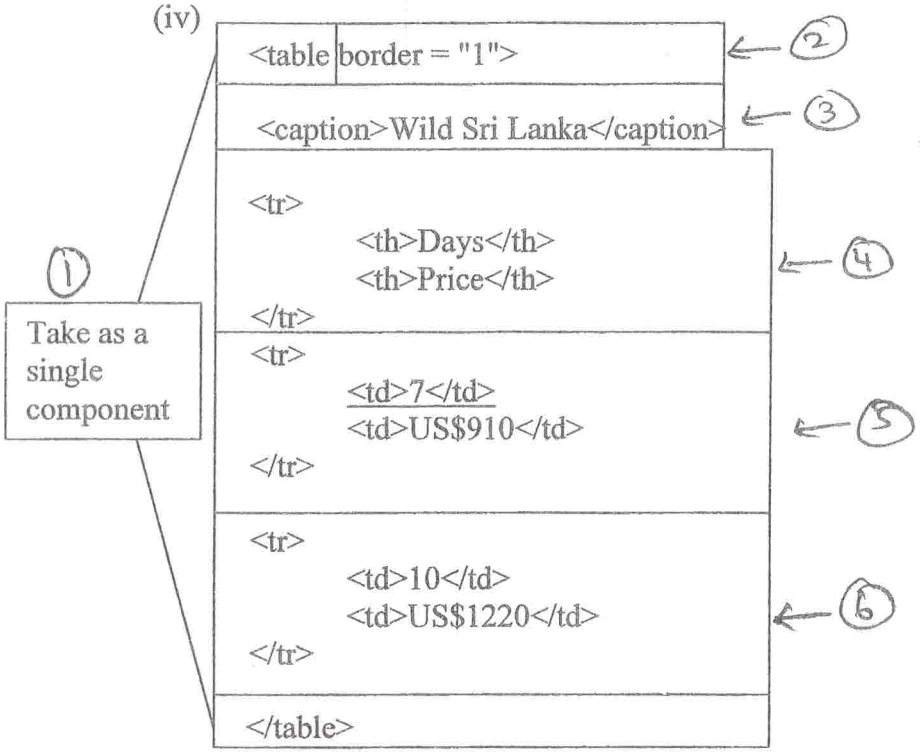
(iii) <input type = "radio" name = "visit" value = "Whale" >Blue Whale

[Each underlined component 0.5 marks * 4 = 2 marks]

<input type = "radio" name = "visit" value = "Leopard" >Leopard
<input type = "radio" name = "visit" value = "Elephant" >Elephant

[0.5 mark for each = 1 marks]

(iv)



[0.5 marks for each component *6 = 3 Marks]

Question 3

1)

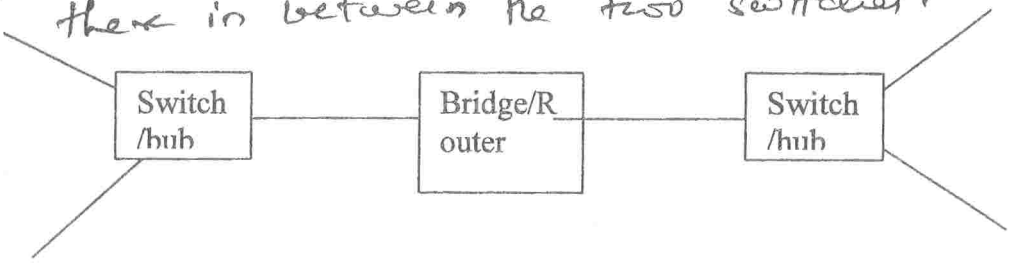
i) 255.255.255.240

[marks 2]

ii) Router or Bridge or L3 Switch (Layer 3 Switch)

[marks 1]

iii) At least one Bridge or Router should be there in between the two switches.



[Correct Answer Marks 2

Partial Marks - Two segments drawn with with no link - 1 Mark]

Gateway address of network 1: 10.32.5.x where x = 1....14
Gateway address of network 2: 10.32.6.y where y = 1..14

[each correct answer 1 * 2 = marks 2]

IP addresses of computers network 1

10.32.5.n where n = 1..14 **but not x**

[marks 1]

IP addresses of computers network 2

10.32.6.m where m = 1..14 **but not y**

[marks 1]

[Do not give marks for duplicate ip numbers]

b).

i. Compare TCP and UDP protocols in terms of reliability

TCP reliability high,
UDP is unreliable.

[2 Marks]

ii. Peer-to-peer (P2P) and client-server models are distributed application architectures. Discuss the difference between them.

P2P partitions tasks or workloads between peers

[1 Mark]

In Client server, server takes the full load.

[1 Mark]

iii. Distinguish between hubs and switches in a network.

