



## Information & communication Technology Student Activity Book

### Model Answers

### Grade 10

## 1. Information and Communication Technology

1.1.

1. Data is informal and information is informal.
2. Data is the basic material used to create information and information is the final result of data processing.
3. Data has no meaning but information has meaning.
4. It is not possible to make conclusions and decisions by looking at data and to make conclusions and decisions by looking at information.

1.2.

- a. Data
- b. Information
- c. Information
- d. Information
- e. Data

1.3.

A	B
1. The application submitted by Mr.Perera was rejected as it did not mention the professional qualification in the application.	p - Timeliness
2. Mr. Sarath search several websites that contain that information to write a dissertation on the evolution of living things.	q -Completeness
3. People always like to watch daily news	r- Accuracy

2.1



2.2.

1. Use of Automatic Teller Machine for cash withdrawals (ATM)
2. Use of cash deposit machines for Cash Deposits Machine (CDM)
3. Transaction processing systems
4. Finger print reader to record the attendance of an organization
5. Digital Identity cards
6. QR Code used to find information by accessing relevant website

2.3

- |                                     |   |
|-------------------------------------|---|
| ★ Take a photo                      | 2 |
| ★ Access the website                | 4 |
| ★ Point the mobile device to the QR | 1 |
| ★ Decoding                          | 3 |

2.4



ISBN Code



QR Code



Bar Code

- 2.5
- |           |  |
|-----------|--|
| Input -   | User name and Password   |
| Process - | Checks its accuracy  |
| Output -  | Displays the required definitions and activity notes on the screen and printout of that document |
| Store -   | download Tutorials and activity notes to the computer  |

- 3.1. A government communicates with its citizens, companies, government and non-government organizations, and governments of other countries by using information and communication technology.

- 3.2
- |              |                |  |
|--------------|----------------|--|
| i www.gov.lk | ii www.icta.lk | iii <a href="http://www.gic.gov.lk">www.gic.gov.lk</a> |
|--------------|----------------|--|

3.3.

- Efficiency
- Ability to quickly access the required information.
- Being able to know more accurate and more information
- Save time, labor and money
- That the information is up to date
- Ability to access at any time

3.4.

- |   |     |
|---|-----|
| a) Renewal of vehicle license           | G2C |
| b) Sri Lanka custom information         | G2G |
| c) Information on business organization | G2B |
| d) Government laws                      | G2C |
| e) Forms                                | G2E |
| f) Business registration                | G2B |

4.1.

- As a learning aid to the teacher
- Use for the learning process in the classroom
- Ease of getting education anywhere, anytime
- Use of learning management systems
- Access to higher education for all

4.2.

- |   |   |
|---|---|
| i. Videos on experiments  | ii. Computer-related presentations and videos |
| iii. Computer based creation  | iv. Learning Using the CD / DVD and Pen drive |
| v. Computerized preparation and printing of articles, magazines, tutorials, assignments, etc. |   |
| vi. Gathering educational information on the internet   |   |

4.3.

- Ability to access at any time
- Lack of daily schedules
- Ability to access from home or anywhere else
- A large amount of information facilitates the study.
- Ability to study at one's own pace and repetitive access.

4.4.

- |   |  |
|---|--|
| i. <a href="http://www.e-thaksalawa.moe.gov.lk">www.e-thaksalawa.moe.gov.lk</a> | ii. <a href="http://www.schoolnet.lk">www.schoolnet.lk</a>               |
| iii. <a href="http://www.nanasayura.gov.lk">www.nanasayura.gov.lk</a>           | iv. <a href="http://www.vidumanpetha.com">www.vidumanpetha.com</a>       |
| v. <a href="http://www.nanasala.lk">www.nanasala.lk</a>                         | vi. <a href="http://www.bbc.co.uk/education">www.bbc.co.uk/education</a> |

★ Any acceptable answer can be considered the correct answer.

4.5.

- |   |
|---|
| i. Images, animations and videos are used to explain lessons that are difficult to describe |
| ii. Preparation of lesson plans using computer.   |
| iii. Obtaining information related to the subject using the Internet.                       |
| iii. Creating and presenting lessons using presentation to attract for the subject.         |

- 4.6. i. Evaluation ii. Teachers Information iii. Student Information  
iv. Questions v. School Information vi. Supervision  
vii. Administration viii. Notes ix. Courses
- 4.7 i. Facilities – Student can get notes, assignments  
School management – Teachers Information, Student Information, School Information  
ii. Requirement - A website owned by a school or institution, Internet Connection, Registration on the website
- 4.8. **Students** - i. Ability to access from a convenient location at any time.  
ii. The ability to upload the assignments completed at home  
iii. The ability to submit queries, getting replies and submitting comments through Forums.  
iv. Ability to participate in the co-curricular activities via video.  
v. The parents can monitor the progress of their children from home

**School management -**

- i. Supervision of assignments and display of results  
ii. Ability to add quality learning materials  
iii. Use of automatic bell system  
iv. Submitting questions, getting replies and providing comments through Forums.
- 4.9. i Online assignments and quizzes.  
ii. Ability to study from a convenient location.  
iii. Within a flexible time frame, provide the facility to learn  
iv. Digital library facility  
v. Contact with a teacher online.  
vi. Easy to obtain teacher consultations..
- 4.10. i Lack of computer lab facilities.  
ii Lack of internet connection .  
iii. Low speed internet connection

- iv. Lack of technical equipment such as multimedia projectors, speakers, headphones, televisions etc.
- v. Failure to maintain school computer labs properly.
- vi. Attitudes of the school community towards facilitating the learning process using modern technological tools.

- |      |      |             |     |                             |
|------|------|-------------|-----|-----------------------------|
| 5.1. | I.   | MRI Machine | II. | Cardiac Screening Machine   |
|      | III. | ECG Machine | IV. | CAT Machine                 |
|      | V.   | EEG Machine | VI. | Blood Sugar Testing machine |

- 5.2. Use of ICT to monitor a patient outside a hospital or to receive treatment from a nearby health care professional or doctor.

- 5.3.
- |      |                           |     |                              |
|------|---------------------------|-----|------------------------------|
| i.   | Emergency Telemedicine    | ii. | Home health medicine         |
| iii. | Telemedicine Consultation | iv. | Telesurgery (Remote Surgery) |
| v.   | Medical Teletraining      |     |                              |

- 6.1
- |            |                      |                           |
|------------|----------------------|---------------------------|
| i. Farming | ii. Animal husbandry | iii. Fisheries industries |
|------------|----------------------|---------------------------|

- 6.2-
- i. Use of modern machinery
  - ii. Use of CCTV for security
  - iii. Use of computers for farm management
  - iv. Use the Internet for market discovery, daily pricing, consumer awareness, etc
  - v. Use of the Internet to provide further information and awareness on cultivation activities

- 6.3.
- |   |                                  |
|---|----------------------------------|
| i. Automated Insect Control Devices     | ii. Drip irrigation              |
| iii. Field conditions measuring devices | iv. Automatic Weed remover       |
| v. Seedlings planter using Robotics     | vi. Crop harvesting using Robots |
| vii. Greenhouse                         | viii. Meteorological Devices     |

- 6.5.
- i. Use of sensor devices to identify fish-rich areas
  - ii. Use of CCTV cameras for security.
  - iii. Use of computers and various communication devices to facilitate the management of large and medium scale fisheries enterprises.
  - iv. Use of the Internet to find market prices and customers.

- 7.1.
- i. Use of robots in production
  - ii. Use of Video Conferencing to facilitate business
  - iii. Use of Human Resource Management
  - iv. Use of CCTV cameras for security.
  - v. Facilitate transactions using e-banking systems.
  - vi. Use of online shopping system for delivery of goods and services.
- 7.2.
- Advantages -
- i. 24 hour service
  - ii. Never get tired
  - iii. Efficiency
  - iv. Accuracy
  - v. Hygiene
- Disadvantages -
- i. cost is high
  - ii. Abolition of handling skills
  - iii. Loss of employment opportunities
- 7.3.
- i. Computer
  - ii. Internet connection
  - iii. Communication devices
  - iv. Communication software
  - v. Video Conference Set
- 7.4.
- Advantages -
- i. No need a special place
  - ii. Save time and labor
  - iii. Low cost
  - iv. Accuracy
- Disadvantages -
- i. high cost of setup
  - ii. Abolition of handling skills
  - iii. Technical problem
  - iv. Lack of personal interaction
- 7.5.
- i. Easy withdrawal of cash from ATM.
  - ii. Cash Deposit Facilities Using Cash Deposit Machines (CDM)
  - iii. Easy payment of bills, money transfers, account checks etc. through mobile phones or computers after registering in the e-banking system
  - iv. Payment facilities by using Credit card, debit card

7.6. Advantages -

- i. Save time and labor
- ii. Having a lot of choices
- iii. Open 24 hours
- iv. Home delivery of goods or services
- v. One can select any global commercial organization which is on the internet.
- vi. The ability to pay using the electronic payment methods such as credit cards.





Disadvantages - i. Product quality issues

- ii. Internet connection is essential
- iii. Lack of secure transactions

- 8.1.
- i. listen to music to overcome a monotonous life
  - ii. To do learning activities and play games during the free time at home
  - iii. read e-books on internet
  - iv. Exchanging information between friends through social media

- 8.2.
- i. Addiction
  - ii. Building unsuitable friendships through social media.
  - iii. Mental disorders
  - iv. Theft of intellectual property
  - v. isolation

9.1

Device				
Generation	Third generation	First generation	Fourth generation	Second generation
Device name	IC	Vacuum Tubes	Microprocessor	Transistor

9.2.

1-Abacus

2-Napier's Bones

3-Adding Machine , Blaise Pascal

4-Herman Hollerith

5-Charles Babbage

6-Analytical Engine

7-Ada Augusta Lovelace

8-ENIAC

9.3

- Third generation
- Fourth generation
- First generation
- First generation
- First generation
- Third generation
- Fifth generation
- Fifth generation



## MCQ

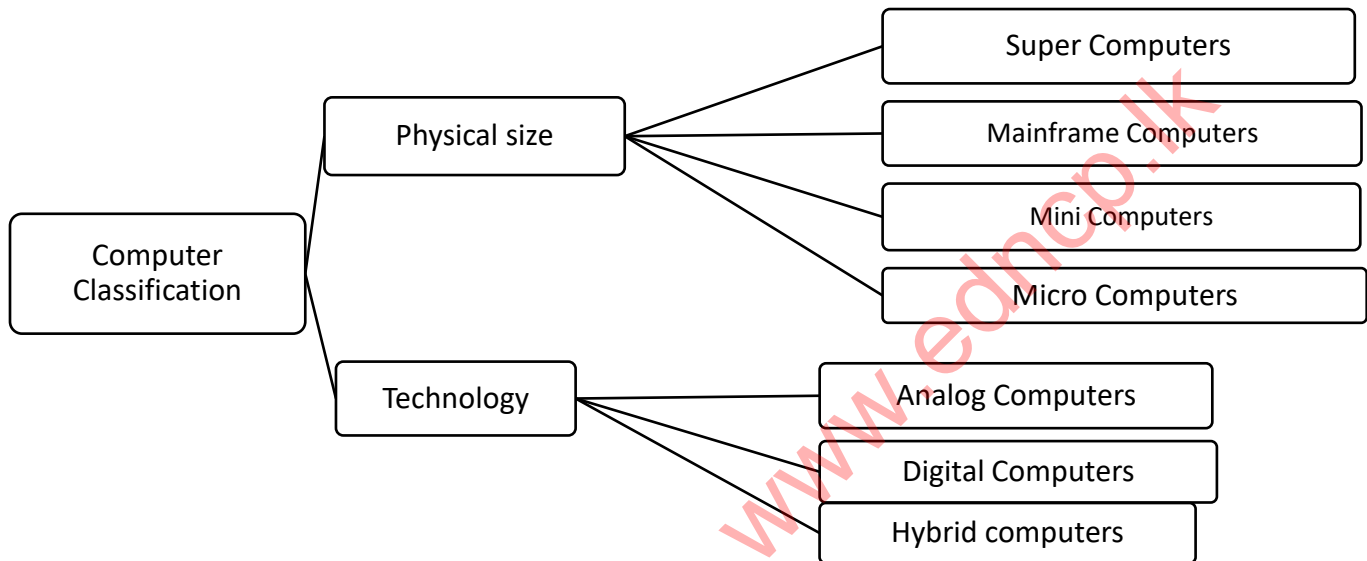
- |        |         |         |
|--------|---------|---------|
| 1) ii  | 11) ii  | 21) ii  |
| 2) ii  | 12) iii | 22) ii  |
| 3) iii | 13) iv  | 23) iv  |
| 4) iv  | 14) ii  | 24) iii |
| 5) iii | 15) iv  | 25) iv  |
| 6) iii | 16) iii | 26) ii  |
| 7) iv  | 17) iv  | 27) ii  |
| 8) iii | 18) iii | 28) ii  |
| 9) iii | 19) iii | 29) iv  |
| 10) iv | 20) iv  | 30) ii  |

