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- Govt. Supply. Exam **September - 2021** question paper is given with answers.



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I pray the almighty to bless the students for consummate success in their examinations.

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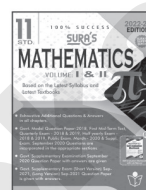
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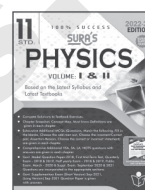
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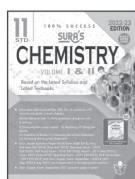


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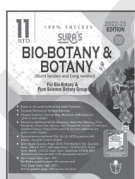


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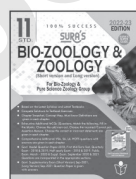
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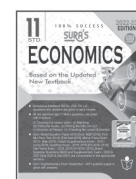
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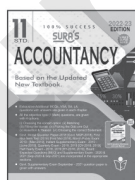
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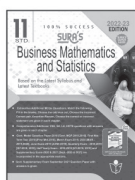
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UNIT-1

FUNDAMENTALS OF COMPUTER AND WORKING WITH A TYPICAL OPERATING SYSTEMS (WINDOWS & LINUX)

CHAPTER 1 INTRODUCTION TO COMPUTERS

CHAPTER SNAPSHOT

- * 1.1. Introduction to Computers
- * 1.2. Generations of Computers
- * 1.3. Sixth Generation Computing
- * 1.4. Data and Information
- * 1.5. Components of a Computer
 - 1.5.1. Input Unit
 - 1.5.2. Central Processing Unit
 - 1.5.3. Output Unit
 - 1.5.4. Memory Unit
 - 1.5.5. Input and Output devices
- * 1.6. Booting of Computer

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER

1. First generation computers used [HY. 2019]
(a) Vacuum tubes (b) Transistors
(c) Integrated circuits (d) Microprocessors
[Ans. (a) Vacuum tubes]
2. Name the volatile memory
(a) ROM (b) PROM
(c) RAM (d) EPROM
[Ans. (c) RAM]
3. Identify the output device [Mar. 2020]
(a) Keyboard (b) Memory
(c) Monitor (d) Mouse
[Ans. (c) Monitor]
4. Identify the input device [FMT 2018]
(a) Printer (b) Mouse
(c) Plotter (d) Projector
[Ans. (b) Mouse]
5. Output device is used for printing building plan.
(a) Thermal printer (b) Plotter
(c) Dot matrix (d) inkjet printer
[Ans. (b) Plotter]
6. Which one of the following is used to in ATM machines
(a) Touch Screen (b) Speaker
(c) Monitor (d) Printer
[Ans. (a) Touch Screen]
7. When a system restarts which type of booting is used.
(a) Warm booting (b) Cold booting
(c) Touch boot (d) Real boot.
[Ans. (a) Warm booting]
8. Expand POST [FMT 2018; Sep. 2020]
(a) Post on self Test
(b) Power on Software Test
(c) Power on Self Test
(d) Power on Self Text
[Ans. (c) Power on Self Test]
9. Which one of the following is the main memory?
(a) ROM (b) RAM
(c) Flash drive (d) Hard disk
[Ans. (b) RAM]
10. Which generation of computer used IC's?
(a) First (b) Second (c) Third (d) Fourth
[Ans. (c) Third]

SECTION - B

VERY SHORT ANSWERS

1. What is a computer? [Sep. 2021]

Ans. (i) A computer is an electronic device that manipulates information, or data. It has the ability to store, retrieve, and process data.

(ii) Computer works faster than human being and given the values more accuracy and reliable

2. Distinguish between data and information.

[FMT 2018]

Data	Information
Data is defined as an unprocessed collection of raw facts, suitable for communication, interpretation or processing.	Information is a collection of facts from which conclusions may be drawn.
(Eg) 134, 16, 'Kavitha', 'C'	(Eg) Kavitha is 16 years old.

3. What are the components of a CPU? [Sep. 2020]

Ans. The CPU has three components which are Control unit, Arithmetic and Logic unit (ALU) and Memory unit.

4. What is the function of an ALU? [Mar. 2020]

Ans. (i) The ALU performs arithmetic operations.

(ii) The result of an operation is stored in internal memory of CPU.

(iii) The logical operations of ALU promote the decision making ability of a computer.

5. Write the functions of control unit.

Ans. The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

6. What is the function of memory?

Ans. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently.

7. Differentiate Input and Output unit.

Input Unit	Output Unit
Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.	An output unit is any hardware component that conveys information to users in an understandable form.
Example : Keyboard, mouse etc.	Example : Monitor, Printer etc.

8. Distinguish Primary and Secondary memory.

Primary Memory	Secondary Memory
It is used to temporarily store the programs and data when the instructions are ready to execute.	It is used to store the data permanently.
It is volatile, the content is lost when the power supply is switched off. Eg. RAM.	It is non-volatile, the content is available even after the power supply is switched off. Eg. ROM, CD-ROM, DVD ROM.

SECTION - C

SHORT ANSWERS

1. What are the characteristics of a computer?

Ans. (i) Computer is the powerful machine.

(ii) It can perform large number of tasks.

(iii) The main capacities of computer are work length, speed accuracy, diligence, versatility memory and automation and lots of more tasks.

2. Write the applications of computer.

Ans. The various applications of computers are,

(i) Business **(ii)** Education

(iii) Marketing **(iv)** Banking

(v) Insurance **(vi)** Communication

(vii) Health care

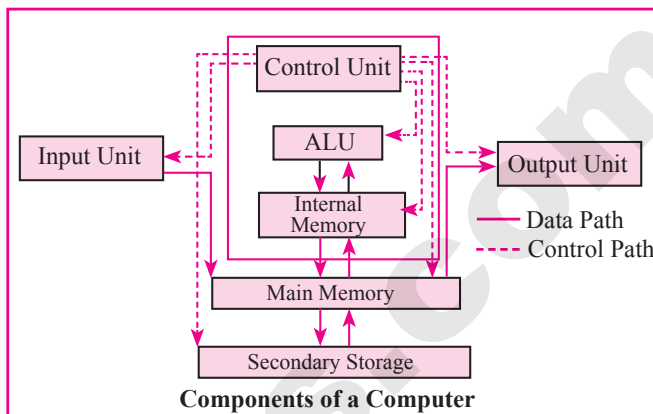
(viii) Engineering - Robotics, Nano technology, Bio Engineering

3. What is an input device? Give two examples.

Ans. Input device is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.

Example: Keyboard, Mouse, Scanner, Fingerprint scanner, Track Ball, Retinal Scanner, Light pen etc.

- (iii) **Arithmetic and Logic Unit** : The ALU is a part of the CPU where various computing functions are performed on data. The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations.
- (iv) **Control Unit** : The control unit controls the flow of data between the CPU, memory and I/o devices. It also controls the entire operation of a computer.
- (v) **Output Unit** : An output unit is any hardware component that conveys information to users in an understandable form. Example : Monitor, Printer etc.
- (vi) **Memory Unit** : The Memory Unit is of two types which are primary memory and secondary memory. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently. The Primary Memory is volatile, that is, the content is lost when the power supply is switched off. The Random Access Memory (RAM) is an example of a main memory. The Secondary memory is non volatile, that is, the content is available even after the power supply is switched off. Hard disk, CD-ROM and DVD ROM are examples of secondary memory.



