

ரணகந்தி  
அந்தரங்கமானது

சுரீ லு஑ு வி஑ு஑ டுபுர஑லுதலு  
இல஑கைபு பரீட்சைத் திணைக்கலம்

சு஑ிக ஑ு஑லீலு ஑ு பரீ஑்஑ ஑ுலு  
தேசிய ஑திபுபுட்டி஑ு஑் பரீட்சித்தலுக்கு஑ு஑ான ஑ேவை

஑.பு.஑. (஑.பு.஑) வி஑ு஑ 2011

஑.பு.த. (஑.யர்தர)பு பரீட்சை 2011

வி஑ு஑  
பாட஑்

} Information & Technology பாட இலக்க஑் } 20

஑ு஑ு டீலு பவிசுவிச - I ப஑ு  
புள்ளி வ஑ு஑ு஑் திட்ட஑் - பத்திர஑் I

஑ு஑ ஑ு஑ு	பி஑ு஑ு	஑ு஑ ஑ு஑ு	பி஑ு஑ு	஑ு஑ ஑ு஑ு	பி஑ு஑ு	஑ு஑ ஑ு஑ு	பி஑ு஑ு	஑ு஑ ஑ு஑ு	பி஑ு஑ு
வி஑ு஑ இல	வி஑ு஑	வி஑ு஑ இல	வி஑ு஑	வி஑ு஑ இல	வி஑ு஑	வி஑ு஑ இல	வி஑ு஑	வி஑ு஑ இல	வி஑ு஑
01	2	11	3	21	3	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

All marks  
to give  
marks

஑ு஑ு

**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

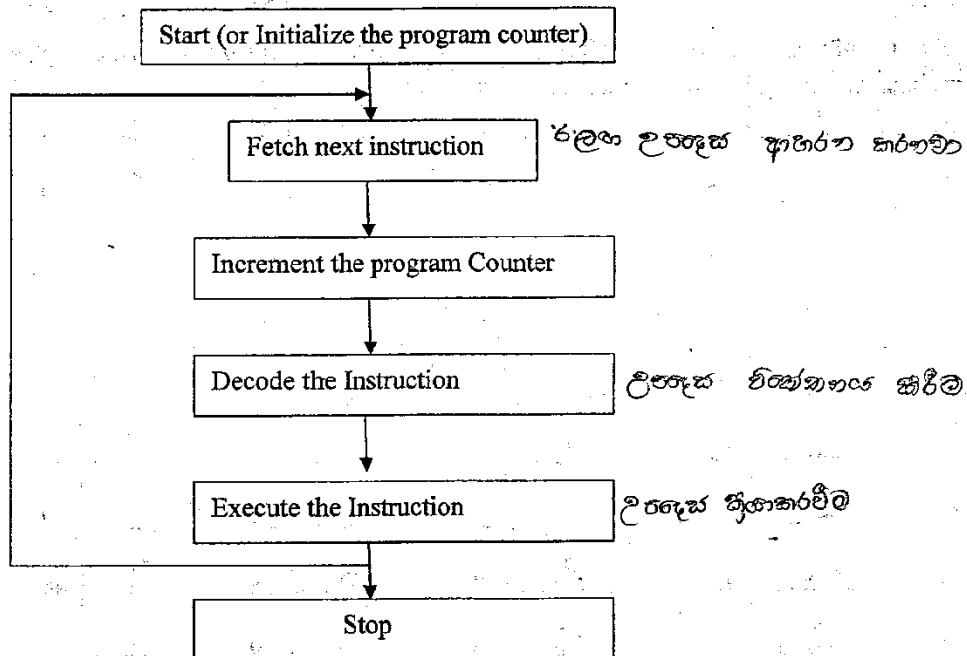
Third Generation (3 GL) : Integrated circuits(ICs) කටයුතු, අනුකූලිත,

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**

- Any two items fetch, decode, execute in correct order **1 Mark**

no cycle - not given marks.

without cycle 0.5 marks.

in that order without marks cycle - ①

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 two's complement 1 Mark

0000 0101  
1111 1101 +

1 carry 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	<u>limited/unlimited</u>	<u>limited/unlimited</u>
Max file name length	<u>limited/unlimited</u>	<u>limited/unlimited</u>
Security	<u>yes/no</u>	<u>yes/no</u>
Support of Unicode.	<u>yes/no</u>	<u>yes/no</u>