Education NCP - www.edncp.lk

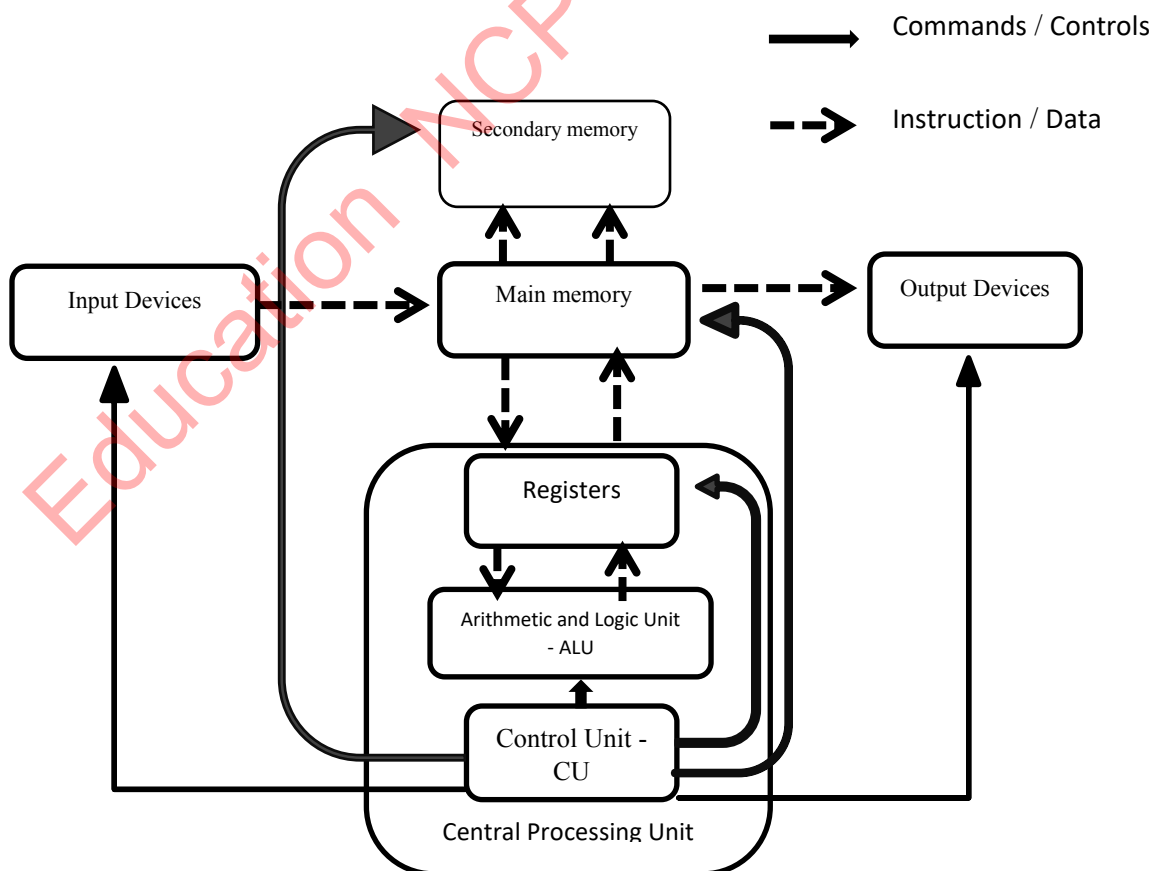
## 2. Fundamental of a Computer System

01. Speed, Accuracy, Efficiency, Versatility, Storing and Retrieving.

02.



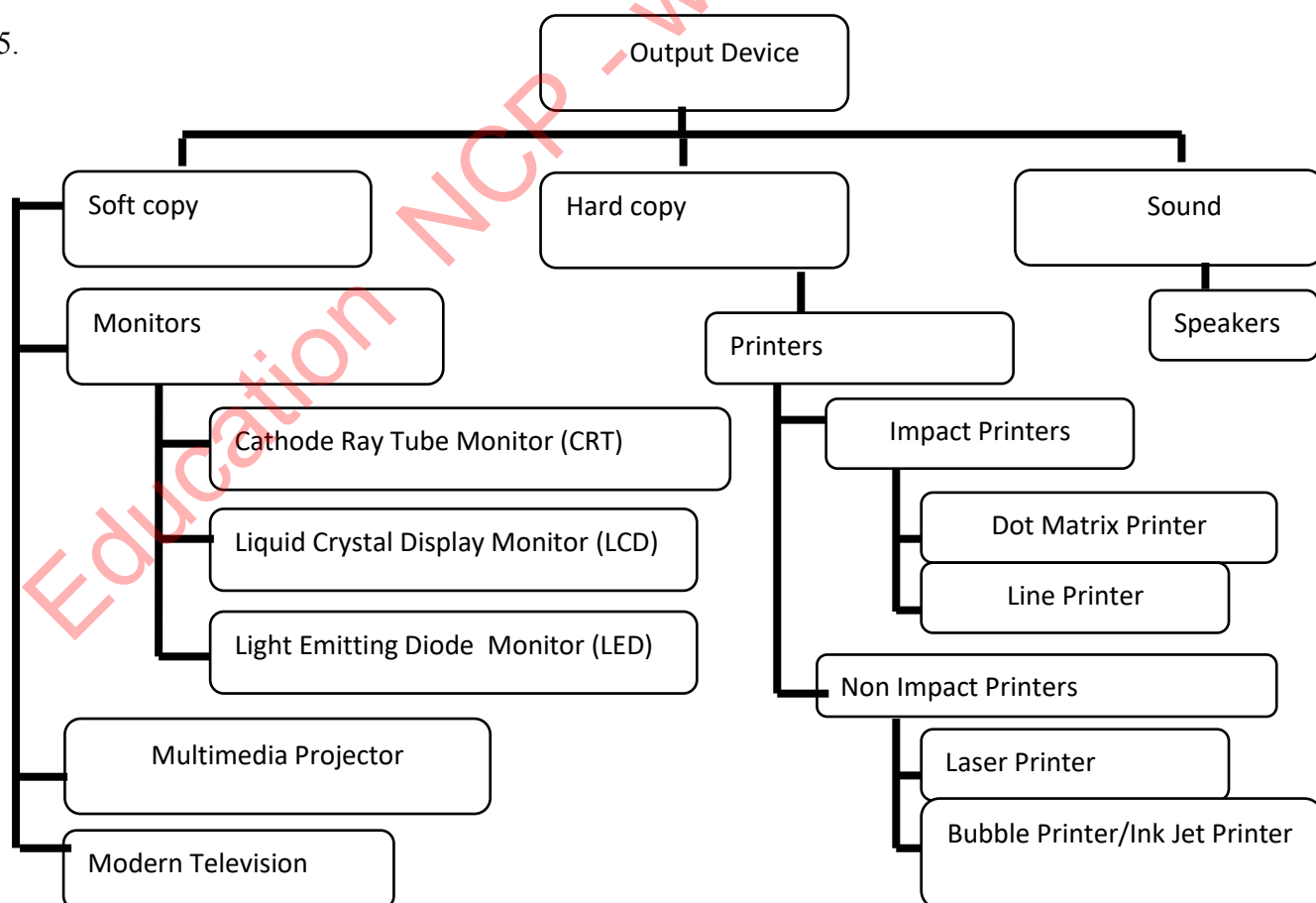
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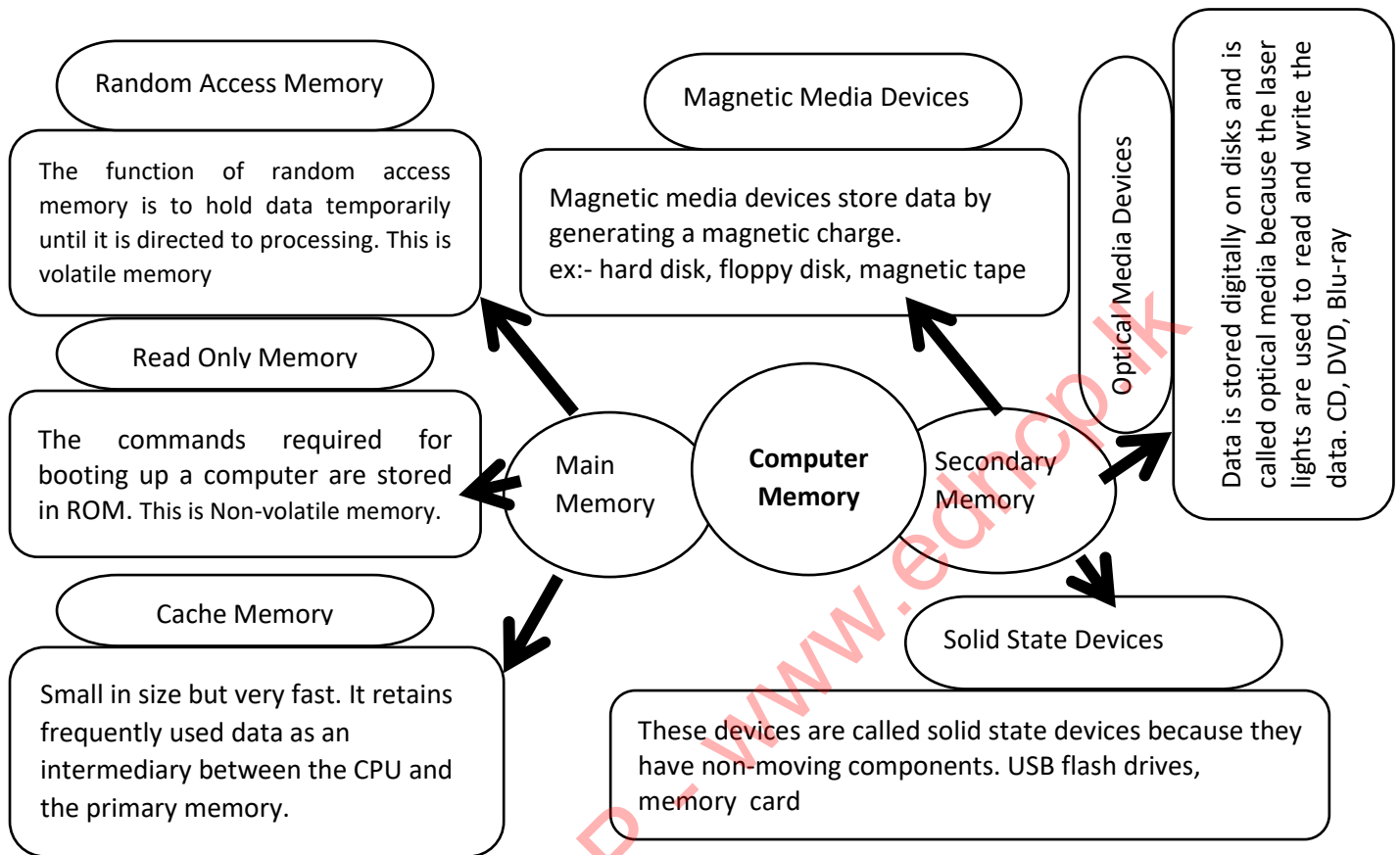
04.