2. Discuss the various generations of computers.

[QY. 2018; June 2019; Mar. 2020; Sep. 2021]

Ans.	S.No	Generation	Period	Main Component used	Merits/ Demerits
	1	First Generation	1940-1956	Vacuum tubes	<ul style="list-style-type: none"> ❑ Big in size ❑ Consumed more power ❑ Malfunction due to overheat ❑ Machine Language was used
First Generation Computer - ENIAC, EDVAC, UNIVAC 1 ENIAC weighed about 27 tons, size 8 feet × 100 feet × 3 feet and consumed around 150 watts of power					
	2.	Second Generation	1956-1964	Transistors	<ul style="list-style-type: none"> ❑ Smaller compared to First Generation ❑ Generated Less Heat ❑ Consumed less power compared to first generation ❑ Punched cards were used ❑ First operating system was developed - Batch Processing and Multiprogramming Operating System ❑ Machine language as well as Assembly language was used.
Second Generation Computers - IBM 1401, IBM 1620, UNIVAC 1108					
	3.	Third Generation	1964-1971	Integrated Circuits (IC)	<ul style="list-style-type: none"> ❑ Computers were smaller, faster and more reliable ❑ Consumed less power. ❑ High Level Languages were used
Third Generation Computers - IBM 360 series, Honeywell 6000 series					

GOVERNMENT EXAM QUESTIONS AND ANSWERS

1 MARK

1. How many types of Booting process in system ?
 (a) 3 (b) 2 [QY. 2018]
 (c) 5 (d) 4 [Ans. (b) 2]
2. Which of the following is a Third generation computers?
 (a) Vacuum tubes (b) Transistor [Govt.MQP-2018]
 (c) Integrated Circuits (d) Microprocessor
 [Ans. (b) Transistor]
3. Which one of the following is Biometric Device?
 (a) Scanner (b) Fingerprint Scanner [QY. 2018]
 (c) Light Pen (d) Mouse
 [Ans. (b) Fingerprint Scanner]
4. Identify the Input device [FMT 2018]
 (a) Printer (b) Mouse
 (c) Plotter (d) Projector
 [Ans. (b) Mouse]
5. Expansion of GUI is [QY. 2018]
 (a) Graphics User Interface
 (b) Graphical User Information
 (c) Geographical User Information
 (d) Graphical User Interface
 [Ans. (d) Graphical User Interface]
6. Which generation of computer used Transistors?
 (a) First (b) Second [June 2019]
 (c) Third (d) Fourth
 [Ans. (b) Second]
7. Plotter is a _____ device. [QY. 2019]
 (a) storage (b) input
 (c) output (d) memory
 [Ans. (c) output]
8. Line printers are capable of printing much more than _____ lines per minute. [QY. 2019]
 (a) 1000 (b) 1200 (c) 1500 (d) 1300
 [Ans. (a) 1000]
9. Which Generations of computer used ULSI?
 (a) Third (b) Fourth [HY. 2018]
 (c) Fifth (d) Sixth
 [Ans. (c) Fifth]

10. Expand ULSI. [Sep. 2021]
 (a) Ultra Large Scale Information
 (b) Ultra Low Scale Integration
 (c) Ultra Low Software Integration
 (d) Ultra Large Scale Integration
 [Ans. (d) Ultra Large Scale Integration]

2 MARKS

1. Expand (i)BIOS (ii)ENIAC (iii)RAM (iv)ALU [Govt.MQP-2018]
Ans. (i) BIOS - Basic Input Output System.
 (ii) ENIAC - Electronic Numerical Integrator And Calculator.
 (iii) RAM - Random Access Memory
 (iv) ALU - Arithmetic and Logic unit
2. Give examples for Impact and Non impact printers. [FMT 2018]
Ans. **Impact:** Dot Matrix printer and line dot matrix printer.
Non - Impact: Laser printer and Inkjet printer.
3. Write short note on registers. [FMT 2018]
Ans. Registers are the high-speed temporary storage locations in the CPU. Hence, their contents can be handled much faster than the contents of memory.
4. Write Demerits of Artificial Intelligence. [QY. 2018]
Ans. (i) Machines need repairing and maintenance which need plenty of cost.
 (ii) The increasing number of machines leading to unemployment and job security issues.
5. Write notes on fifth generation computers.
Ans. (i) Parallel Processing [QY. 2019]
 (ii) Super conductors
 (iii) Computers size was drastically reduced.
 (iv) Can recognise Images and Graphics
 (v) Introduction of Artificial Intelligence and Expert Systems
 (vi) Able to solve high complex problems including decision making and logical reasoning

3 MARKS

1. Write the mechanism of laser mouse. [FMT 2018]
Ans. (i) Measures the motion and acceleration of pointer.
 (ii) Laser mouse uses laser light.
 (iii) Laser mouse is highly sensitive and able to work on any hard surface.

2. Write the sequence of steps in boot process? (or) Explain the types of booting in computer.

[Govt.MQP, FMT-2018]

Ans. Booting process is of two types.

- (i) Cold Booting (ii) Warm Booting [HY. 2019]

(i) Cold Booting: When the system starts from initial state i.e. it is switched on, we call it cold booting or Hard Booting. When the user presses the Power button, the instructions are read from the ROM to initiate the booting process.

(ii) Warm Booting: When the system restarts or when Reset button is pressed, we call it Warm Booting or Soft Booting. The system does not start from initial state and so all diagnostic tests need not be carried out in this case. There are chances of data loss and system damage as the data might not have been stored properly. Differentiate optical mouse and laser mouse.

3. Write notes on multimedia projector.

[QY. 2019]

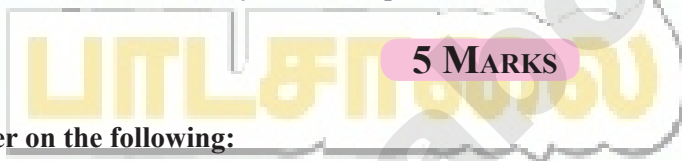
Ans. (i) Multimedia projectors are used to produce computer output on a big screen.

(ii) These are used to display presentations in meeting halls or in classrooms.

4. How Finger Print Scanner Working?

[QY. 2018]

Ans. Finger print Scanner: Fingerprint Scanners is a fingerprint recognition device used for computer security, equipped with the fingerprint recognition feature that uses biometric technology. Fingerprint Reader / Scanner is very safe and convenient device for security instead of password, that is vulnerable to fraud and is hard to remember.



1. Short answer on the following:

[QY. 2018]

- a) Data b) Hardware c) Natural Language Processing
d) Types of Memory e) Bit

Ans. (a) Data : The term data comes from the word datum, which means a raw fact. The data is a fact about people, places or some objects.

(b) Hardware : Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc.,

(c) Natural Language Processing : Natural Language Processing is a method used in artificial intelligence to process and derive meaning from the human language.

(d) Types of Memory : The memory unit is of two types - Primary memory, Secondary memory.

(e) Bit : Machine language is a collection of binary digits or bits that the computer reads and interprets.

2. Differentiate Impact Printers and Non-Impact Printers.

[QY. 2019]

Ans.	S.No	Impact Printers	Non-Impact Printers
	1.	It uses ribbons / carbon papers to leave the impressions on the paper.	It use ink cartridges and the impressions appear on the paper with the flow of ink.
	2.	The quality of printing is a draft quality.	The quality of printing is a high quality.
	3.	Striking Mechanism used to produce output.	No striking mechanism used to produce output.
	4.	Faster speeds around 250 words per second,	Slower speeds around 1 page per seconds.
	5.	Example : Dot Matrix printers and line matrix printers	Example : Laser printers and Inkjet printers.

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS.

1. Which of the following led us today to extremely high speed calculating device?

- (a) Laptop (b) Tabulating Machine
(c) Abacus (d) ENIAC

[Ans. (c) Abacus]

2. In which year the concept of the analytical engine was invented?

- (a) 1837 (b) 1910 (c) 1991 (d) 1836

[Ans. (a) 1837]

3. Which of the following period the first generation computers belongs?

- (a) 1956-1963 (b) 1940-1956
(c) 1964-1971 (d) 1980-1990

[Ans. (b) 1940-1956]

4. Which of the following is not a first generation computers?

- (a) ENIAC (b) EDVAC
(c) UNIVAC 1 (d) IBM1401

[Ans. (d) IBM1401]

5. Which component used in third generation computers?

- (a) Vacuum Tubes (b) Transistors
(c) IC (d) Microprocessor

[Ans. (c) IC]

6. In which generation, the Voice Recognition software developed?

- (a) Sixth (b) Fourth (c) Third (d) Second

[Ans. (a) Sixth]

7. Which generation gave a start to parallel computing?

- (a) fourth (b) fifth (c) sixth (d) seventh

[Ans. (c) sixth]

8. Which of the following is not a form of parallel computing?

- (a) bit level (b) instruction level
(c) task parallelism (d) Robotics

[Ans. (d) Robotics]