**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

*(because of computation)*

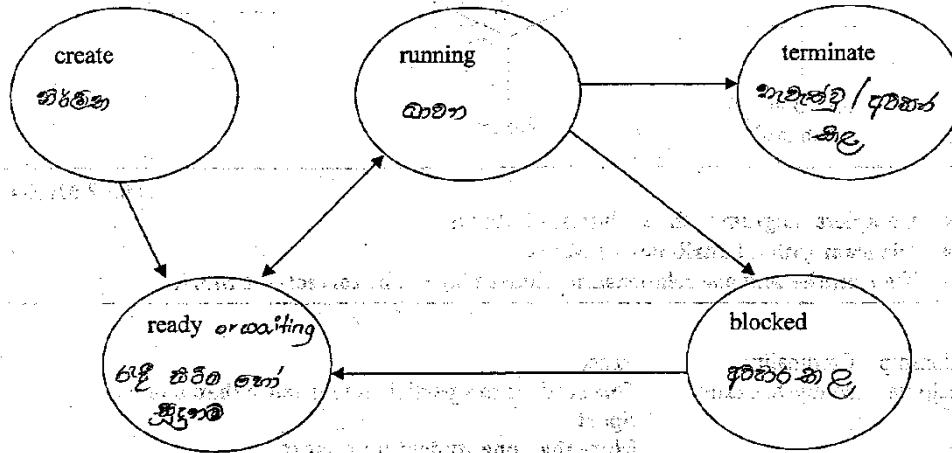
ii)

[ 010111 | 000000111100 ]  
Page displacement

**Total 1 Mark**

- Both page and displacements are correct 1 Mark (No marks for partial answers) — *with identification.*
- If at least page and displacement is identified 0.5 Marks — *only separation is been done 0.5*

c)



Total 4 Marks

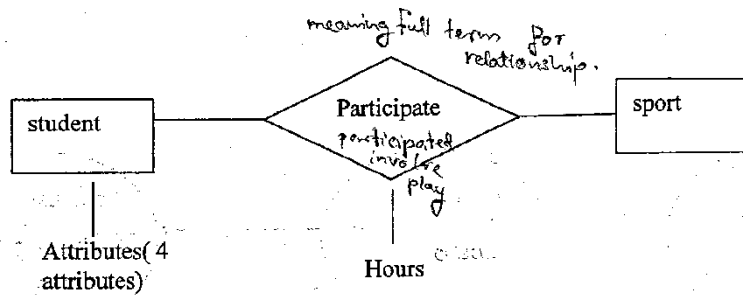
All 5 states with arrows in the correct directions- 4 Marks.

Create, Ready, Running, Terminate with arrows in the correct directions - 3 Marks.

All five states of the above 4 states (arrows in wrong direction or without arrows)- 2 Marks

Any two states - 1 Mark (either without arrows)

3) a)



**Total 2 Marks**

- 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  
Participate Many-to-many

Reasons  
One student can participate for more than one Sport.  
More than one student for a sport.

**Total 1 Marks**

- 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

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

**Total 1 Mark**

**Sport table with attribute – Sport Code, Sport Name**

**Total 1 Mark**

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

**Total 1 Mark**

4)

a)

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

**Total 2 Marks**

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

b)

இவ் வகை - இயற்கை எல்லை  
Magnetic – Hard disk, Diskette, Tape Drive ( Any one)  
Optical – CD, DVD, VCD ,blue-ray CD - பைராவை அடிக  
Solid State – Flash Drive, Memory cards  
உருவாக்கினை

**Total 3 Marks**

- 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 Marks**

- 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. ~~def~~

1 - Mark

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

1 - Mark

03/09/2011

**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.



കമ്പ്യൂട്ടറുടെ പ്രവർത്തനം  
നിയന്ത്രിക്കുകയും  
അവയെ നിയന്ത്രിക്കുകയും ചെയ്യുന്നു.