Pointing Devices	Image and video input Devices	Scanners
Mouse	Digital camera	Flatbed scanner
Touch pad	Web camera	Bar code reader
Touch Screen	CCTV	Magnetic Ink Character Reader
Joy stick		Optical Character Recognition
Light pen		Optical Mark Recognition
		Automated teller machine

05.



06.



07.

- Arithmetic And Logic Unit - Perform all mathematical and logical functions
- Control Unit - Controls all devices of a computer system.
- Registers - Temporarily stores data needed for the function of ALU and the information produced by ALU

08.

Ports	Name of the port	Devices that can be connect
	PS/2 Port	Purple - Keyboard Green - Mouse
	Parallel Port	Printer
	HDMI Port	Monitor, Multimedia projector, Digital TVs, and digital speakers to the computer.
	RJ 45 Port	A computer network to the network router, network switch
	Audio Ports/ Jacks	Blue – Line In Green – Line Out, Head Phone Pink – Microphone
	USB (Universal Serial Bus Port)	Modern mouse, Modern keyboard, Pen drive, Digital camera, Joy stick, Modern printer, Scanner
	Video port - VGA (Video Graphics Adaptor)	Monitor, multimedia projector
	Serial port	Modem

.....

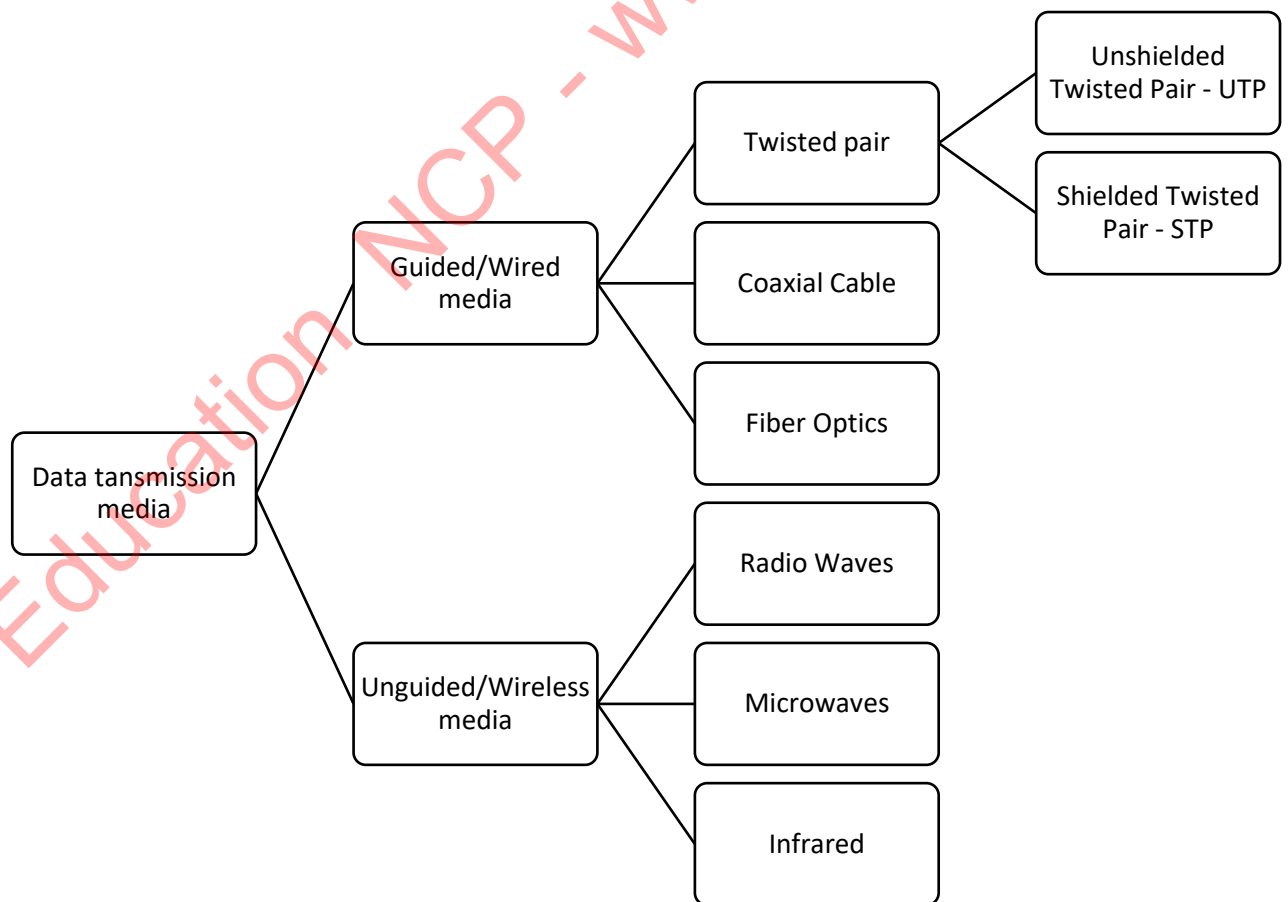
09. I.


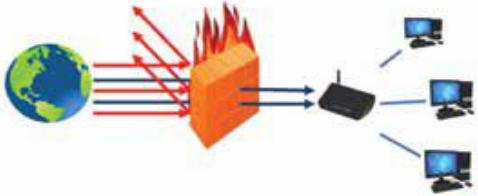




- Simplex Mode - Data is transmitted from the sender to the receiver only.  
Amal watching TV
- Half- duplex Mode- Data is transmitted to one direction at a time.  
Police officers communicate data with using walkie-talkie machines
- Full Duplex Mode- Data is transmitted to both sides at the same time.  
Calling Amal 1990 by phone.

II.

- Source - Amal
- Medium - Telephone wires
- Receiver - The recipient of 1990 call

10.



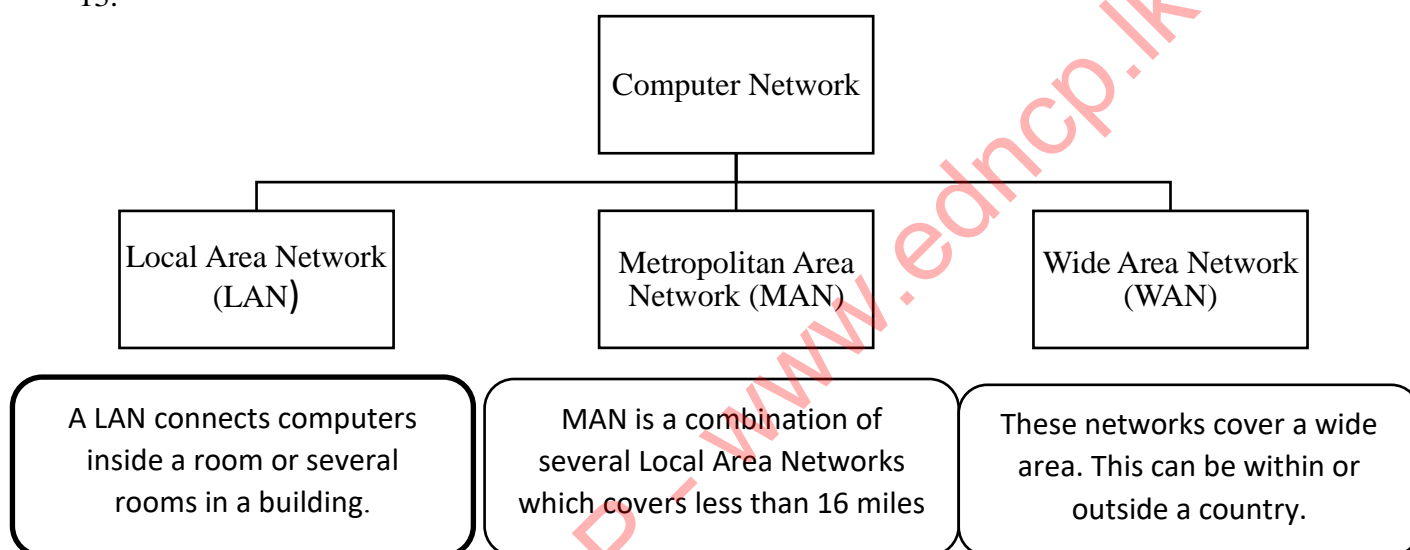
Device		Description
Modem		A modem is a device used to connect a computer to the Internet. The modem acts as a data converter
Firewall		This device will be installed as a security barrier between the internet and the computer network and can be used as a software as well as hardware
Network interface Card		A data transmission guided medium connects to the computer at the network port (RJ 45) on the network interface card.
Switch or Hub		The switch or hub acts as an intermediary to establish a connection between two or more computers
Wi-Fi		This allows the users to build a computer network easily and internet connections for mobile phones and laptop computers using radio waves
Router		Router is the device used to build a connection between two or more computer networks. This finds out the most suitable ports for data transmission in network communication.

11.

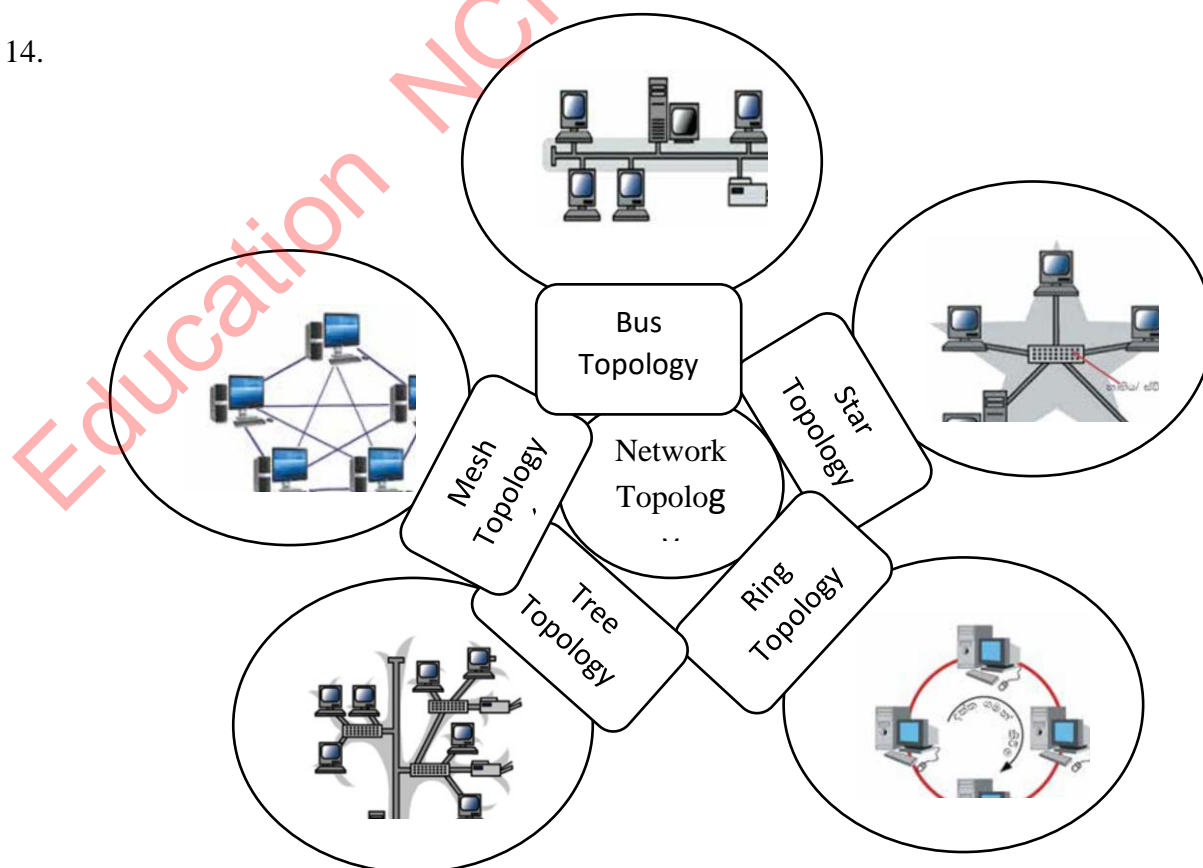
12.