9. Which of the following holds the data and instructions during the processing?

- (a) Input unit (b) output unit
(c) Memory unit (d) Software

[Ans. (c) Memory unit]

10. Which unit does the processing of data?

- (a) CPU (b) Registers
(c) Input unit (d) Output unit

[Ans. (a) CPU]

11. Which of the following is the heart of the computer?

- (a) CPU (b) HDD (c) SDD (d) ANN

[Ans. (a) CPU]

12. Which of the following operations of ALU promote decision-making ability of a computer?

- (a) Logical (b) Relational
(c) Arithmetic (d) Binary

[Ans. (a) Logical]

13. Which of the following is not a non volatile memory?

- (a) ROM (b) Hard disk
(c) CD-ROM (d) RAM

[Ans. (d) RAM]

14. Who invented the computer mouse?

- (a) Douglas Engelbart (b) Bill English
(c) Apple Lisa (d) Henry Babbage

[Ans. (a) Douglas Engelbart]

15. Which device works like a xerox machine?

- (a) Retinal scanner (b) OCR
(c) OMR (d) Scanner

[Ans. (d) Scanner]

16. Which device is very safe and convenient for security instead of password?

- (a) Scanner (b) Fingerprint Scanner
(c) Track ball (d) Retinal Scanner

[Ans. (b) Fingerprint Scanner]

17. Which of the following device uses CCD Electronic chip?

- (a) OCR (b) BCR
(c) Voice Input Systems (d) Digital Camera

[Ans. (d) Digital Camera]

18. In which device the keys are arranged in a cluster?

- (a) Keyboard
- (b) Keyer
- (c) Barcode Reader
- (d) Touch Screen

[Ans. (b) Keyer]

19. Who was the inventor of the electronic digital computer?

- (a) John Vincent Atanasoft
- (b) J. Presper Eckert
- (c) John Mauchly
- (d) Charles babbage

[Ans. (a) John Vincent Atanasoft]

20. Which company developed first digital computer?

- (a) Atanasoft Berry Computer
- (b) AT & T bell
- (c) IBM
- (d) Microsoft

[Ans. (a) Atanasoft Berry Computer]

21. Which of the following are the computer systems inspired by the biological neural networks?

- (a) NLP
- (b) IBM
- (c) Robotics
- (d) ANN [Ans. (d) ANN]

22. Which of the following has become the dominant paradigm in computer architecture?

- (a) Parallel computing
- (b) parallel processing
- (c) Multi tasking
- (d) Multi processing [Ans. (a) Parallel computing]

23. Which of the following concerned with the interactions between computers and human language?

- (a) Artificial Neurons
- (b) Neural network
- (c) Artificial intelligence
- (d) Natural language processing

[Ans. (c) Artificial intelligence]

24. Which of the following is the logical machine which interprets and executes software instructions?

- (a) CPU
- (b) ALU
- (c) Control Unit
- (d) Memory Unit

[Ans. (a) CPU]

25. How many classification of memories in memory unit?

- (a) 2
- (b) 3
- (c) 4
- (d) more than 2

[Ans. (a) 2]

26. How many types of Keyboards used to input the data?

- (a) 3
- (b) 2
- (c) 4
- (d) 5

[Ans. (a) 3]

27. How many types of pointing device are there?

- (a) 2
- (b) 3
- (c) 1
- (d) Many

[Ans. (a) 2]

28. Which mouse has as many as 12 buttons?

- (a) Laser
- (b) Optical
- (c) Mechanical
- (d) Both a and b

[Ans. (a) Laser]

29. Which printer do not use striking mechanism for printer?

- (a) Inkjet
- (b) Laser
- (c) Thermal
- (d) All of these

[Ans. (d) All of these]

30. Which device is used to produce computer output on a big screen?

- (a) Monitor
- (b) LED
- (c) Projector
- (d) Monochrome Monitor

[Ans. (c) Projector]

31. Which of the following is the diagnostic testing sequence of the computer hardware?

- (a) POST
- (b) BIOS
- (c) MAR
- (d) MBR

[Ans. (a) POST]

32. Which of the following issue an error message if any computer hardware not defected?

- (a) BIOS
- (b) BUS
- (c) RAM
- (d) POST

[Ans. (a) BIOS]

33. Which device produce graphical output on papers?

- (a) Scanner
- (b) Touch Screen
- (c) Plotter
- (d) Track ball

[Ans. (c) Plotter]

34. Which code checks partition table for an active partition in a computer?

- (a) MBR
- (b) Marse
- (c) Binary
- (d) Object

[Ans. (a) MBR]

- 2. The component used in second generation computers is**
 (a) Transistors (b) ICs
 (c) Vacuum tubes (d) Microprocessors
[Ans. (a) Transistors]
- 3. The Second generation computers belongs to period**
 (a) 1940-1956 (b) 1956-1964
 (c) 1980-1990 (d) 1964-1971
[Ans. (b) 1956-1964]
- 4. The fourth generation belongs to**
 (a) 1940-1956 (b) 1971-1980
 (c) 1964-1971 (d) 1980-1990
[Ans. (b) 1971-1980]
- 5. The component used in fourth generation computers are**
 (a) ICS (b) Transistors
 (c) VLSI (d) Vacuum tube
[Ans. (c) VLSI]
- 6. Laptops, Notebook, Tablets are belongs to generation computers.**
 (a) First (b) Second (c) Third (d) Fourth
[Ans. (d) Fourth]
- 7. The fifth generation computers belongs to**
 (a) 1971-1980 (b) 1980- till date
 (c) 1964-1971 (d) 1940-1956
[Ans. (b) 1980-till date]
- 8. Name the software introduced in fifth generation computers**
 (a) Artificial Neural Networks
 (b) Artificial Intelligence
 (c) Robotics
 (d) Natural language processing
[Ans. (b) Artificial Intelligence]
- 9. Robotics developed in generation.**
 (a) Third (b) Fourth (c) Fifth (d) Sixth
[Ans. (d) Sixth]
- 10. ENIAC was invented by**
 (a) John Vincent
 (b) Cliff Berry
 (c) Presper Eckert, John Mauchly
 (d) Earl R Johnson and Atanasoff
[Ans. (c) Presper Eckert, John Mauchly]
- 11. Expand NLP**
 (a) National Language Problem
 (b) Natural Language Processing
 (c) Network Language Program
 (d) Network Local Processing
[Ans. (b) Natural Language Processing]
- 12. NLP is a component of**
 (a) Expert systems
 (b) Robotics
 (c) Parallel computing
 (d) Artificial Intelligence
[Ans. (d) Artificial Intelligence]
- 13. Every task given to a computer-follows a(n) cycle.**
 (a) BPO (b) IPO
 (c) ANN (d) NLP **[Ans. (b) IPO]**
- 14. Expansion of CPU is**
 (a) Control processing unit
 (b) Central processor unique
 (c) Central processing unit
 (d) Control processor unit
[Ans. (c) Central processing unit]
- 15. Expansion of ALU is**
 (a) Arithmetic Logical Unit
 (b) Accumulator Logical Unit
 (c) Arithmetic Language Unit
 (d) None of these
[Ans. (a) Arithmetic Logical Unit]
- 16. The memory unit is of kinds.**
 (a) 3 (b) 4 (c) 2 (d) 5
[Ans. (c) 2]
- 17. Optical Mouse invented in the year**
 (a) 1968 (b) 1973 (c) 1988 (d) 1981
[Ans. (c) 1988]
- 18. Laser mouse has as many as buttons.**
 (a) 10 (b) 11 (c) 12 (d) 3
[Ans. (c) 12]
- 19. Expansion of CCD is**
 (a) Coupled Changed Device
 (b) Changed Coupled Device
 (c) Changed Couple Device
 (d) Camera changed Divider
[Ans. (b) Changed Coupled Device]

IV. PICK THE ODD ONE OUT.

1. (a) Keyboard (b) Mouse
(c) Track Ball (d) Monitor

[Ans. (d) Monitor]

Reason : Monitor is the most commonly used output device to display the information. Other three are examples of input device.