**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]**

- എളുപ്പമായ വിവരങ്ങൾ.
- 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.**

*Secondary Storage only.*

*main memory, X*

**[0.5 Marks \* 4 = 2 Marks]**

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]

(All 2 marks)

8 bits = 1 byte

10400 bits =  $\frac{10400}{8}$  bytes

= 1300 bytes

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

need to  
check for  
minterms  
in solution  
and check  
if minterms  
are included

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

← includes  
1 to the  
solution.

[0.25 x 16 = 4 Marks]

(ii)

Solution 1  

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

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

OR

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

Solution 2

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

[2 Marks]

(iii) Logic Circuit

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

OR

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

OR

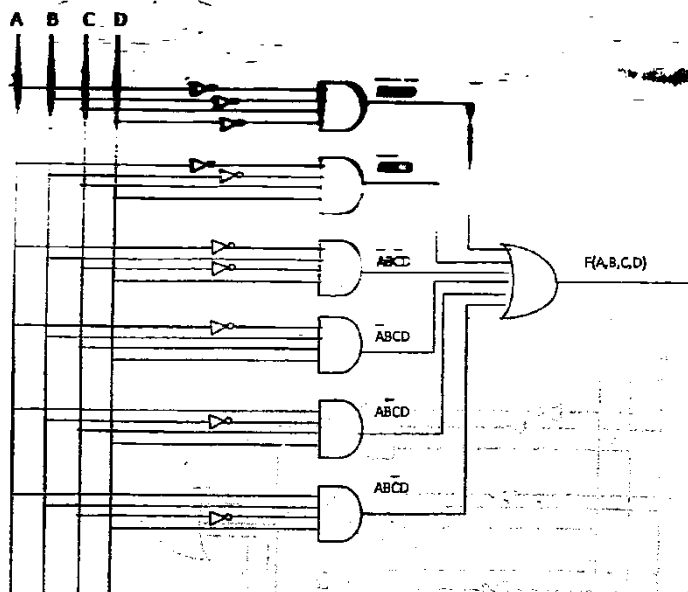
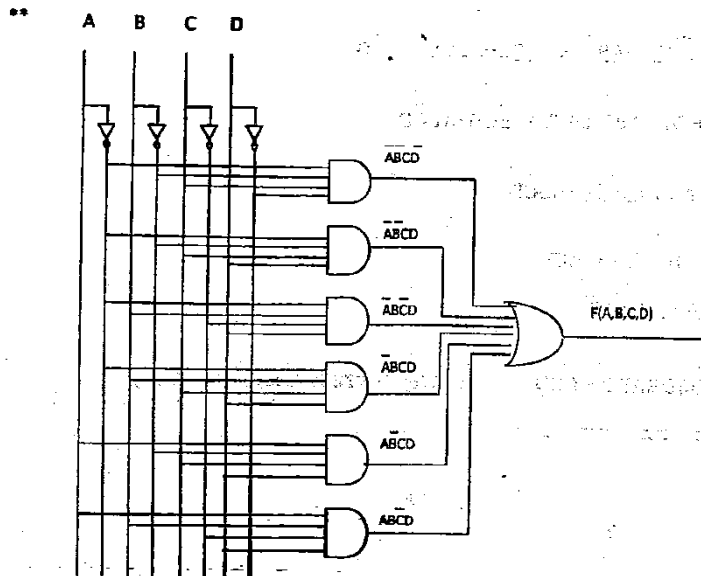
• Simplified Boolean Expression

[2 Marks]

(As given below)

Logic circuit for

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



OR

1st solution

# Simplified Boolean Expression using Boolean algebra or Karnaugh map

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

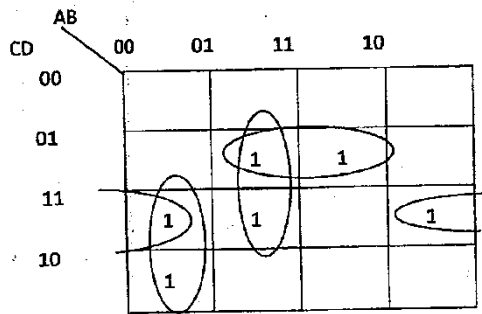
$$= \overline{A}\overline{B}(\overline{D}+D) + \overline{A}B(\overline{C}+C) + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D$$

$$= \overline{A}\overline{B}C + \overline{A}B\overline{C} + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D$$