Switch	Hub
<ul style="list-style-type: none"> <li>• Transmission speed is high</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission speed is low</li> </ul>
<ul style="list-style-type: none"> <li>• Full duplex</li> </ul>	<ul style="list-style-type: none"> <li>• Half duplex</li> </ul>
<ul style="list-style-type: none"> <li>• Not create unnecessary congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Create unnecessary congestion</li> </ul>

13.



14.

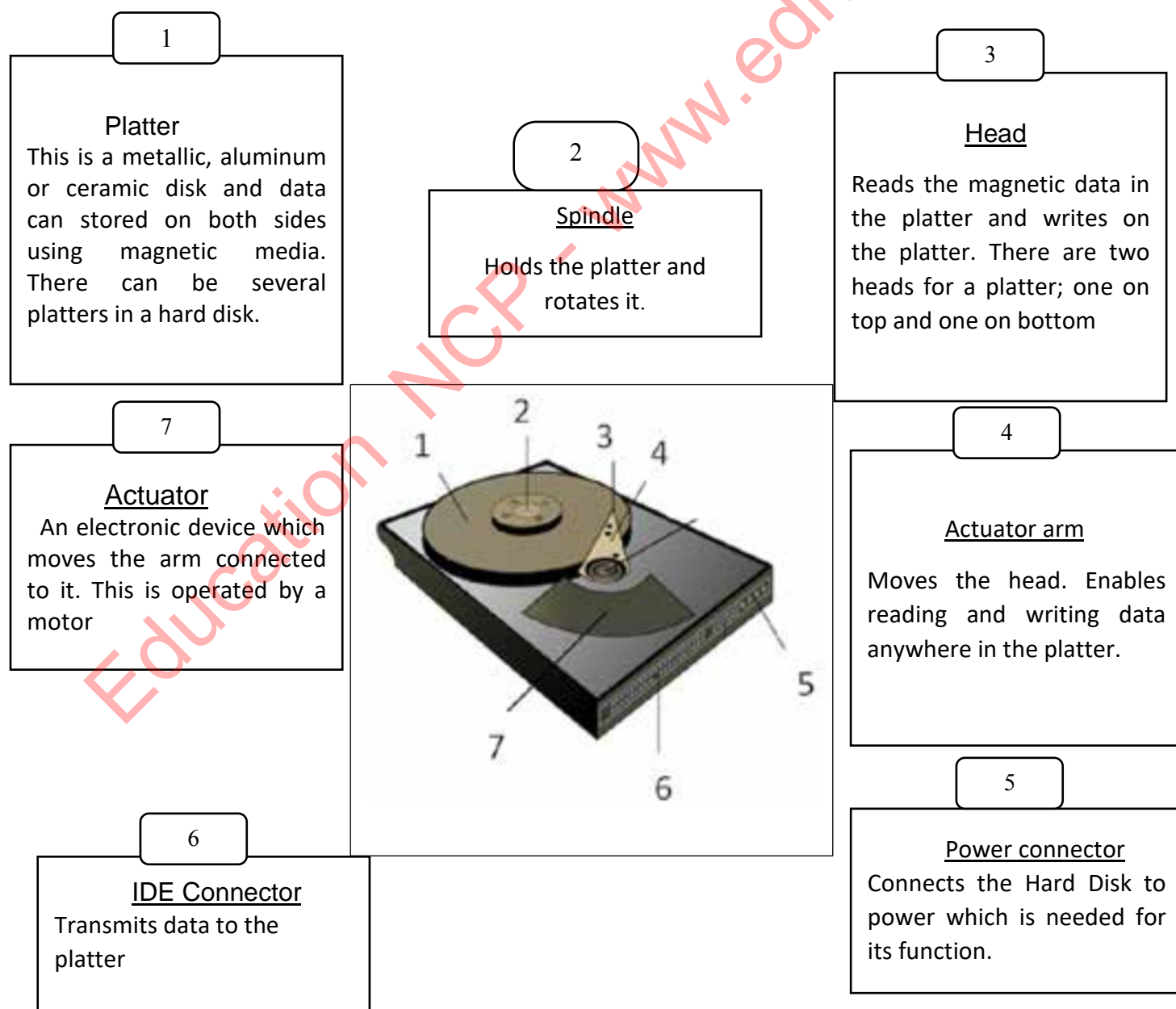




15.

Advantages of networking	Disadvantages of networking
<ul style="list-style-type: none"> <li>• Data and information can be shared between computers.</li> </ul>	<ul style="list-style-type: none"> <li>• Possible security issues for data</li> </ul>
<ul style="list-style-type: none"> <li>• Less storage space</li> </ul>	<ul style="list-style-type: none"> <li>• Breakdown of network</li> </ul>
<ul style="list-style-type: none"> <li>• Ability to share resources</li> </ul>	<ul style="list-style-type: none"> <li>• Virus</li> </ul>
<ul style="list-style-type: none"> <li>• Ability to control central software</li> </ul>	<ul style="list-style-type: none"> <li>• Computer break downs</li> </ul>
<ul style="list-style-type: none"> <li>• Ability to connect at any where and at any time</li> </ul>	<ul style="list-style-type: none"> <li>• Training requirements</li> </ul>

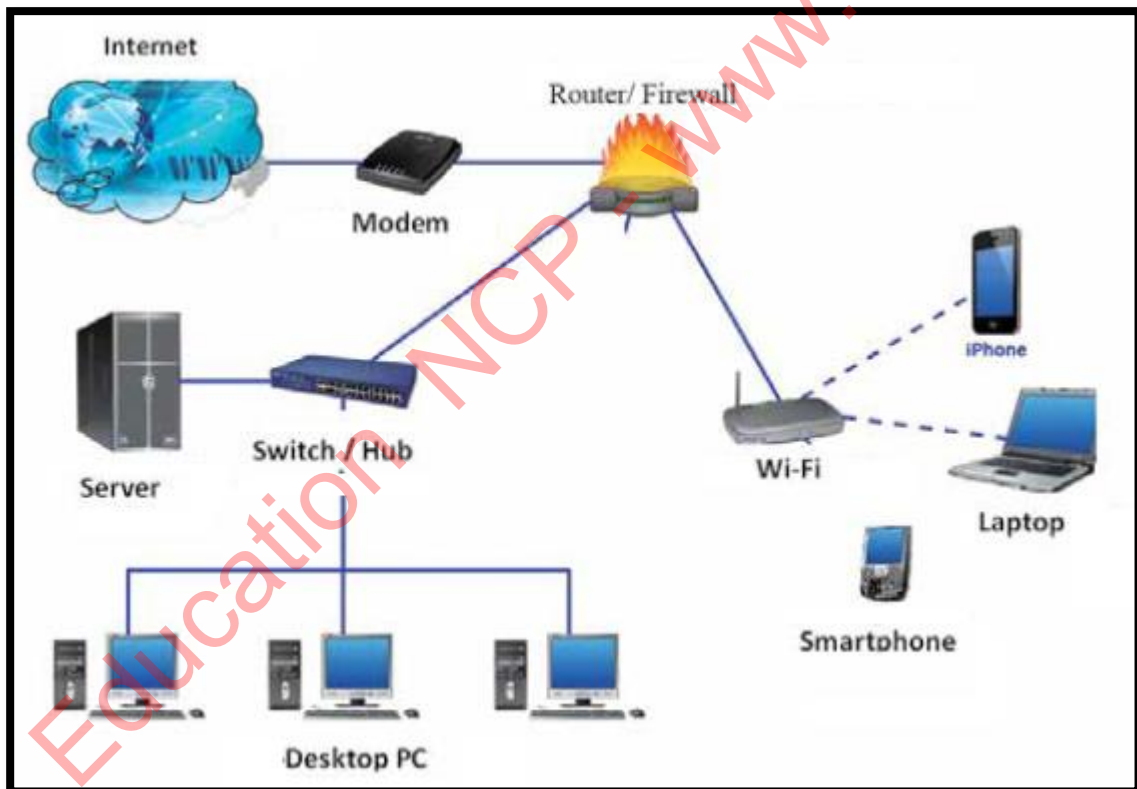
16.



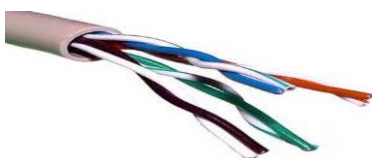


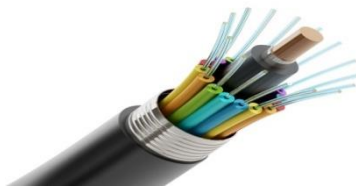
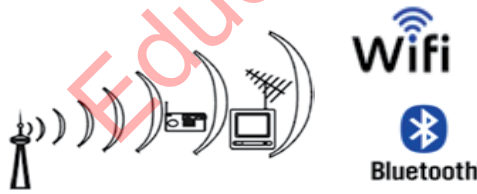
17.

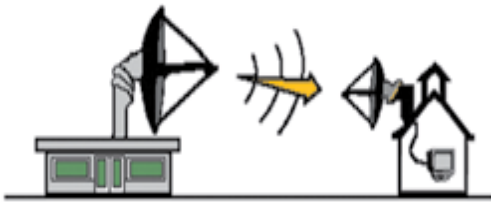

screen technology with cathode ray tube	light emitting diode
Large in size	Low electricity consumption
High electricity consumption	Made according to flat display technology.
The clarity and quality of the scenes is low.	The clarity and quality of the scenes is high.

18.






19.

Data transmission Media	Name and features
	<p><b>Unshielded Twisted Pair - TP</b></p> <p>The twisted copper wire pairs used for telephone connections. These are very flexible and low-priced. However, it is difficult to transmit data for a long distance through UTP wires. It is suitable for maximum of 100 meters.</p>
	<p><b>Shielded Twisted Pair- STP</b></p> <p>Heavy and expensive but Shielded twisted wire pairs improve quality and protect data transmission .</p>
	<p><b>Coaxial cable</b></p> <p>This consists of an electronic cable pair. The outer cable which is like a braided copper net produces electromagnetic field around the central cable. These two cables are separated by a plastic shield. These cables are expensive and used for TV antenna and CCTV.</p>
	<p><b>Fiber optics</b></p> <p>Fiber Optics cable consists of a pair of cables. There is a plastic jacket to separate the two cables. Core is a glass tube and there is glass cladding around it. The data transmission is carried out by reflecting light. These are used in modern telephone networks. The cable is relatively more expensive. This is the fastest data transmission media at present.</p>
	<p><b>Radio waves</b></p> <p>Data transmission is performed using radio waves. Wifi and Bluetooth are examples for radio waves based communication</p>

	<p style="text-align: center;"><b>Microwaves</b></p> <p>Microwaves travel in a linear mode. Transmission center is positioned facing each other. The distance between centers are decided based on geographical factor of the area. Microwaves are used in Satellite communication to transmit data as transponders.</p>
	<p style="text-align: center;"><b>Infrared</b></p> <p>Infrared data transmission is used in TV remote controllers, wireless keyboards and mouse etc.</p>

20.