2. (a) Mechanical Mouse (b) Laser Mouse
(c) Plotter (d) Optical Mouse

[Ans. (c) Plotter]

Reason : Plotter is an output device that is used to produce graphical output on papers other three are types of mouse.

V. WHICH ONE OF THE FOLLOWING IS NOT CORRECTLY MATCHED?

1. (a) Impact printers – Dot Matrix printer
(b) Non-Impact printers – Laser printer
(c) Hardware – Keyboard
(d) Software – CPU

[Ans. (d) Software – CPU]

2. (a) Second generation – Transistors
(b) Third generation – Integrated circuits
(c) Fourth generation – Vacuum tubes
(d) Fifth generation+ – ULSI

[Ans. (c) Fourth generation – Vacuum tubes]

VI. CONSIDER THE FOLLOWING STATEMENT.

1. **Assertion (A) :** Computers have now become an indispensable part of our lives.

Reason (R) : Computers have revolutionized our lives with their accuracy and speed of performing a job, it is truly remarkable.

- (a) Both (A) and (R) are true and (R) is the correct explanation of A.
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A)]

2. **Assertion (A) :** CPU is the major component which interprets and executes software instructions.

Reason (R) : The ALU is a part of the CPU where various computing functions are performed on data.

- (a) Both (A) and (R) are true and (R) is the correct explanation of A.
(b) Both (A) and (R) are true and (R) is not the correct explanation of A.
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (b) Both (A) and (R) are true and (R) is not the correct explanation of (A)]

3. **Assertion (A) :** Microphone serves as a voice Input device.

Reason (R) : Digital camera uses a CCD electronic chip.

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

[Ans. (b) Both (A) and (R) are true and (R) is not the correct explanation of (A)]

VII. CHOOSE THE CORRECT STATEMENT.

1. Which of the following statements are true?

- (i) Machine language programs are done in first generation
(ii) Third generation computers are not more reliable
(iii) Voice recognition software developed in fifth generation computer
(iv) Micro processors are used in fourth generation computer
(a) Only (i)
(b) Only (i) and (iv)
(c) Only (iii) and (iv)
(d) Only (i) (iii) and (iv)

[Ans. (b) Only (i) and (iv)]

VERY SHORT ANSWERS**2 MARKS****1. Name the first generation computers.****Ans.** ENIAC, EDVAC, UNIVAC 1.**2. Name the Second generation computers.****Ans.** IBM 1401, IBM 1620, UNIVAC 1108.**3. Name the Third generation computers.****Ans.** IBM 360 Series, Honeywell 6000 series.**4. Name the softwares introduced in fifth generation computers.****Ans. (i)** Artificial Intelligence
(ii) Expert Systems**5. Name the types of computer introduced in Fourth generation computers.****Ans. (i)** Microcomputer
(ii) Portal Computers.**6. Write the developments of Sixth generation computers.****Ans. (i)** Parallel Computing
(ii) Artificial Neural Networks
(iii) Robotics
(iv) Natural Language Processing**7. What is NLP?****Ans.** Natural Language Processing is the ability of a computer program to understand human language. It is a component of artificial intelligence.**8. What is the use of Microphone?****Ans.** Microphone serves as a voice Input device. It captures the voice data and send it to the Computer.**9. Write a note on Digital Camera.****Ans.** It captures images / videos directly in the digital form. It uses a CCD (Charge Coupled Device) electronic chip. When light falls on the chip through the lens, it converts light rays into digital format.**10. What is use of VGA?****Ans.** The screen monitor works with the VGA (Video Graphics Array). The video graphics card helps the keyboard to communicate with the screen. It acts as an interface between the computer and display monitor. Usually the recent motherboard incorporates built in video card.**11. Write the two main categories of Printer.****Ans.** Printers are divided into two main categories:

- (i)** Impact Printers
- (ii)** Non Impact printers

12. What is booting a computer?**Ans.** Booting a computer is to load an operating system into the computer's main memory or random access memory (RAM).**13. What makes Charles Babbage the father of computing?****Ans.** Charles Babbage radical ideas and concept of the Analytical Engine (It contained an ALU, basic flow control and integrated memory) makes him the father of computing.**14. What is the goal of neural network approach?****Ans.** The original goal of the neural network approach was to solve problems in the same way that a human brain would. Over time, attention focused on matching specific mental abilities, leading to deviations from biology.**15. Write the tools in which nano technology was born.****Ans.** The right tools, such as the scanning tunneling microscope (STM) and the atomic force microscope (AFM), the age of nano-technology was born.**16. Define IPO Cycle.****Ans.** The functional components of a computer performs. Every task given to a computer follows an Input-Process- Output Cycle (IPO cycle).**17. Name the different keys available in the keyboard.****Ans.** There are different set of keys available in the keyboard such as character keys, modifier keys, system and GUI keys, enter and editing keys, function keys, navigation keys, numeric keypad and lock keys.**18. Which device is used to draw a lines?****Ans.** Light Pen is an input device which is used to draw lines or figures on a computer screen. It is touched to the CRT screen where it can detect faster on the screen as it passes.

CHAPTER 2

NUMBER SYSTEMS

CHAPTER SNAPSHOT

Part I - Number Systems

- * 2.1 Number Systems - Introduction
- * 2.2 Data Representations
- * 2.3 Different Types of Number Systems
 - 2.3.1 Decimal Number System
 - 2.3.2 Binary Number System
 - 2.3.3 Octal Number System
 - 2.3.4 Hexadecimal Number System
- * 2.4 Number System Conversions
 - 2.4.1 Decimal to Binary Conversion
 - 2.4.2 Decimal to Octal Conversion
 - 2.4.3 Decimal to Hexadecimal Conversion
 - 2.4.4 Conversion of fractional Decimal to Binary
 - 2.4.5 Binary to Decimal Conversion
 - 2.4.6 Binary to Octal Conversion
 - 2.4.7. Binary to Hexadecimal Conversion
 - 2.4.8 Conversion of fractional Binary to Decimal equivalent
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 - 2.4.10 Octal to Binary Conversion
 - 2.4.11 Hexadecimal to Decimal Conversion
 - 2.4.12 Hexadecimal to Binary Conversion
- * 2.5 Binary Representation for Signed Numbers
 - 2.5.1 Signed Magnitude representation
 - 2.5.2 1's Complement representation
 - 2.5.3 2's Complement representation
- * 2.6 Binary Arithmetic
 - 2.6.1 Binary Addition
 - 2.6.2 Binary Subtraction

- * 2.7 Representing Characters in Memory
 - 2.7.1 Binary Coded Decimal (BCD)
 - 2.7.2 American Standard Code for Information Interchange (ASCII)
 - 2.7.3 Extended Binary Coded Decimal Interchange Code (EBCDIC)
 - 2.7.4 Indian Standard Code for Information Interchange (ISCII)
 - 2.7.5 Unicode

Part II - Boolean Algebra

- * 2.8. Boolean Algebra - Introduction
 - 2.8.1 Binary valued quantities
 - 2.8.2 Logical Operations
 - 2.8.3 Truth Table
 - 2.8.4 AND operator
 - 2.8.5 OR operator
 - 2.8.6 NOT operator
 - 2.8.7 NAND operator
 - 2.8.8 NOR operator
- * 2.9. Basic Logic Gates
 - 2.9.1 AND Gate
 - 2.9.2 OR Gate
 - 2.9.3 NOT Gate
 - 2.9.4 NOR Gate
 - 2.9.5 Bubbled AND Gate
 - 2.9.6 NAND Gate
 - 2.9.7 Bubbled OR Gate
 - 2.9.8 XOR Gate
 - 2.9.9 XNOR Gate

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER:

1. Which refers to the number of bits processed by a computer's CPU?

- (a) Byte (b) Nibble
(c) Word length (d) Bit

[Ans. (c) Word length]

2. How many bytes does 1 KiloByte contain?

- (a) 1000 (b) 8
(c) 4 (d) 1024 [Ans. (d) 1024]

3. Expansion for ASCII

- (a) American School Code for Information Interchange
(b) American Standard Code for Information Interchange
(c) All Standard Code for Information Interchange
(d) American Society Code for Information Interchange

[Ans. (b) American Standard Code for Information Interchange]

4. 2^{50} is referred as

- (a) Kilo (b) Tera
(c) Peta (d) Zetta

[Ans. (c) Peta]

5. How many characters can be handled in Binary Coded Decimal System?

- (a) 64 (b) 255
(c) 256 (d) 128 [Ans. (a) 64]

6. For 1101_2 the equivalent Hexadecimal equivalent is?

- (a) F (b) E
(c) D (d) B [Ans. (c) D]

7. What is the 1's complement of 00100110?

- (a) 00100110 (b) 11011001
(c) 11010001 (d) 00101001

[Ans. (b) 11011001]

8. Which amongst this is not an Octal number?

- (A) 645 (B) 234 (C) 876 (D) 123
[Sep. 2020]

[Ans. (c) 876]

SECTION - B

VERY SHORT ANSWERS

1. What is data?

Ans. The term data comes from the word datum, which means a raw fact. The data is a fact about people, places or some objects.