Hub : When a packet arrives at one port, it is copied to all the other ports.
Switch : When a switch receives a packet, it sends the packet only to the particular destination port.

[1 for each x 2 = 2 Marks]

Question 4

a)

- Requirement (Elicitation and) Analysis.
- System Design.
- Implementation/Coding.
- Testing
- Maintenance.

[0.5 for each item identification x 5 = 2.5 Marks]
[0.5 for each item description x 5 = 2.5 Marks]

b) Functional requirements:

- Services expected by the user or
- Services provided by the system.

Non-Functional Requirements:

- System constraints/ limitations.

[1 for each x 2 = 2 Marks]

Mobile phone- functional:

- Make a call,
- receive a call,
- send an SMS,
- receive an SMS

[0.5 for any correct answers up to three x 3 = 1.5 Marks]

Mobile phone- non-functional:

- Size,
- price,
- battery life time,
- memory capacity,
- appearance

[0.5 for any correct answer up to two correct answers x 2 = 1 Marks]

a) *Maintenance : Necessary changing modifications to meet the requirements.
Requirment Analysis: Identification of user requirments.
System Design: Development of a conceptual model to represent the actual system, which can be implemented
Implementation: convert the conceptual model to a collection of ~~computer~~ executable computer programs.
Testing: Identify the existance of errors and error

c) Unit testing:

5.

- Purpose: To test the individual source programs for logical errors.
- People: Programmer/Software Engineer who developed the source code/program

Integrated testing:

- Purpose: Unit tested source codes are combined as a group and test for (functionality, performance, and/or reliability) errors due to the integration.
- People: software engineers/programmers, senior SE/team lead/ project manager development people only)

Acceptance testing:

- Purpose: To test the requirements of a specifications or contract are met.
- People: people from software development team and clients/end users.

[0.5 for each purpose x 3 = 1.5 Marks]
[0.5 for each correct people involved x 3 = 1.5 Marks]

d)

Any explanation with the following key features is acceptable.

Decide the functionality

[0.5 Marks]

Decide the expected output

[0.5 Marks]

Conduct the test

[0.5 Marks]

Compare the actual behavior with the expected one.

[1 Mark]

5.

(a)

Computer (processor) cannot understand programs written in **any language other than machine code**. Therefore language translators are needed to translate such programs to **machine code** prior to their execution.

[2Marks]

(b)

First generation languages :

1) In Machine Code.
2) Execute very fast compared to other generation languages.
3) Tied up with the machine architecture.
4) Translators are not need to execute programs.

Second generation languages:

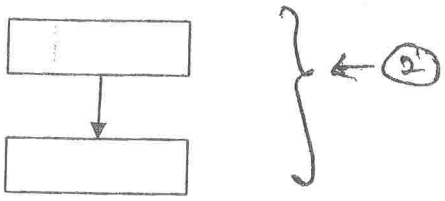
1) In assembly language
2) Mapping between assemble instructions and machine instruction is usually 1-1
3) Tied up with the machine architecture.
4) Assembler is needed to execute the program

Two features from each generation 2 – Mark

- **Each correct answer 0.5 subjected to maximum 1 for each generation.**

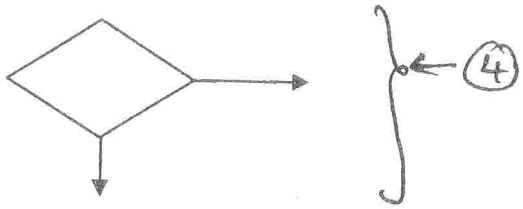
(c)

i. Sequence ← (1)

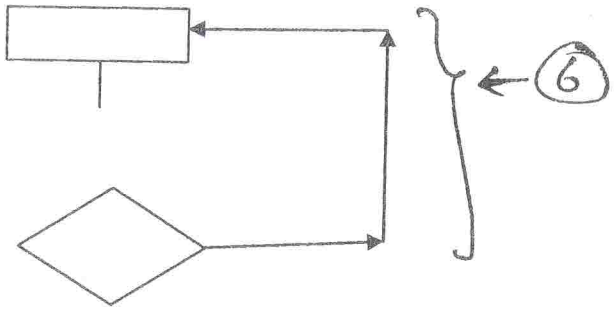


Element of the diagram can be any valid item. Only the sequence of one instruction followed by the other is important.

i. Branching (decision) ← (3)



ii. Iteration (repetition) ← (5)



All three control features are correct with the flow charts – 3 Marks

- **Each correct answer = 0.5 marks** (item or flow chart)