	<p style="text-align: center;"><b>Analog Computers</b></p> <p>These computers use analog signals such as environmental parameters (speed, pressure, and temperature).</p>
	<p style="text-align: center;"><b>Digital Computers</b></p> <p>The computers used by us in day-to-day life are called digital computers. These computers use digital signals.</p>
	<p style="text-align: center;"><b>Hybrid Computers</b></p> <p>This is a combination of analog and digital computers.</p>

### MCQ

- |        |        |
|--------|--------|
| 1) IV  | 6) IV  |
| 2) II  | 7) III |
| 3) IV  | 8) IV  |
| 4) III | 9) III |
| 5) III | 10) IV |

### Essay

- 1) Star topology, Bus topology, Tree topology, Ring topology, Mesh topology
- 2) Digital computer, Analog computer, Hybrid computer
- 3) Low security for data  
Breakdown of network  
Virus  
Computer break downs  
Training requirements
- 4) Pointing Devices – Touch screen  
Scanner - Flatbed Scanners  
Image and Video input devices - CCTV  
Printers - Laser Printer  
Soft copy - Multimedia Projector  
Sounds - Speaker  
For both Input and Output – ATM machine  
Memory Devices – Hard disk
- 5) Secondary memory - Hard Disk  
Optical media- Digital versatile Disk

Primary Memory- Random Access Memory

Volatile Memory - Hard Disk

Non- volatile Memory – Hard disk, Digital versatile Disk

Magnetic Media – Hard disk

6)

- A. Client
- B. Server
- C. Local Area Network
- D. Wide Area Network
- E. Location
- F. Network Topology

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### 3. Data Representation Methods in the Computer system

01.    A     Abacus
- B     Number system
- C     Binary Numbers
- D     Octal
- E     Hexadecimal

02.    Binary number system
- Octal number system
- Decimal number system
- Hexa-Decimal number system

03.

Number System	Base Value	Number and Alphabetical character used
Binary	2	0,1
Octal	8	0,1,2,3,4,5,6,7
Decimal	10	0,1,2,3,4,5,6,7,8,9
Hexa-Decimal	16	0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

04.

4.1

- i. 23-     $10111_2$
- ii. 40-     $101000_2$
- iii. 59-     $111011_2$
- iv. 78-     $1001110_2$
- v. 105-     $1101001_2$

4.2

- I.  $1101_2 - 13$
- II.  $1100101_2 - 101$
- III.  $10001_2 - 17$
- IV.  $10111_2 - 23$
- V.  $101101_2 - 45$

05.

Decimal Number	Binary Number	Octal Number	Hexadecimal Number
26	$11010_2$	$32_8$	$1A_{16}$
51	$110011_2$	$63_8$	$33_{16}$
31	$11111_2$	$37_8$	$1F_{16}$
482	$111100010_2$	$742_8$	$1E2_{16}$
74	$1001010_2$	$112_8$	$4A_{16}$

06.

 $1110011110_2$ 

Octal Numbr

$1 \quad 110 \quad 011 \quad 110$   
 $1 \quad 6 \quad 3 \quad 6$

$\longrightarrow 1636_8$

Hexa-Decimal Number

$11 \quad 1001 \quad 1110$   
 $3 \quad 9 \quad 14$

$\longrightarrow 39E_{16}$

07.

7.1  $24, 75_8, 11001_2, 21_{16} \longrightarrow 75_8, 21_{16}, 11001_2, 24$

7.2  $AC_{16}, 920, 100111_2, 28_8 \longrightarrow 100111_2, 28_8, AC_{16}, 920$



08.

Paravi	Mayura
Saman	Sakunthala
Vikum	Prasanna
	Kithsiri

09.

	LSB	MSB	LSD	MSD
$1010_2$	0	1		
$1.011_2$	1	1		
$0.10_2$	1	1		
0.6			6	6
$125_8$			5	1
$1010.10_2$			1	1
$1C_{16}$			12	1

10.

A		B	
P	4 bits	1 PB	R
Q	The smallest unit of measurement of data	1 Byte	S
R	1024 TB	1 GB	T
S	8 bits	A bit	Q
T	1024 MB	A nibble	P

11.

Hard Disk	.....6TB .....
Digital versatile Disk	.....8GB .....
Magnetic Tape	.....150TB .....
Cache Memory	.....32MB .....
Register Memory	.....1KB .....

12.

1. Magnetic Tape
2. Compact Disk
3. Hard Disk
4. Flash Memory
5. Cache Memory

13.

1. BCD            Binary Coded Decimal
2. ASCII        American Standards Code for Information Interchange
3. EBCDIC       Extended Binary Coded Decimal Interchange Code
4. Unicode

14.

1. False- EBCDIC
2. True-
3. False- 4 bits
4. False – 8 bits
5. False -only 0 to 9

15.

- A- 568            010101101000 BCD
- B- 9723           1001011100100011 BCD
- C- 651            011001010001 BCD
- D- 288            001010001000 BCD
- E- 1258           0001001001011000 BCD

16.

1000001<sub>2</sub>

17.

Octal

Decimal

Hexa-Decimal

18.

Name of the color	Hexadecimal value	R	G	B
Blue	#1515FF	21	21	255
Light Green	#37E32F	55	227	47
Black	#181617	24	22	23
Purple	#871F79	135	31	121
Yellow	#FFEE00	255	238	0

19.

1. Rs. 50.00/                      50/=
2. Rs. 21.00                      21/=
3. Rs. 71                       $\longrightarrow$  107<sub>8</sub>

20.

221 MB

**MCQ**

- |      |       |
|------|-------|
| 1. 3 | 10. 2 |
| 2. 2 | 11. 2 |
| 3. 1 | 12. 2 |
| 4. 4 | 13. 3 |
| 5. 2 | 14. 3 |
| 6. 1 | 15. 2 |
| 7. 3 | 16. 1 |
| 8. 3 | 17. 4 |
| 9. 4 | 18. 4 |

**Essay**

1) 11011111101110

2) 1001		0010		0100
9		2		4
924 <sub>16</sub>				

- 3) 1) 351
- 2) 14C<sub>16</sub>

#### 4. Logic Gates with Boolean Functions

1.

a. AND gate

b.

c.  $Q = \overline{A}$ 

2. AND gate

A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

3. OR gate

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

4. NOT gate

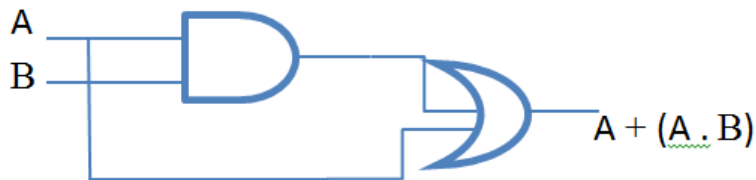
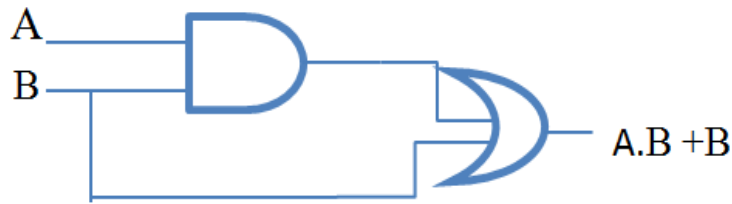
A	$\overline{A}$
0	1
1	0

5. Basic Logic Gates

Combinational Logic Gates

6. input, inputs, an output, transistors, resistors

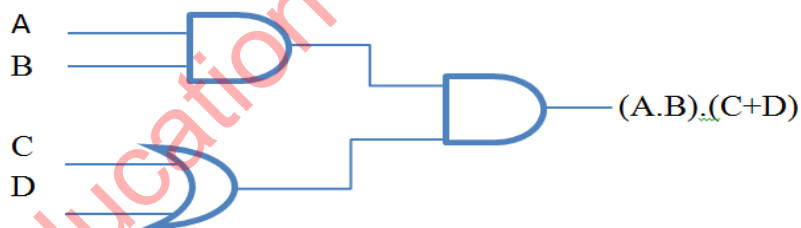
7.



8. Circuits which enable building of certain logical conditions using binary values and which enable making certain decisions, are called Logic Circuits.

9. It is a circuit made up of several basic logic gates that receive complex logic.

10.



11. complex digital circuits

12.

- Computer
- Calculator
- Washing machine
- Microwave oven
- Mobile phone
- Modern televisions
- Digital clock
- Air condition

13.  $\overline{(A.B)} + (A.B)$

14.

A	B	C	A+B	F
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	1	1
1	1	0	1	0
1	1	1	1	1

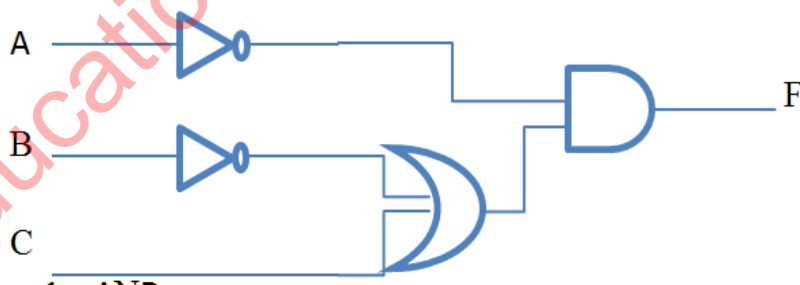
15.

1. AND gate
2. OR gate
3. NOT gate

16. A-1, B-1, C-0

A-1, B-1, C-1

17.



18.

- 1 – AND
- 2 – OR
- 3 – OR , AND
- 4 – AND
- 5 - NOT

19.

A	B	A+B	$\overline{B}$	$(A+B) \cdot \overline{B}$
0	0	0	1	0
0	1	1	0	0
1	0	1	1	1
1	1	1	0	0

20. Light sensor, Timer and A manual switch

There are several occasions when the lights are on. These are,

- When only the manual switch is closed
- When the input of the timer is 1 and when the environment is dark

21. OR gate

22. An integrated circuit is a type of circuit designed for a certain function with devices such as transistors, resistors, capacitors and diodes.