2. Write the 1's complement procedure.

Ans. **Step 1:** Convert given Decimal number into Binary

Step 2: Check if the binary number contains 8 bits, if less add 0 at the left most bit, to make it as 8 bits.

Step 3: Invert all bits (i.e. Change 1 as 0 and 0 as 1).

3. Convert $(46)_{10}$ into Binary number.

2	46	
2	23	- 0
2	11	- 1
2	5	- 1
2	2	- 1
Ans. 2	1	- 0

Answer - $46_{10} = (101110)_2$

4. We cannot find 1's complement for $(28)_{10}$. State reason. [QY. 2019]

Ans. $(28)_{10}$ is positive number. 1's Complement represent signed numbers (Negative numbers) only. So, $(28)_{10}$ cannot find 1's complement.

5. List the encoding systems that represents characters in memory. [FMT 2018]

- Ans. (i) BCD – Binary Coded Decimal.
(ii) EBCDIC – Extended Binary Coded Decimal Interchange Code.
(iii) ASCII – American Standard Code for Information Interchange.
(iv) Unicode.
(v) ISCII - Indian Standard Code for Information Interchange.

SECTION - D

EXPLAIN IN DETAIL

1. a) Write the procedure to convert fractional Decimal to Binary
- b) Convert $(98.46)_{10}$ to Binary

[FMT 2018 ; Sep.2020]

Ans. a) The method of repeated multiplication by 2 has to be used to convert such kind of decimal fractions. The steps involved in the method of repeated multiplication by 2:

Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

b) 98.46_{10}

1. Integer part

$$\begin{array}{r}
 2 \overline{) 98} \\
 \underline{2 \quad 49 \quad -0} \\
 2 \quad 24 \quad -1 \\
 \underline{2 \quad 12 \quad -0} \\
 2 \quad 6 \quad -0 \\
 \underline{2 \quad 3 \quad -0} \\
 1 \quad -1
 \end{array}$$

2. Fractional part

$0.46 \times 2 = 0.92 = 0$

$0.92 \times 2 = 1.84 = 1$

$0.84 \times 2 = 1.68 = 1$

$0.68 \times 2 = 1.36 = 1$

$0.36 \times 2 = 0.72 = 0$

$0.72 \times 2 = 1.44 = 1$

$98.46_{10} = (1100010.011101\dots)_2$

2. Find 1's Complement and 2's Complement for the following Decimal number. a) -98 b) -135

Ans. a) -98

$$\begin{array}{r}
 2 \overline{) 98} \\
 \underline{2 \quad 49 \quad -0} \\
 2 \quad 24 \quad -1 \\
 \underline{2 \quad 12 \quad -0} \\
 2 \quad 6 \quad -0 \\
 \underline{2 \quad 3 \quad -0} \\
 1 \quad -1
 \end{array}$$

$98_{10} = 1100010$

8 bit format of $98_{10} = 01100010$

1's complement = 10011101

Add 1 bit = +1

2's complement = 10011110

b) -135

$$\begin{array}{r}
 2 \overline{) 135} \\
 \underline{2 \quad 67 \quad -1} \\
 2 \quad 33 \quad -1 \\
 \underline{2 \quad 16 \quad -1} \\
 2 \quad 8 \quad -0 \\
 \underline{2 \quad 4 \quad -0} \\
 2 \quad 2 \quad -0 \\
 1 \quad -0
 \end{array}$$

$135_{10} = 10000111$

1's complement = 01111000

Add 1 bit = +1

2's complement = 01111001

3. a) Add $1101010_2 + 101101_2$ [Sep. 2020]

b) Subtract $1101011_2 - 111010_2$

Ans. a) $1101010_2 + 101101_2$

$$\begin{array}{r}
 1101010 \\
 +101101 \\
 \hline
 10010111 \\
 = 10010111_2
 \end{array}$$

- b) $1101011_2 - 111010_2$ [HF. 2018]

$$\begin{array}{r}
 1101011 \\
 -111010 \\
 \hline
 110001 \\
 = 110001_2
 \end{array}$$

WORKSHOP

1. Identify the number system for the following numbers.

Ans.	S.No	NUMBER	NUMBER SYSTEM
	1.	$(1010)_{10}$	Decimal Number system
	2.	$(1010)_2$	Binary Number System
	3.	$(989)_{16}$	Hexadecimal Number System
	4.	$(750)_8$	Octal Number System
	5.	$(926)_{10}$	Decimal Number System

2. State whether the following numbers are valid or not. If invalid, give reason.

Ans.	S.No	STATEMENT	YES / NO	REASON (IF INVALID)
	1.	786 is an Octal number	No	In. octal number, the allowable digits is between 0 and 7
	2.	101 is a Binary number	No	No Radix is mentioned
	3.	Radix of Octal number is 7	No	Radix of octal number is 8

3. Convert the following Decimal numbers to its equivalent Binary, Octal, Hexadecimal.

1) 1920 2) 255 3) 126

Ans. 1) $1920_{10} = ?_2$

$$\begin{array}{r}
 2 \overline{) 1920} \\
 \underline{2 960} - 0 \\
 2 \underline{480} - 0 \\
 2 \underline{240} - 0 \\
 2 \underline{120} - 0 \\
 2 \underline{60} - 0 \\
 2 \underline{30} - 0 \\
 2 \underline{15} - 0 \\
 2 \underline{7} - 1 \\
 2 \underline{3} - 1 \\
 1 - 1 \\
 \hline
 1920_{10} = 1111000000_2
 \end{array}$$

$$1920_{10} = ?_8$$

$$\begin{array}{r}
 8 \overline{) 1920} \\
 \underline{8 240} - 0 \\
 8 \underline{30} - 0 \\
 3 - 6
 \end{array}$$

$$1920 = 3600_8$$

[Mar. 2019]

$$\begin{array}{r}
 16 \overline{) 1920} \\
 \underline{16 120} - 0 \\
 7 - 8
 \end{array}$$

$$= 1920_{10} = 780_{16}$$

2) 255_{10}

[Mar. 2019]

$$\begin{array}{r}
 2 \overline{) 255} \\
 \underline{2 127} - 1 \\
 2 \underline{63} - 1 \\
 2 \underline{31} - 1 \\
 2 \underline{15} - 1 \\
 2 \underline{7} - 1 \\
 2 \underline{3} - 1 \\
 2 \underline{1} - 1
 \end{array}$$

$$255_{10} = 11111111_2$$

$$255_{10} = ?_8$$

$$\begin{array}{r}
 8 \overline{) 255} \\
 \underline{8 31} - 7 \\
 3 - 7
 \end{array}$$

$$255_{10} = 377_8$$

$$255_{10} = ?_{16}$$

$$\begin{array}{r}
 16 \overline{) 255} \\
 \underline{16 15} - 15
 \end{array}
 \quad \boxed{15 - F}$$

$$255_{10} = FF_{16}$$

3) 126_{10}

$$\begin{array}{r} 2 \overline{) 126} \\ \underline{63} \quad -0 \\ 2 \overline{) 31} \quad -1 \\ \underline{15} \quad -1 \\ 2 \overline{) 7} \quad -1 \\ \underline{3} \quad -1 \\ 1 \quad -1 \end{array}$$