(d)

```
1    x = int(input("Enter an integer ->)
2    while x != 0 :
3     bn = ""
4        while x > 1:
5              quotient = int(x /2)
6               remainder = x %2
7              bn =bn +  str(remainder);
8                    x = quotient
9              bn = str(x) + bn
10       print ("Binary Number -", bn)
11       x = int(input("Enter your number ->)
```

Syntax errors

a) Line No 1
   i. String is not closed properly (“)
   ii. Need one more close bracket (“(“)

b) Line No 3
   i. bn variable should be right indented.

c) Line No 6
   i. Assignment operator should ne = not ==

d) Line No 7
   i. No line terminator (“;”)

e) Line No 8
   i. Line should be indented with the previous line.

f) Line 11
   i. String is not closed properly (“)
   ii. Need one more close bracket (“(“)

All 8 correct with reasons – 4 Marks

- **Each correct error identification of an error 0.25 marks, error correction 0.25 mark**

Logical errors

a) Line 7 should be

```
bn = str(remainder) + bn
```

If the order on the right hand side reversed, The binary number would be in the reverse order.

b) Line 9 should be aligned with line 4 to capture the last bit.

```
3       x = int(input("Enter an integer  ->"))
4       while x != 0 :
3           bn = ""
4           while x > 1:
5                   quotient = int(x /2)
6                    remainder = x %2
7                   bn = str(remainder) + bn
8                   x = quotient
9           bn = str(x) + bn
10          print ("Binary Number -", bn)
11          x = int(input("Enter an integer ->"))
```

All 2 corrections – 4 Marks

- **Each correction – 2 Marks**

6. (a) For this question valid business entities are

- Manufacture
- Wholesaler
- Retailer
- Service Provider

(i) Business to Business – Describes **electronic commercial transaction between businesses.**

[Each bold point 0.5 Marks x 2 = 1]

In the example both parties should be business entities.
Example : Delivering motor vehicles by the manufacturer to the wholesale dealer through on-line transactions.

[Each valid business party 0.5 Marks x 2 = 1]

Business to Consumer – Describes **electronic commercial transaction between business to a Consumer.**

[Each bold point 0.5 Marks x 2 = 1]

Example - Processing an on-line order to purchase a Mobile Phone, Computer, Food (Home delivery of food),

[Each valid business party 0.5 Marks x 2 = 1]

Consumer to Consumer – Describes **electronic commercial transaction between consumers.**

[Each bold point 0.5 Marks x 2 = 1]

Note : Transactions are generally performed through a facilitator e.g. Amazon.com, Craigslist.com, eBay.com or through a collaborative facilitation among consumers. e.g. e-commerce web portal for university students.

Example – Processing an on-line transaction to purchase a text book by one consumer from another consumer. (The latter is also a member of the same community)

[Each valid business party 0.5 Marks x 2 = 1]

(ii) B2E Most appropriate tool - email

[1 Mark]

Justification :

- Simple and easy to use,
- Easy to obtain.
- Easy to access from low-end electronic devices.
- Each individual can have his/her own email address,
- Delivery of messages guaranteed,
- Privacy/Security assured,
- Different email groups can be formed among the entire community to communicate at different levels,
- a tool like webmail can provide wider access facility,
- Each individual can communicate with his/her peer groups independently.

[1 Mark for each valid justification up to 2 = 2 Marks]

(b) (i) Agent - A software agent is a **computer program** which works **autonomously** towards goals in a **dynamic environment** on **behalf of another entity** over extended period of time,

[0.5 marks for each characteristic * 4 = 2 Marks]

(ii) Characteristics

- Autonomous
- Intelligent
- Performs in dynamic environments
- Able to interact with massively increasing information
- Self-governed. i.e. No direct supervision or control required,
- Flexible to a significant degree
- Interacts with other agents competitively or collaboratively
- Works over extended period of time
- Creative (to transform goals into active tasks)
- Community – predefined or open-ended

[1 mark for each correct answer up to 2 = 2 marks]

(iii) Examples

- Transportation: Agents can be a part of an user-friendly transportation system which perform intelligently by adjusting to the dynamic environment.
- Defense : In a battle field agents interact autonomously with the enemy by changing the strategies according to the tactics used by the enemy.
- Web Crawler : An Agent can be a server-based program that continuously or periodically scan the web or selected portions of the web looking for information of interest.
- Web Browser : An agent can provide the client side user interface for a sophisticated network application which may be an intelligent web browser
- Robot as an Agent : The agent in the robot interacts with the environment. Robot (agent) is capable of reacting to the changing environment.
- Agent interacting with a Robot : Agent in the environment can interact with the Robot which acts dynamically.
- User Interface : Agent acts as an interactive program that presents a very user-friendly interface to perform specific tasks as directed by the user.

[Any valid example 1 Marks + Correct explanation 1 Mark = 2 Marks]