MCQ

- |      |       |
|------|-------|
| 1. 2 | 6. 3  |
| 2. 1 | 7. 3  |
| 3. 3 | 8. 3  |
| 4. 1 | 9. 3  |
| 5. 1 | 10. 3 |
|      | 11. 2 |

Essay

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

2)

1. AND Gate



OR Gate

 $A+B$ 

NOT Gate

 $\overline{A}$ 

2. AND Gate

A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

OR Gate

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

NOT Gate

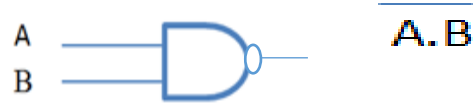
A	$\overline{A}$
1	0
0	1



## 3. NAND Gate



or



## NOR Gate



NAND Gate

or

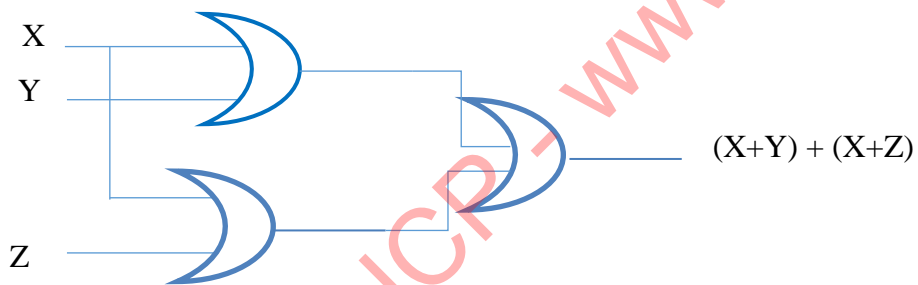


## 4. NAND Gate

A	B	A+B	$\overline{A+B}$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

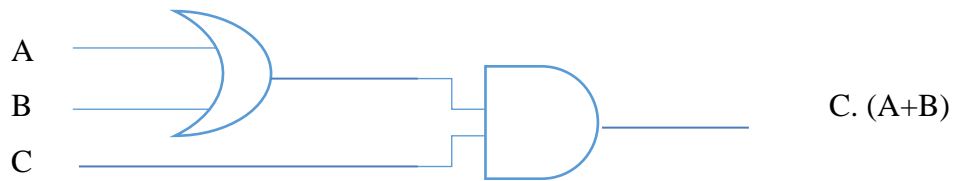
## NOR Gate

A	B	A.B	$\overline{A.B}$
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

5. i.  $(X+Y) + (X+Z)$ 

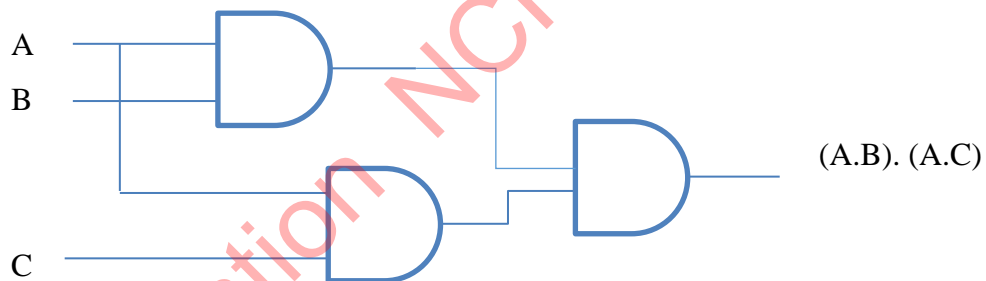
X	Y	Z	X+Y	X+Z	$(X+Y) + (X+Z)$
0	0	0	0	0	0
0	0	1	0	1	1
0	1	0	1	0	1
0	1	1	1	1	1
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	1	1	1
1	1	1	1	1	1

ii. C. (A+B)



A	B	C	A+B	C. (A+B)
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	1	1
1	1	0	1	0
1	1	1	1	1

iii. (A.B). (A.C)



A	B	C	A.B	A.C	(A.B) . (A.C)
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	0	1	0
1	1	0	1	0	0
1	1	1	1	1	1

03. i.

A	B	C	A+C	A.B.C	B.(A+C)	A.B.C+( B.(A+C))
0	0	0	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	1	1	0	1	1
1	0	0	1	0	0	0
1	0	1	1	0	0	0
1	1	0	1	0	1	1
1	1	1	1	1	1	1

ii.  $(A.B.C)+(B.(A+C))$ 

04.

i. AND gate

OR gate

NOT gate

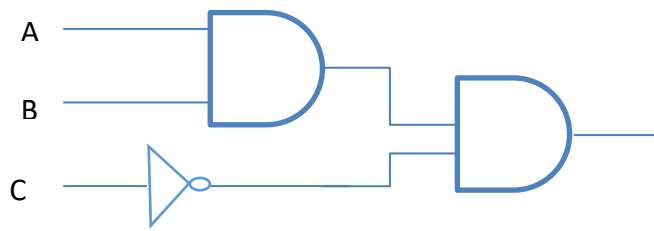
ii.  $(A.B.C) + (\bar{A}.B.C) + (A.B.\bar{C})$ 

iii.

A	B	C	$\bar{A}$	$\bar{C}$	A.B.C	$\bar{A}.B.C$	A.B. $\bar{C}$	$(A.B.C)+(\bar{A}.B.C)+(A.B.\bar{C})$
0	0	0	1	1	0	0	0	0
0	0	1	1	0	0	0	0	0
0	1	0	1	1	0	0	0	0
0	1	1	1	0	0	0	0	0
1	0	0	0	1	0	0	0	0
1	0	1	0	0	0	1	0	0
1	1	0	0	1	1	0	1	0
1	1	1	0	0	1	1	0	1

05. i.

$$F = A.B.\overline{C}$$



ii .

$$F = A.B.\overline{C}$$

A	B	C	$\overline{C}$	$A.B.\overline{C}$
0	0	0	1	0
0	0	1	0	0
0	1	0	1	0
0	1	1	0	0
1	0	0	1	0
1	0	1	0	0
1	1	0	1	1
1	1	1	0	0

## 5. Operating Systems

01. Hardware - mouse, keyboard, monitor, hard disk, speakers

Software – System and Application software

Firmware - Installation instructions on the ROM

02. C

F

B

E

A

D

03. 1- Operating system

2- Utility software

3- Language Translator

4- Assembler

5- Compiler

6- Interpreter

7- Word Processing

8- Spread Sheets

9- Web Browsers

10- Computer Games

04. An operating system is required to make the connection between the user and the hardware in a computer, as well as to manage the hardware and provide a user-friendly interface. That is, an operating system is required to properly manage and operate the entire computer system.

05. A- Application Software

B- Operating System

C- Other System Software

D- Hardware

06. For copyrighted operating systems, the software may be used after payment to the relevant manufacturing company, and the owner's legal agreement is required to modify or grant the software to another person, but open source operating systems are free to download, modify, use, and another Legal permission is not required to grant.

07.

Operating System	Proprietary/ Free and Open Source
1) windows	Proprietary
2) Ubuntu	Free and Open Source
3) Android	Free and Open Source
4) Mac	Proprietary
5) Isuru Linux	Free and Open Source

08.

- |                                    |   |
|------------------------------------|---|
| A - Real Time Operating System     | 1- ATM machines, Calculators                |
| B - Multi-tasking Operating System | 2- Windows 10, Ubuntu, Mac Operating System |
| C - Multi-User Operating System    | 3- Linux, Windows Server                    |
| D - Single user Operating System   | 4- MS DOS                                   |

09. i. Process Management

ii. Memory Management

iii. Device Management

iv. File Management

v. Security Management

vi. Network Management

10.

The following methods should be properly explained.

1) Applying usernames and passwords

2) Applying access privileges

11.

FAT (File Allocation Table)	NTFS (New Technology File System)
1. File capacity is small 1- 4GB	1. File capacity is large-16 TB
2. Keeps 2 copies to protect file data	2. Access privileges and encryption methods are used as security privileges

12.

Interfaces	
1. Command Line Interface - CLI <ul style="list-style-type: none"> <li>Based on commands</li> <li>Somewhat difficult to use and learn</li> <li>The relevant ordering committee rule must be followed correctly .</li> </ul> Eg: MS DOS, Unix,Linux	2. Graphical User Interface - GUI <ul style="list-style-type: none"> <li>Easy to use and learn</li> <li>No need to memorize commands</li> <li>WIMP – Windows,Icons,Menu,Pointer</li> </ul> Eg: Windows 8 , Windows 10 ....

13.

Utility programs are used to keep the computer running smoothly and to protect the computer from occasional hazards.

14. (In addition to the utility programs listed here, the utility programs mentioned can be confirmed as correct answers based on their relevance.)

Backup Software - To copy files and take back up of hard drives

Disk scanner - To check the errors in hard drive

Disk defragmentation - Organizing the hard disk by rearranging clusters of small spaces together and creating a larger free space. This increases the efficiency of the hard disk

15. A- TACK

B- SECTOR

C- BLOCK

D- CLUSTER



16. True

True

False

False

17. More time to read the file

Computer efficiency reduction

Damage to file contents in some cases

18. Agree

When storing files on Linux-based operating systems, the file does not have to be placed next to each other, allocating extra space for each file. Also, if for some reason the capacity of the file grows larger than the space allotted for the file, then the file is moved to another location. As a result, no utility programs are required for this type of operating system.

19.

File name	Name of the file	File extension	File type
1. first.pptx	first	pptx	Power point
2. fpc_3.0.4.exe	fpc_3.0.4	exe	Executable
3. salary.xlsx	salary	xlsx	Excel
4. home.jpg	home	jpg	image
5. scl_Anthm.mp3	scl_Anthm	mp3	Audio

20. - File size

- The location where the file is stored

- File stored date, time, etc.

-File name, file extension, file type, etc. ....

**MCQ**

- |      |       |
|------|-------|
| 1) 2 | 6) 2  |
| 2) 4 | 7) 3  |
| 3) 1 | 8) 1  |
| 4) 3 | 9) 3  |
| 5) 4 | 10) 3 |

**Essay**

(01)

i) Utility software is software used to enhance the effectiveness of a computer system.

ii) P – V                  Q – T                  R – W                  S – U

iii) - To install more than one operating system on a computer  
 - To store the contents of the computer separately

(02)

i) - Command Line Interface

- Graphical User Interface

(only two differences )

Interface	
1. Command Line Interface - CLI <ul style="list-style-type: none"> <li>Based on commands</li> <li>Somewhat difficult to use and learn</li> <li>Not multitasking.</li> </ul>	2. Graphical User Interface - GUI <ul style="list-style-type: none"> <li>No need to memorize commands</li> <li>Easy to use and learn</li> <li>Multitasking</li> </ul>

ii) - Making new files and saving them at suitable places

- Deleting the unnecessary files
- Arranging the folders in order and deleting the unnecessary folders
- Creating backups of the files and folders as needed

iii) - Air Traffic Control Systems

- ATM ....

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## 06. Word Processing

01. Letters, Certificates, Magazines, Invitations cards

02. 1-quick access tool bar

2-Title bar

3-ribbon

4-scroll bar

5-tabs

6- Browse Buttons

7-work sheet

8-view buttons

03. False

True

True

False

04.

A	B
Software Name	Company
1. Libre Office Writer	A. Source Gear Corporation
2. Open Office Writer	B. Microsoft Office Corporation
3. AbiWord	C. Adobe System Incorporated
4. King soft Office Writer	D. Corel
5. Microsoft Office	E. The Document Foundation( Open Source)
6. Word Perfect	F. King Soft
7. LyX	G. Apple
8. Frame Maker	H. The LyX Project
9. iwork Pages	I. Apache Software Foundation (Open Source Software)