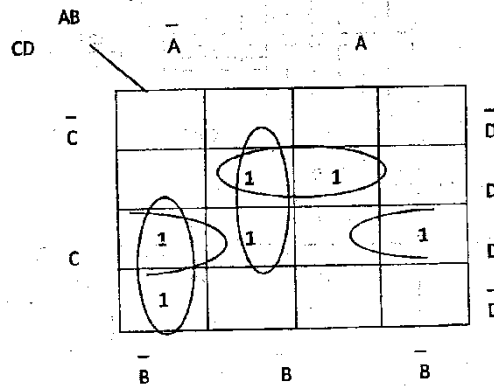
$$= \overline{B}C(\overline{A}+A) + \overline{B}D(\overline{A}+A)$$

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

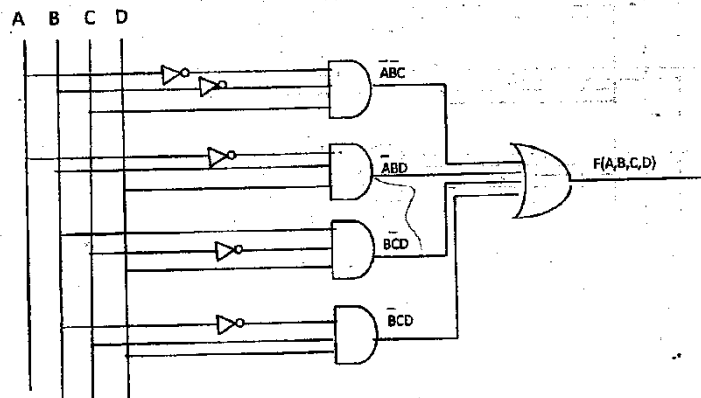
$$= \overline{A}\overline{B}C + \overline{B}C\overline{D} + \overline{A}B\overline{C} + \overline{B}C\overline{D} \quad (\text{or any correct simplification})$$