$126_{10} = 1111110_2$

$$\begin{array}{r} 8 \overline{) 126} \\ \underline{15} \quad -6 \\ 1 \quad -7 \end{array}$$

$126_{10} = 176_8$

$126_{10} = ?_{16}$

$$\begin{array}{r} 16 \overline{) 126} \\ \underline{7} \quad -14 \\ \underline{14} \quad -E \end{array}$$

$126_{10} = 7E_{16}$

4. Convert the given Binary number into its equivalent Decimal, Octal and Hexadecimal number.

1) 101110101 2) 1011010 3) 101011111

Ans. 1) 101110101

Decimal Equivalent :

$$= 1 \times 2^8 + 0 \times 2^7 + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

$$= 256 + 64 + 32 + 16 + 4 + 1 = 373_{10}$$

Octal Equivalent :

$$= \begin{array}{ccc} \overline{101} & \overline{110} & \overline{101} \\ \downarrow & \downarrow & \downarrow \\ 5 & 6 & 5 \end{array}$$

$$= 565_8$$

Hexadecimal Equivalent :

$$= \begin{array}{ccc} \overline{10} & \overline{1110} & \overline{101} \\ \downarrow & \downarrow & \downarrow \\ 1 & 7 & 5 \end{array}$$

$$= 175_{16} ; 101110101_2 = 373_{10} = 565_8 = 175_{16}$$

2) 1011010_2

Decimal Equivalent :

$$= 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$

$$= 64 + 16 + 8 + 2 = 90_{10}$$

Octal Equivalent :

$$= \begin{array}{ccc} \overline{10} & \overline{110} & \overline{110} \\ \downarrow & \downarrow & \downarrow \\ 1 & 3 & 2 \end{array}$$

$$= 132_8$$

Hexadecimal Equivalent :

$$= \begin{array}{cc} \overline{101} & \overline{1010} \\ \downarrow & \downarrow \\ 5 & 10 \\ \downarrow & \downarrow \\ 5 & A \end{array}$$

$$= 5A_{16}$$

$$1011010_2 = 90_{10} = 132_8 = 5A_{16}$$

3) 101011111

Decimal Equivalent :

$$= 1 \times 2^8 + 0 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$$

$$= 256 + 64 + 16 + 8 + 4 + 2 + 1 = 351_{10}$$

Octal Equivalent :

$$= \begin{array}{ccc} \overline{101} & \overline{011} & \overline{111} \\ \downarrow & \downarrow & \downarrow \\ 5 & 3 & 7 \end{array}$$

$$= 537_8$$

Hexadecimal Equivalent :

$$= \begin{array}{ccc} \overline{10} & \overline{101} & \overline{1111} \\ \downarrow & \downarrow & \downarrow \\ 1 & 5 & 15 \\ \downarrow & \downarrow & \downarrow \\ 1 & 5 & F \end{array}$$

$$= 15F_{16}$$

$$101011111_2 = 351_{10} = 537_8 = 15F_{16}$$

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWER 1 MARK

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS.

1. How the information entered in a computer?
(a) Knowledge (b) data
(c) ASCII Value (d) BCD [Ans. (b) data]
2. Which establishment done convention using groups of 8 bits as a basic unit of storage medium?
(a) Apple (b) Microsoft
(c) IBM (d) DELL [Ans. (c) IBM]
3. Who coined the term byte?
(a) Charles Babbage (b) John von newmann
(c) Werner Buchholz (d) Herman Hollerith
[Ans. (c) Werner Buchholz]
4. How many standard number system are there to use?
(a) 2 (b) 4 (c) 8 (d) 16
[Ans. (b), 4]
5. Which of the following is not a standard number system?
(a) Pentagon (b) Hexadecimal
(c) Decimal (d) Binary
[Ans. (a) Pentagon]
6. What are the two symbols used in Binary number system?
(a) 0, 1 (b) +, -
(c) 2, 4 (d) $2^0, 2^1$ [Ans. (a) 0, 1]
7. How many parameters can be considered to know the magnitude of the number?
(a) 2 (b) 4 (c) 3 (d) 5
[Ans. (c) 3]
8. Which is used to measure the number of bits in each word?
(a) Word length (b) length
(c) Size (d) word size
[Ans. (a) Word length]
9. How many ways are there to represent signed binary number?
(a) 2 (b) 4 (c) 1 (d) 6
[Ans. (c) 1]
10. In binary numbers, the signed negative number has a prefix?
(a) - (b) 0 (c) 1 (d) 2
[Ans. (c) 1]

11. How many unique symbols in Octal number system?
(a) 4 (b) 16 (c) 2 (d) 8
[Ans. (d) 8]
12. How many procedures are there to convert from decimal to binary?
(a) 2 (b) 4 (c) 8 (d) 3
[Ans. (a) 2]
13. How many common coding schemes are used to represent a character?
(a) 2 (b) 3 (c) 4 (d) 5
[Ans. (c) 4]
14. How many coding schemes are used to represent character in India?
(a) 2 (b) 3 (c) 4 (d) 5
[Ans. (a) 2]
15. Which complement performs the logical negation on each individual bit?
(a) Signed (b) Unsigned
(c) 2's (d) 1's
[Ans. (b) Unsigned]
16. Which of the following is not a common coding schemes to represent a character?
(a) BCD (b) Unicode
(c) ASCII Code (d) Byte code
[Ans. (d) Byte code]
17. Which of the following programs uses ASCII code?
(a) only C (b) only C++
(c) both C, C++ (d) Java
[Ans. (c) both C, C++]
18. Which of the programs used Unicode?
(a) C (b) C++
(c) Java (d) None of these
[Ans. (c) Java]
19. Which of the following is the idea behind positional numbering systems?
(a) Absolute Value (b) Place Volume
(c) Radix (d) All of these
[Ans. (c) Radix]
20. Which is an elementary building block of the digital circuit?
(a) Gate (b) Digital gate
(c) Logic gate (d) Physical gate
[Ans. (c) Logic gate]

21. Which one of the following are fundamental logic gates?

- (a) NAND, NOR, NOT (b) AND, OR, NOT
(c) NAND, XOR, XNOR (d) AND, XOR, NOT

[Ans. (b) AND, OR, NOT]

22. Which one of the following are called universal gates?

- (a) AND, OR, NOT (b) XOR AND XNOR
(c) NAND and NOR (d) NAND and AND

[Ans. (c) NAND and NOR]

23. Which digit is not allowed in hexadecimal number system?

- (a) G (b) B (c) E (d) D

[Ans. (a) G]

24. Which coding scheme is used to LCD?

- (a) Unicode (b) ASCII
(c) EBCDIC (d) BCD [Ans. (d) BCD]

25. How many parameters are considered to find the magnitude of a number?

- (a) 3 (b) 4 (c) 2 (d) 5

[Ans. (a) 3]

II. MATCH LIST I WITH LIST II AND SELECT THE CORRECT ANSWER USING THE CODES GIVEN BELOW.

	List I		List II
(i)	Binary Number System	1	Base 16
(ii)	Hexa Decimal Number System	2	Base 8
(iii)	Decimal Number System	3	Base 2
(iv)	Octal Number System	4	Base 10

Codes:

- | | | | |
|-------|------|-------|------|
| (i) | (ii) | (iii) | (iv) |
| (a) 4 | 1 | 3 | 2 |
| (b) 1 | 3 | 2 | 4 |
| (c) 3 | 1 | 4 | 2 |
| (d) 4 | 3 | 1 | 2 |

[Ans. (c) (i)-3, (ii)-1, (iii)-4, (iv)-2]

	List I		List II
(i)	0 to 9 , A o F	1	Binary
(ii)	0, 1	2	Hexadecimal
(iii)	0 to 9	3	Octal
(iv)	0 to 7	4	Decimal

Codes:

- | | | | |
|-------|------|-------|------|
| (i) | (ii) | (iii) | (iv) |
| (a) 4 | 1 | 3 | 2 |
| (b) 1 | 3 | 2 | 4 |
| (c) 3 | 4 | 1 | 2 |
| (d) 4 | 3 | 1 | 2 |

[Ans. (c) (i)-3, (ii)-4, (iii)-1, (iv)-2]