05. 1- Save

2- Cut letters / objects

3- Select the document

4- Get the cursor to the opening of the document

5- Open a document

6- Paste letters / objects

7- Replace words

8- Get the cursor to the end of the document

9- Paste letters / objects

10- Copy letters / objects

06. 1- font name

11- shading

2- font size

12- line spacing

3- increase font

13- alignments

4- decrease font

14- font color

5- bullets

15- change case

6- numbering

16- superscript

7- indentation

17- subscript

8- sort

18- underline

9- dialog box launcher

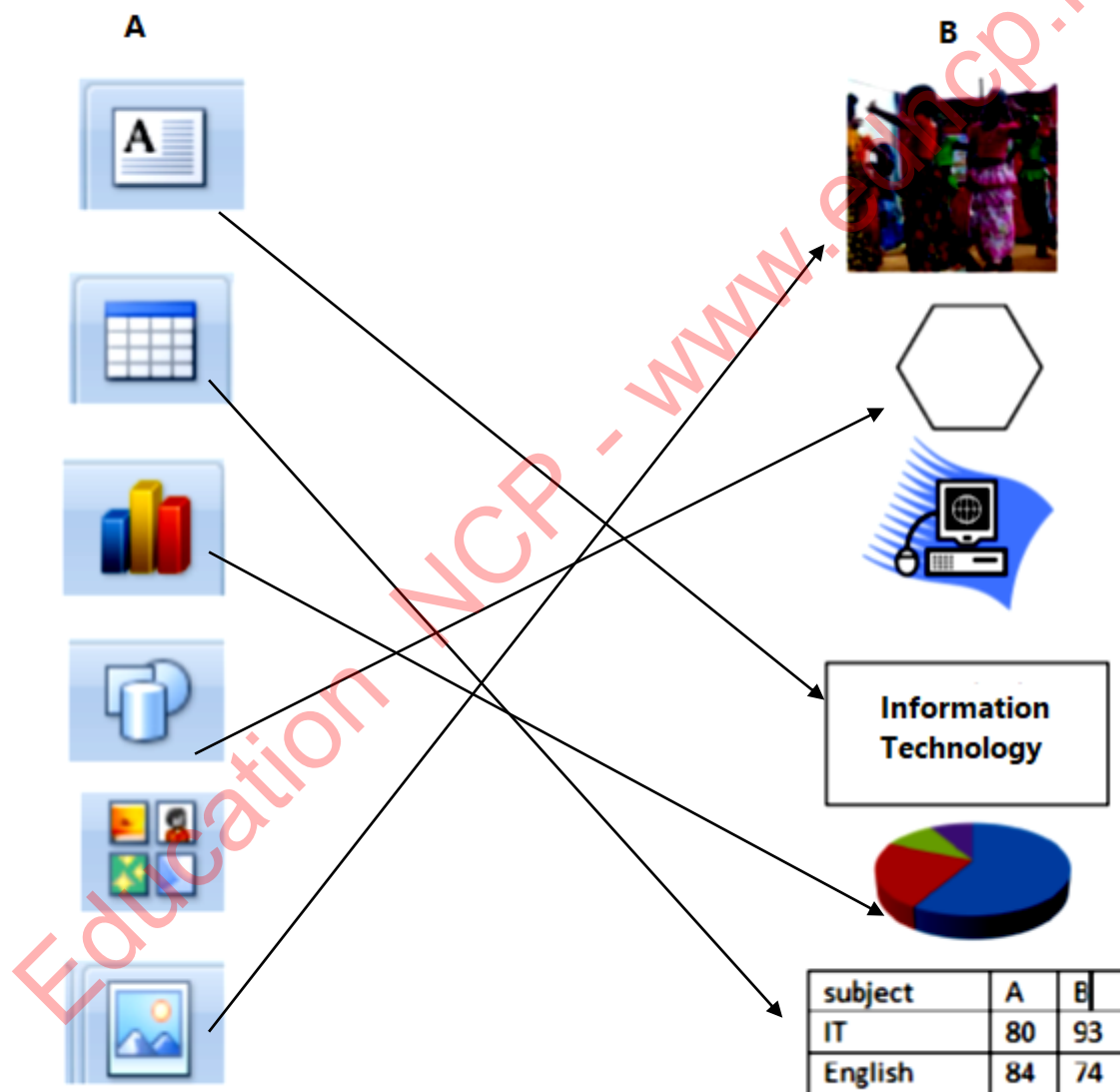
19- italic

10- border

20- bold

07. 1- underline  
2- align left  
3- italic  
4- superscript  
5- line spacing

08.



09. A- merge

B- text direction

C- split

1.insert column

2.delete row

10. 1-3

2-4

3-4

4-2

11. 1- This capitalizes the first letter of each sentence, and converts the rest of the text to lower case

2- Converts all letters in to simple letters

3- Converts all letters in to capital letters

4- Converts only the first letter in to capital letter of the each word in the sentence, and converts the rest of the text to lower case

5- Converts only the first letter in to simple letter of the each word in the sentence, and converts the rest of the text to upper case

12. 1-CLIP ART

2-border

3-image

4-wordart

5-shapes

6- superscript

13. 1-printer name

2- Show pages that need to be printed

3-Number of copies

4-Number of pages

5-printer drivers

14. 1-2

2-4

3-3

4-4

15. 1-3

2-2








3-1

4-4

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16.

	<p>Format painter</p> <p>.....</p>
	<p>Border</p> <p>.....</p>
	<p>Spellings and grammar</p> <p>.....</p>
	<p>shading</p> <p>.....</p>
	<p>paste</p> <p>.....</p>
	<p>copy</p> <p>.....</p>
	<p>cut</p> <p>.....</p>

17. 1- start mail merge

2-edit recipient list

3-address block

4-insert merge field

5-previous record

6-next record

7-finish and merge

8-print

- 9-last record
- 10-first record
- 11-preview results
- 12-greeting line
- 13-highlight merge fields
- 14-edit recipient list

18. 1- h

2-d

3-c

4-

5-P

19. 1-2

2-1

3-3

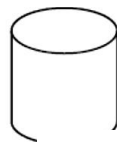
4-4

5-1

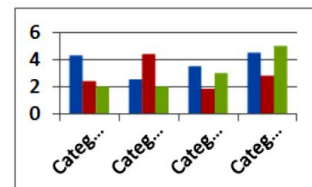
20.



PICTURES



SHAPES

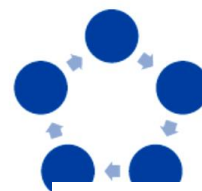


CHARTS


TABLE



CLIP ART



SMARTART

### MCQ

1. 1
2. 3
3. 3
4. 3
5. 3
6. 2
7. 1
8. 2
9. 4
10. 3
11. 4
12. 2
13. 3
14. 1
15. 2
16. 2
17. 1
18. 1
19. 3

### Essay

1.
  - i. underline
  - ii. shape
  - iii. italic
  - iv. picture
  - v. align center

2.

- i. page border
- ii. italic
- iii. drop cap
- iv. water mark
- v. chart

3.

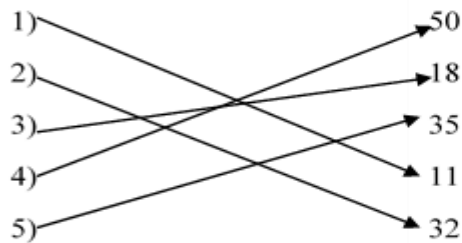
- i. bold
- ii. bullet
- iii. border
- iv. columns
- v. ctrl + s  
apply save command

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## 7. Electronic Spreadsheet

- 01.
- 1) columns and rows
  - 2) Ctrl+Arrow keys
  - 3) Column letter , Row letter
  - 4) cells

02.



03.

- 1) Excel, Numbers, Libre office calc, open office calc
- 2)
  - Simple and complex calculations
  - Presentation of data in charts
  - Show data in ascending and descending order
  - Segregate only the required data
  - Check the validity of data
  - Protection of data using passwords
  - Saving for future use
- 3) Ctrl + Home
- 4) Selecting cell range → Formal Cell's dialog box → Number tab → Text → OK

- 5) ()  
^  
\*, /  
+, -

- 6) = SUM(A1,B1,C1)  
= SUM(A1:C1)  
= SUM(A1,B2,C1)  
= SUM(B1:C2)

- 7) Select the cell which contains the formula.

Click the small black square in the bottom-right corner of the selected cell.

Drag the fill handle up to the required cell.

- 8) Relative cell reference - If the row number and the column letter of the adjacent cells change accordingly when a formula is copied, such cell addresses are called relative cell reference.

Eg:- A2

Row absolute cell reference - If the row number of the cells remain unchanged when a formulae is dragged sideways along a row, it is called row absolute cell reference.

Eg:- A\$2

Column absolute cell reference - If the column letter of the cells remain unchanged when a formula is dragged down along a column, it is called column absolute cell reference.

Eg:- \$A2

Row and column absolute cell reference - If the row numbers and column letters of the cells remain unchanged when a formula is dragged sideways along a row, such cell addresses are known as row and column absolute cell reference.

Eg:- \$A\$2

- 9) Column Chart - Comparing classes of data items in group. Group comparison  
 Bar Chart - Comparing classes of data items in group. Group comparison  
 Line Chart - Comparing classes of data items in group. Group comparison  
 Pie Chart- Comparing classes of data items as percentage.  
 XY Scatter Chart - Comparing data in pairs

## 10) CURRENCY

04. 1) IF

2) SUM

3) AVERAGE

4) RANK

5) Select O4 cell , Click the small black square in the bottom-right corner of the O4 cell and drag the fill handle up to the O9 cell.

05 1)  $\$B\$8 * 200$ 

2) SUM (C4:C6)

3)  $\$C\$13 - \$F\$13$ 

4. Select cell range → Formal Cell's dialog box → NUMBER TAB → INCREASE DECIMAL

5. XY Scatter Chart – It is the most suitable graph for comparing data in pairs .

## MCQ

1. II
2. II
3. III
4. I
5. II
6. I
7. II
8. IV
9. IV
10. IV

11. II
12. I
13. IV
14. I
15. I
16. III
17. II
18. IV
19. IV
20. III

**Essay**

- 01). 1) B3:D3  
 2) =SUM(B3:D3)/ = B3+C3+D3  
 3)=SUM(B3:D3)  
 4)=SUM(E3:E7)  
 5)=E3\*E3/D9\*100  
 6)=MAX(B3:B7)  
 7) Column Chart, Bar Chart
- 02). 1) =SUM(B3:C3)  
 2) Selecting D10 cell, Enter the following formula =SUM(D3:D9)  
 3 )=SUM(B3:B9)  
 4)Pie chart
- 03). 1) =B2+B\$8  
 2) C2\*D2  
 3) =SUM(E2:E6)  
 4) EXCEL, NUMBERS, LIBRE OFFICE CALC, OPEN OFFICE CALC
- 04). 1) = SUM(D5:D10)  
 2) =SUM(E5:E10)  
 3) =(D5\*5/100)  
 4) =C5-B5
- 05). 1) = SUM(B4:C4)  
 2) =B11/G11  
 3) MAX (E4:E11)  
 4) MIN (G4:G11)  
 5) Pie chart



## 8. Electronic Presentations

01. E-Presentation is a presentation made by an individual or a group of people using technological tools such as presentation software.
02. Apple Keynote, Microsoft PowerPoint, Libre Office Impress, Corel Presentation
03. Number of Sentence lines should be 6-9 per slide  
 Font size at 32 or more  
 Correction of grammar, spelling and use of language  
 Concern for color  
 Collection of motion pictures, drawings, videos
04. 1- normal view  
 2- slide sorter  
 3-reading view  
 4-slide show
05. 1- New slide  
 2- slide transition  
 3- insert objects  
 4- help window  
 5- slide sorter
06. 1- title slide  
 2-content with caption  
 3-title and content  
 4-section header  
 5-two content  
 6-title only  
 7-blank  
 8-comparison  
 9-picture with caption  
 10-normal view  
 11-slide sorter  
 12-notes page  
 13-slide master

**MCQ**

- |       |       |
|-------|-------|
| 1) 1  | 11) 4 |
| 2) 4  | 12) 2 |
| 3) 4  | 13) 3 |
| 4) 3  | 14) 2 |
| 5) 4  | 15) 2 |
| 6) 2  | 16) 3 |
| 7) 1  | 17) 2 |
| 8) 2  | 18) 4 |
| 9) 3  | 19) 4 |
| 10) 3 | 20) 4 |

**Eassy**

01. 1-B  
2-D  
3-C  
4-A

## 9. Database

01. A database is a collection of data that can be used to enter interconnected data, systematically store entered data, retrieve stored data efficiently when needed, and store large amounts of data.

02. 1. Manual Database

2. Electronic Database

03. 1. More efficient in retrieving information

2. Easy to obtain copies.

3. Smaller physical space to store data.

4. Data analysis can be carried out efficiently.

5. Data can be shared.

6. Independence of data.

04. 1. The Abstraction from data redundancy::

If the same data is stored in several tables, this is called data redundancy.

Eg :- the name of a student may be recorded separately in the admission card and the library membership card. When a name is changed, that name should be edited separately in all documents. However, by storing related database in tables, data redundancy can be minimized.

2. The existence of the data consistency:

By minimizing data redundancy, the same data being saved in various tables can be reduced or prevented. This enables to maintenance of data consistency.

Eg:- According to the above example students' names and library book names should be entered only once when storing data in relational tables. Thus, data consistency is maintained.