OR



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

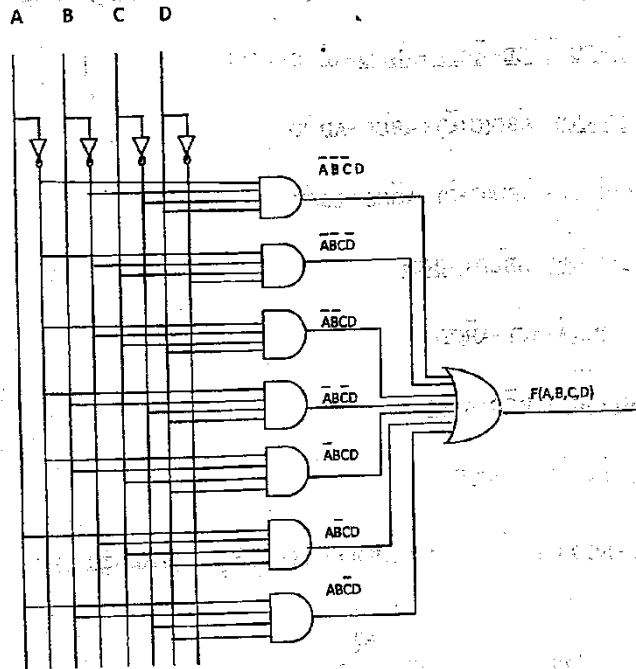


Solution 1

Logic circuit for

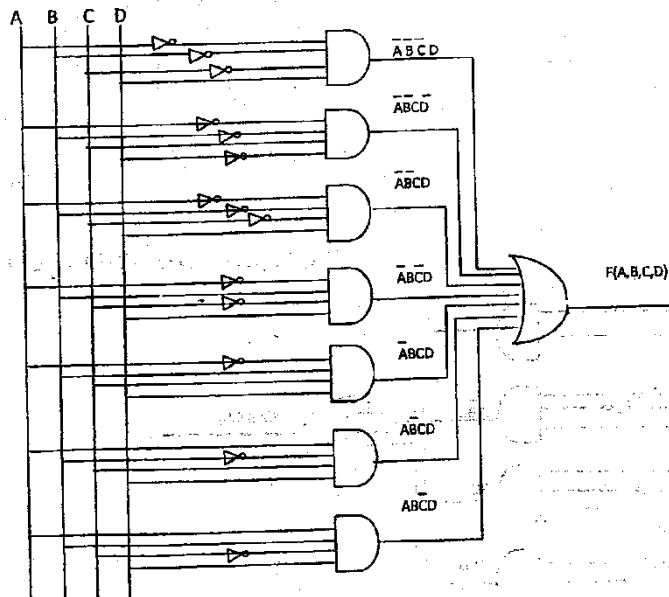
$$F(A,B,C,D) = \overline{A}BCD + A\overline{B}CD + AB\overline{C}D + ABC\overline{D} + \overline{A}BC\overline{D} + A\overline{B}C\overline{D} + AB\overline{C}\overline{D} + ABC\overline{D}$$

\*\*



\*\*

OR



solution 2

Simplified Boolean Expression using Boolean algebra or Karnaugh map

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

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

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

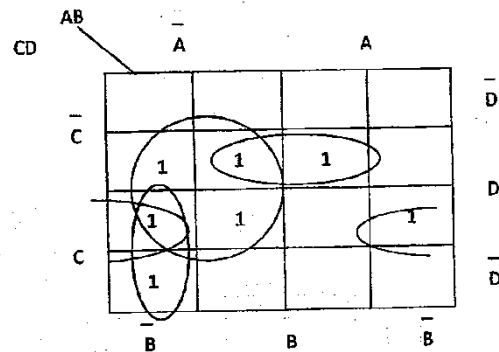
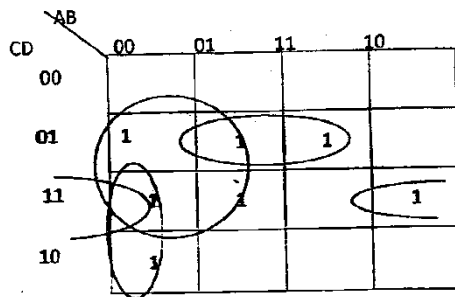
$$= \bar{A}\bar{B}(\bar{C}D + C) + \bar{A}B\bar{C}D + \bar{A}B\bar{C}D$$

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

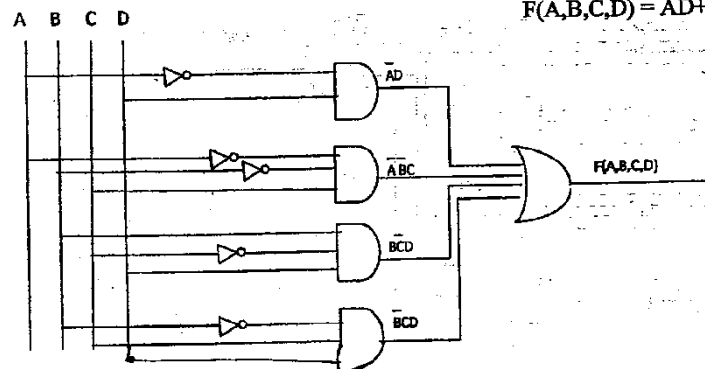
$$= \bar{A}\bar{B}C + \bar{A}\bar{B}D + \bar{A}B\bar{C}D + \bar{A}B\bar{C}D$$

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

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



\*\*



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

any simplify expression and (Suitable) circuit  
Give marks

Solution 2



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

[0.25 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.

(iii) <input type = "radio" name = "visit" value = "Whale" >Blue Whale <br/>  
 [Each underlined component 0.5 marks \* 4 = 2 marks]

<input type = "radio" name = "visit" value = "Leopard" >Leopard <br/>  
<input type = "radio" name = "visit" value = "Elephant" >Elephant <br/>  
 [0.5 mark for each = 1 marks]

(iv)

<table border = "1">	
<caption>Wild Sri Lanka</caption>	
<th>Days</th>	<td>Days <td>
<th>Price</th>	<td>Price <td>
<td>7</td>	<td>US\$910</td>
<td>10</td>	<td>US\$1220</td>
</table>	