III. CHOOSE THE CORRECT OPTION AND FILL IN THE BLANKS.

1. Data means

- (a) a set of values (b) a set of information
(c) a set of records (d) a set of files

[Ans. (a) a set of values]

2. The singular form of data is

- (a) Record (b) File
(c) Datum (d) Values

[Ans. (c) Datum]

3. "75% of Men likes cricket" is

- (a) Information (b) data
(c) knowledge (d) Record

[Ans. (c) knowledge]

4. The processed data is called

- (a) Information (b) Knowledge
(c) datum (d) files

[Ans. (a) Information]

5. In a computer, a data is converted into

- (a) ASCII form (b) BCD form
(c) Binary form (d) Octal form

[Ans. (c) Binary form]

6. The most basic unit of information in a digital computer is called a

- (a) word (b) data
(c) nibble (d) bit [Ans. (d) bit]

7. Expansion of BIT is

- (a) BASIC DIGITS (b) BINARY DIGIT
(c) BINARY INFORMATION TECHNOLOGY
(d) BASE DIGIT [Ans. (b) BINARY DIGIT]

CHAPTER 3 COMPUTER ORGANIZATION

CHAPTER SNAPSHOT

- * 3.1. Introduction
- * 3.2. Basics of Microprocessors
- * 3.3. Data Communication between CPU and memory
- * 3.4. Types of Microprocessors
 - 3.4.1. Classification of Microprocessors Based on the Data Width
 - 3.4.2. Classification of Microprocessors Based on Instruction set
- * 3.5. Memory Devices
 - 3.5.1. Random Access Memory(RAM)
 - 3.5.2. Types of RAM
 - 3.5.3. Read Only Memory (ROM)
 - 3.5.4. Cache Memory
- * 3.6. Secondary Storage Devices
 - 3.6.1. Hard Disks
 - 3.6.2. Compact Disc (CD)
 - 3.6.3. Digital Versatile Disc (DVD)
 - 3.6.4. Flash Memory Devices
 - 3.6.5. Blu-Ray Disc
- * 3.7. Ports and Interfaces

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER

1. Which of the following is said to be the brain of a computer?

- (a) Input devices (b) Output devices
(c) Memory device (d) Microprocessor

[Ans. (d) Microprocessor]

2. Which of the following is not the part of a microprocessor unit?

- (a) ALU (b) Control unit
(c) Cache memory (d) register

[Ans. (c) Cache memory]

3. How many bits constitute a word?

- (a) 8 (b) 16 (c) 32
(d) determined by the processor used.

[Ans. (d) determined by the processor used]

4. Which of the following device identifies the location when address is placed in the memory address register?

- (a) locator (b) encoder
(c) decoder (d) multiplexer

[Ans. (c) decoder]

5. Which of the following is a CISC processor?

- (a) Intel P6 (b) AMD K6
(c) Pentium III (d) Pentium IV

[Ans. (c) Pentium III]

6. Which is the fastest memory? [FMT 2018]

- (a) Hard disk (b) Main memory
(c) Cache memory (d) Blue-Ray disc

[Ans. (c) Cache memory]

7. How many memory locations are identified by a processor with 8 bits address bus at a time?

- (a) 28 (b) 1024
(c) 256 (d) 8000

[Ans. (c) 256]

8. What is the capacity of 12cm diameter DVD with single sided and single layer?

- (a) 4.7 GB (b) 5.5 GB
(c) 7.8 GB (d) 2.2 GB

[Ans. (a) 4.7 GB]

9. What is the smallest size of data represented in a CD?

- (a) blocks (b) sectors
(c) pits (d) tracks [Ans. (c) pits]

10. Display devices are connected to the computer through

- (a) USB port
(b) Ps/2 port
(c) SCSI port
(d) VGA connector [Ans. (d) VGA connector]

SECTION - B

VERY SHORT ANSWERS

1. What are the parameters which influence the characteristics of a microprocessor?

Ans. A Microprocessor's performance depends on the following characteristics:

- (i) Clock speed
(ii) Instruction set
(iii) Word size

2. What is an instruction?

Ans. A command which is given to a computer to perform an operation on data is called an instruction.

3. What is a program counter? [Mar. 2019]

Ans. The Program Counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.

4. What is HDMI? [FMT 2018; HY. 2019; Sep. 2020]

Ans. High-Definition Multimedia Interface is an audio/video interface which transfers the uncompressed video and audio data from a video controller, to a compatible computer monitor, LCD projector, digital television etc.

5. Which source is used to erase the content of a EPROM?

Ans. Ultra-violet-rays is used to erase the content of a EPROM.

SECTION - C

SHORT ANSWERS

1. Differentiate Computer Organization from Computer Architecture.

Ans. (i) Computer Organization deals with the hardware components that are transparent to the programmer.

(ii) Computer architecture deals with the engineering considerations involved in designing a computer.

2. Classify the microprocessor based on the size of the data.

Ans. Microprocessors can process instructions. The microprocessors can be classified as follows based on the size of the data.

(i) 8-bit microprocessor

(ii) 16-bit microprocessor

(iii) 32-bit microprocessor

(iv) 64-bit microprocessor

3. Write down the classifications of microprocessors based on the instruction set.

Ans. The two types of microprocessors which are based on their instruction sets.

(i) Reduced Instruction Set Computers (RISC)

(ii) Complex Instruction Set Computers (CISC)

4. Differentiate PROM and EPROM.

	PROM	EPROM
(i)	Programmable Read only memory.	Erasable Programmable Read only memory.
(ii)	It is also a non-volatile memory on which data can be written only once.	It is also a non-volatile memory and a special type of memory.
(iii)	PROM burner is used to write data to a PROM chip.	EPROM serves as a PROM, but the content can be erased using ultraviolet rays

5. Write down the interfaces and ports available in a computer. [HY. 2019; Sep. 2020]

Ans. (i) Serial Port

(ii) Parallel Port

(iii) USB 3.0

(iv) VGA Connector

(v) Audio Plugs

(vi) PS/2 Port

(vii) SCSI Port

(viii) High Definition Multimedia Interface(HDMI).

6. Differentiate CD and DVD. [FMT 2018; June 2019; Mar. 2020]

	CD	DVD
(i)	Expansion is Compact-Disk	Expansion is Digital Versatile Disc.
(ii)	A standard CD can store about 700 MB of Data.	A standard DVD can hold 4.7 GB of data.
(iii)	CD players cannot play DVDs.	DVD players can play CDs.
(iv)	It stores upto 80 min of audio.	It can range from 4.7 GB to 17.08 GB.

7. How will you differentiate a flash memory and an EEPROM?

Ans. Flash memory devices:

(i) Flash memory is an electronic (solid-state) non-volatile computer storage medium that can be electrically erased and reprogrammed.

(ii) Flash memories can be used in personal computers, Personal Digital Assistants (PDA), digital audio players, digital cameras and mobile phones.

(iii) Flash memory offers fast access times. The time taken to read or write a character in memory is called access time.

(iv) Examples for Flash memories are pen drives, memory cards etc.

EEPROM:

(i) Electrically Erasable Programmable Read Only Memory can be erased by exposing it to an electrical charge.

(ii) EEPROM is non-volatile.

(iii) EEPROM is slower in performance.

SECTION - D

EXPLAIN IN DETAIL

1. Explain the characteristics of a microprocessor.

[FMT; HY. 2018; June 2019; HY. 2019]

Ans. A Microprocessor's performance depends on the following characteristics:

- (i) Clock speed
- (ii) Instruction set
- (iii) Word size
- (i) **Clock Speed** [Govt.MQP-2018; QY. 2019]

Every microprocessor has an internal clock that regulates the speed at which it executes instructions. The speed at which the microprocessor executes instructions is called clock speed. Clock speed is measured in MHz (Mega Hertz) or in GHz (Giga Hertz).

- (ii) **Instruction set :** A command which is given to a computer to perform an operation on data is called an instruction. Basic set of machine level instructions that a microprocessor is designed to execute is called as an instruction set. This instruction set carries out the following types of operations:
 1. Data transfer
 2. Arithmetic operations
 3. Logical operations
 4. Control flow
 5. Input/output.