## 3. Increases efficiency:

Since database tables are properly organized, saving and reading data can be carried out efficiently. Hence, efficiency is higher.

This can be explained by the example above. That is, in related databases data consistency increases speed. Hence, efficiency is increased.

## 4. Increases accuracy:

Since data redundancy can be minimized in a database, data consistency is maintained. This increases accuracy.

Explain this further with the example above.

## 5. Increases validity:

Properties of fields can be assigned when a database is planned. Validity can be checked at the data entry stage. This increases the validity of the database.

Eg :- When entering a fee, the attribute can be set to 2 decimal places and the minimum fee payable is 1000 so that it must be input.

## 6. Security :

Unauthorized access can be controlled by using a password and encrypting the database. This increases security.

05.

Manual Database	Electronic Database
Less efficient	More efficient
Less reliability	More reliability
Less accurate	More accurate
Should present in the order of input	Can change the data input order
Difficult to analyze data	Easy to analyze data
Difficult to update data	Easy to update data
Difficult to delete unnecessary data	Easy to delete unnecessary data
More space is needed to save data	A very small space is needed to save data
More man power is needed	Less man power is needed

06. A collection of **fields** that contain data relevant to individual object or a person is called **a record**. A collection of records is called a data **table**. A collection of related **tables** is called a relational **database**.

07.

1). A column (or a combination of columns) which enables to identify a record uniquely is called primary key. 2). Because a record containing data in a database can be uniquely identified, eliminating / controlling data redundancy can stop / minimize the storing of the same data in different tables. Therefore, When managing the database, efficiency and data updating is very easy.

- 3).     • Should not be empty (data being there is mandatory)  
           • No duplicate values (same values do not exist)

4). Composite Key

5). Foreign Key

- 6).     • Builds a connection between two tables.  
           • The related data of the primary key field exist in the other table.  
           • Foreign key of one table is the primary key of the other table.

08. 1. Inability to select a primary key field to maintain identity of records.

2. Inability to analyse data properly.

3. Reduced efficiency

4. Possibility to get inaccurate data is high.

5. Difficult to input data.

6. Possibility to make errors in deleting data.

7. difficult to update data

09.

<b>A</b>	<b>Answer letter</b>	<b>B</b>
1. Numeric	<b>D</b>	A. Used to indicate monetary values.
2. Integer	<b>E</b>	B. indicates dates and time
3. Real	<b>G</b>	C. Consists of letters, numbers, or special symbols. Numbers are used but not used for the calculation.
4. Text	<b>C</b>	D. Used for calculations.
5. Currency	<b>A</b>	E. plus or minus whole numeric figures.
6. Date/Time	<b>B</b>	F. There are only two logical values as true and false.
7. Boolean	<b>F</b>	G. plus or minus numbers with decimal places.

10.

<b>Field</b>	<b>Data type</b>
1. Admission Number	Text
2. Student name	Text
3. Date of birth	Date/Time
4. Amount paid for facility fees	Currency
5. Average mark obtained from term test	Real
6. Are you registered with the school library?	Boolean

i. Primary key - Admission Number

The reason for choosing the admission number as the primary key is that a record containing data is uniquely identifiable and contains attributes that do not duplicate data.

ii. A type of data related to one field is called a data type. The type of data in a field is most important because it determines what type of data can be stored.

Ex :- Text data type is used to insert letters, numbers, or special symbols. But even if numbers are used, they are not used for calculations. It is best to use a numeric data type for calculations.

iii.

1. Teacher Name

2. Date of birth

3. Address

4. Date of appointment

5. Marital status

6. Date of transfer to this school etc..

11. A collection of objects which facilitates planning and maintenance of the database to the user is called a Database Management System (DBMS). This consists of several objects like tables, queries, forms and reports.

a) Table:

A collection of several records on a specific topic. The database can have multiple tables. (Eg:. student table, teacher table). Tables are the main objects of entering data into the database. Tables can be used to create queries, forms and reports.

b) Queries:

Queries are used to obtain necessary information from the data of related tables. Query represents data of selected fields (columns) in each table. Furthermore, various calculations can be made using fields through query.

c) Forms :

Forms are used to enter data to a table in Database Management Systems. Further, forms are used to display entered data as well.

## d) Reports:

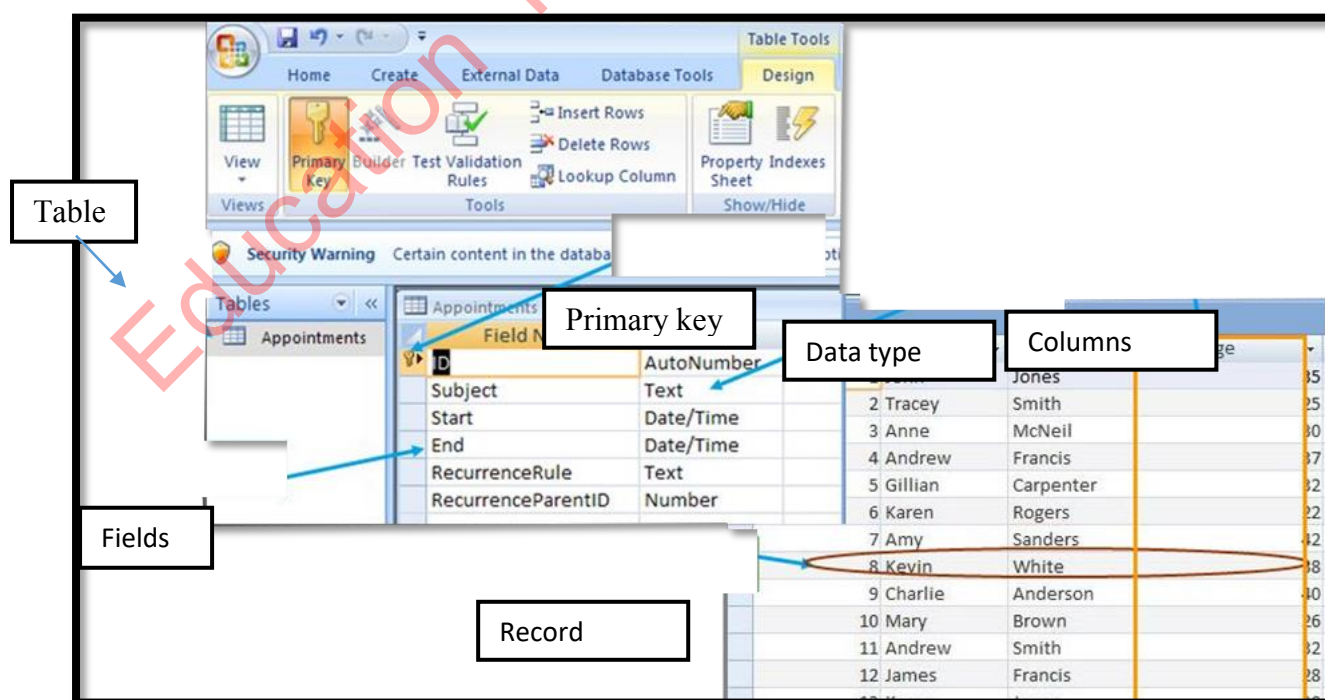
Reports are used to obtain printed copies of important information received from the data of related tables. Both tables and queries can be used to design reports.

12.

Software	Manufacturing company
1. Access	Microsoft Company
2. Base	The Document Foundation
3. Oracle	Oracle Cooperation
4. MySQL	Oracle Cooperation
5. SQL Sever	Microsoft Company

1. Easy to set up data tables.
2. Ability to store large amounts of data in a very small space.
3. Availability of information in a very short time.
4. More security to data..
5. Easy to update records.
6. Easy to prepare reports by separating information, summarizing when required
7. Easy to manage data because interconnections between tables can be built

13.

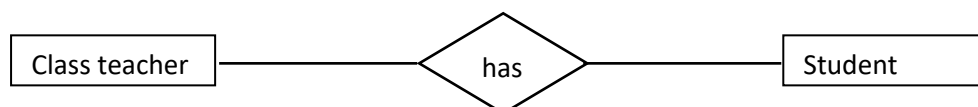




14. **1. one to one relationship**

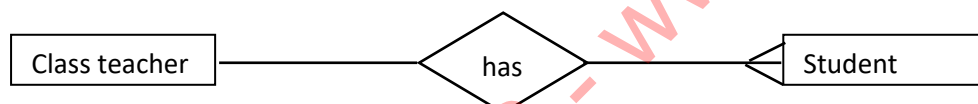
If only a row of a table is related to a row of another table, it is called a one-to-one relationship..

Eg :- Think of a teacher in charge of a class with only one student. That student has only one class teacher and the class teacher has only one student.

**2. one to many relationship**

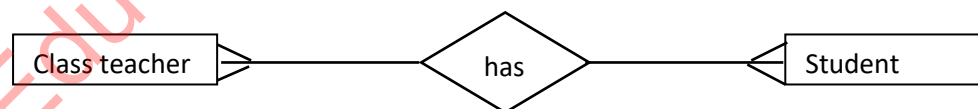
If each record of a table is related to several records of the other table, this is called a one-to-many relationship.

Eg :- Think of a teacher in charge of a class with several students. Those students have only one class teacher and the class teacher has several students.

**3. many to many relationship**

If a record of a table is related to several records of another table and if a record of that related table is related to several records of the other table, there is a many-to-many relationship between those two tables.

Eg :- Think about the students and teachers in a class. One student in that class may have several teachers and one teacher may have several students.



15.

one to many Relationship

many to many Relationship

16. Data duplication errors may exist

Difficult to update data and

Inefficient of data handling

Reduced accuracy....etc..

1. Base Software

2. My SQL Software

17. Record

18. Number of fields : 4.

Number of records : 6.

19.

- 1) Several related tables are defined as a Data Base. A column in a table is called a Field. A row in a table is called a Record. A column (or a combination of columns) which enables to identify a record uniquely is called Primary Key.
- 2) If a field (or a combination of fields) of one table can be used to uniquely identify rows of another table, that field is called Foreign Key. The foreign key builds Relationship of two tables. Re-entry of data in each column of a table is called Data Duplication.
- 3) when storing data, if the same data is stored in several table it is called Data Redundancy. Types of data relevant to one field is called Data type.
- 4) Forms are used to entering and displaying data. Query is used to extract the required information from the data in the interconnected tables. Furthermore, Query is used only for various calculations using fields in a database. The Report is used to present information.

**MCQ**

01. 4

02. 4

03. 4

04. 2

05. 2

06. 4

07. 4

08. 4

09. 1

10. 4

11. 4

12. 3

13. 3

14. 2

15. 4

16. 1

17. 4

18. 2

19. 1

20. 3

**Essay**

- 01** 1. A column or collection of columns in a table when records can be identified uniquely is called primary key and prevents duplication of data.
2. Stno and Course fields in Student\_ Course table

3.	<u>Fields</u>	<u>Data type</u>
	course fee	Currency
	course date	Date/Time
	course duration	Numeric

4. Data security is ensured by applying passwords and encrypting data to the database that limit the possibility of unauthorized access and activity.

5. Lecturer - Course :- one to many relationship

6.

1. Failure to select a primary key field to maintain the identity of the records.

2. Inability to analyze data accurately.

3. Decreased database efficiency.

4. Increase the ability to receive information errors.

5. Difficult to input data.

6. Errors in deleting data.

7. Difficult to update data

02. 1) Number of fields - 03, Number of records - 05

2) Suppliers table - Supplier\_code, Item table – Item\_code, Supply - Supplier\_code and Item\_code

3) Supply table - Supplier\_code, Item\_code

4) Suppliers table and Supply table

Suppliers table

Supplier_code	Name	contacts
Sup_5	Sunil	0761245780

Supply table

Supplier_code	Item_code	Supplied_date
Sup_5	A004	2020/07/07

05) a) many-to-many relationship

b) one-to-many relationship