Take as a single component

Handwritten notes and arrows:  
 (2) points to <table border = "1">  
 (3) points to <caption>Wild Sri Lanka</caption>  
 (4) points to <th>Days</th>  
 (5) points to <td>US\$910</td>  
 (6) points to <td>US\$1220</td>

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

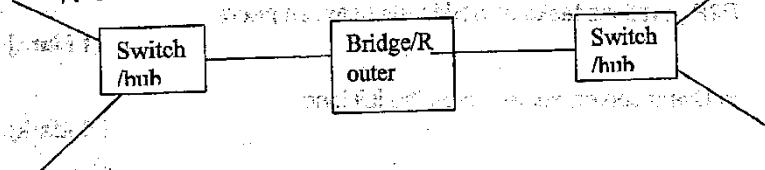
### Question 3

1)

a) 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.

no intelligent Hub : When a packet arrives at one port, it is copied to all the other ports. (broadcasting) Layer 1

Intelligent Switch : When a switch receives a packet, it sends the packet only to the particular destination port.

[1 for each x 2 = 2 Marks]

Switch - Layer 2

അർത്ഥശൂന്യമായ ഒരു സിസ്റ്റം അനാലൈസിംഗ് എഞ്ചിൻ സാധാരണയായി ഉപയോഗിക്കപ്പെടുന്നു. ഇത് ഉപയോഗിച്ച് ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും. ഉദാഹരണത്തിന്, ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും. ഉദാഹരണത്തിന്, ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും.

ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും. ഉദാഹരണത്തിന്, ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും. ഉദാഹരണത്തിന്, ഒരു സിസ്റ്റത്തിന്റെ പ്രവർത്തനം മെച്ചപ്പെടുത്താൻ കഴിയും.

Facility is available  
Facility is (functioning) use  
Availability is non functional  
Use is functional.

Question 4

a)

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

At least these steps.  
(in Tim 7 steps)

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

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

5

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

every change

Service also functional  
also system history  
non functional

- can taking a photo by using camera in a phone

gsm1234@, gsm5678@, gsm9012@, gsm3456@, gsm7890@

two 2 1.0

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

Mobile phone- non-functional:

- Size, dual size - non functional.
- price, electricity
- battery life time, gsm1234@, gsm5678@, gsm9012@, gsm3456@, gsm7890@
- memory capacity,
- appearance

three

1.5

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

a) Maintenance: Necessary modifications to meet the changing requirements.  
Requirement Analysis: Identification of user requirements.

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.

Identify the existence of errors and error 12

c) Unit testing:

- 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]

1 x 1 = 2

(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

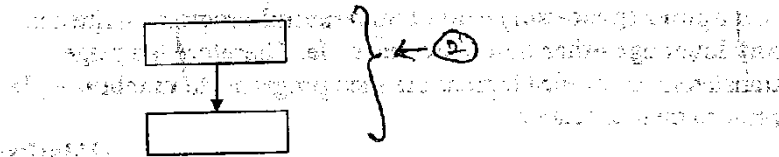
Two features from each generation 2 – Mark

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

(c)

i. Sequence

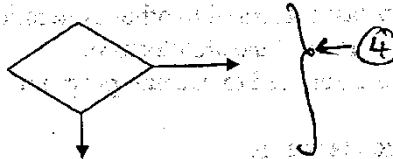
4 → ④



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

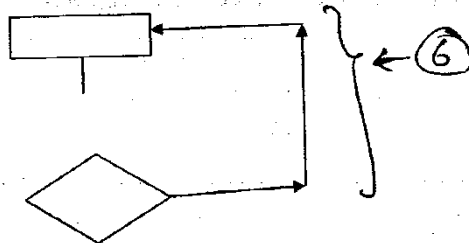
i. Branching (decision)

3 → ③



ii. Iteration (repetition)

5 → ⑤




6 × 0.5 = 3

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

- Each correct answer = 0.5 marks (item or flowchart)



(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 be = 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 identification

(ii)

**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

0.5  
Transaction

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

*manufacturer → wholesaler*  
[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.

example  
{ each side - 0.5  
party 2 = 0.5

*among example of the original print of document*  
[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]

correct  
0.5

**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]

- Business to employee*
- (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]