- (iii) **Word Size :** [Govt.MQP-2018]

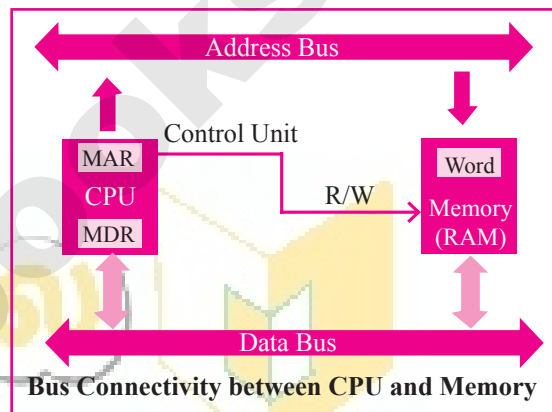
The number of bits that can be processed by a processor in a single instruction is called its word size. Word size determines the amount of RAM that can be accessed by a microprocessor at one time and the total number of pins on the microprocessor. Total number of input and output pins in turn determines the architecture of the microprocessor.

2. How the read and write operations are performed by a processor? Explain.

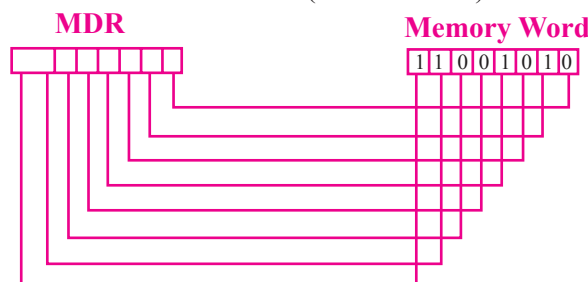
Ans. (i) The Central Processing Unit(CPU) has a Memory Data Register (MDR) and a Memory Address Register (MAR).

- (ii) The Memory Data Register (MDR) keeps the data which is transferred between the Memory and the CPU. The Program Counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.

- (iii) A bus is a collection of wires used for communication between the internal components of a computer.
- (iv) The address bus is used to point a memory location. A decoder, a digital circuit is used to point to the specific memory location where the word can be located.
- (v) The read operation fetches data from memory and transfers to MDR. A single control line performs two operations like read write using 1 or 0.
- (vi) Also, the write operation transfers data from the MDR to memory.



- (vii) The word in the RAM has the same size (no. of bits) as the Memory Data Register (MDR).
- (viii) The data bus has eight parallel wires to transfer data either from MDR to word or word to MDR based on the control(Read or write).



Before the read operation

- (ix) This control line is labeled as R/W, which becomes 1 means READ operation and 0 means WRITE operation. The content of MDR and the Word before the READ operation. Also figure shows the content of MDR and the Word after the READ operation.

LONG ANSWERS

5 MARKS

1. Explain the classification of Microprocessor based on Instruction set?

Ans. (i) The size of the instruction set is another important consideration while categorizing microprocessors. Initially, microprocessors had very small instruction sets because complex hardware was expensive as well as difficult to build.

(ii) As technology had developed to overcome these issues, more and more complex instructions were added to increase the functionality of microprocessors.

(iii) Reduced Instruction Set Computers (RISC): RISC stands for Reduced Instruction Set Computers. They have a small set of highly optimized instructions. Complex instructions are also implemented using simple instructions thus reducing the size of the instruction set.

Examples of RISC processors are Pentium IV, Intel P6, AMD K6 and K7.

(iv) Complex Instruction Set Computers (CISC): CISC stands for Complex Instruction Set Computers. They support hundreds of instructions. Computers supporting CISC can accomplish a wide variety of tasks, making them ideal for personal computers.

Examples of CISC processors are Intel 386 & 486, Pentium, Pentium II and III, and Motorola 68000.

2. Define the following.

- (i) Bus (ii) Data bus**
(iii) Address bus (iv) Control Bus

Ans. (i) Bus : A bus is a collection of wires used for communication between the internal components of a computer.

(ii) Data bus : Data bus is a collection of wires to carry data in bits. A data bus is used to transfer data between the memory and the CPU. The data bus is bidirectional.

(iii) Address bus : Address bus is a collection of wires to carry data in bits. The address bus is used to point a memory location. The address bus is unidirectional.

(iv) Control bus : Control bus is a control line, collection of wires to control the operation functions. The control bus controls both read and write operations.

3. Explain any two secondary storage devices.

Ans. Hard disk :

(i) Hard disk is a magnetic disk on which you can store data. The hard disk has the stacked arrangement of disks accessed by a pair of heads for each of the disks.

(ii) The hard disks come with a single or double sided disk.

Compact Disk (CD) :

(i) A CD or CD-ROM is made from 1.2 millimeters thick, polycarbonate plastic material. A thin layer of aluminum or gold is applied to the surface.

(ii) CD data is represented as tiny indentations known as "pits", encoded in a spiral track moulded into the top of the polycarbonate layer. The areas between pits are known as "lands".

(iii) A motor within the CD player rotates the disk. The capacity of an ordinary CD- ROM is 700MB.



CHAPTER

4

THEORETICAL CONCEPTS OF OPERATING SYSTEM

CHAPTER SNAPSHOT

- * 4.1. Introduction to Software
 - 4.1.1. Types of Software
- * 4.2. Introduction to Operating System (OS)
- * 4.3. Types of Operating System
 - 4.3.1. Single User Operating Systems
 - 4.3.2. Multi-user Operating Systems
- * 4.4. Key features of the Operating System
 - 4.4.1. User Interface (UI)
 - 4.4.2. Memory Management
 - 4.4.3. Process Management
 - 4.4.4. Security Management
 - 4.4.5. Fault Tolerance
 - 4.4.6. File Management
 - 4.4.7. Multi-Processing
 - 4.4.8. Time-sharing
 - 4.4.9. Distributed Operating Systems
- * 4.5. Prominent Operating Systems

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER

1. Operating system is a
 - (a) Application Software (b) Hardware
 - (c) System Software (d) Component

[Ans. (c) System Software]
2. Identify the usage of Operating Systems
 - (a) Easy interaction between the human and computer
 - (b) Controlling Input & Output Devices
 - (c) Managing use of main memory
 - (d) All the above

[Ans. (d) All the above]
3. Which of the following is not a function of an Operating System?
 - (a) Process Management
 - (b) Memory Management
 - (c) Security management
 - (d) Compiler Environment

[Ans. (d) Compiler Environment]
4. Which of the following OS is a Commercially licensed Operating system?
 - (a) Windows (b) UBUNTU
 - (c) FEDORA (d) REDHAT

[Ans. (a) Windows]
5. Which of the following Operating systems support Mobile Devices?
 - (a) Windows 7 (b) Linux
 - (c) BOSS (d) iOS

[Ans. (d) iOS]
6. File Management manages
 - (a) Files (b) Folders
 - (c) Directory systems (d) All the Above

[Ans. (d) All the Above]
7. Interactive Operating System provides
 - (a) Graphics User Interface (GUI)
 - (b) Data Distribution
 - (c) Security Management
 - (d) Real Time Processing

[Ans. (a) Graphics User Interface (GUI)]

8. An example for single task operating system is

- (a) Linux (b) Windows
(c) MS-DOS (d) Unix

[Ans. (c) MS-DOS]

9. The File management system used by Linux is

- (a) ext2 (b) NTFS (c) FAT (d) NFTS

[Ans. (a) ext2]

SECTION - B

VERY SHORT ANSWERS

1. List out any two uses of Operating System.

Ans. (i) To ensure that a computer can be used to extract what the user wants it do.

(ii) Easy interaction between the users and computers.

2. What is multi-user Operating system?

Ans. Multi-user Operating Systems : [Mar. 2019]

(i) It is used in computers and laptops that allow same data and applications to be accessed by multiple users at the same time.

(ii) The users can also communicate with each other. Windows, Linux and UNIX are examples for multi-user Operating System.

3. What is a GUI? [Govt.MQP-2018; June 2019]

Ans. The GUI is a window based system with a pointing device to direct I/O, choose from menus, make selections and a keyboard to enter text. Its vibrant colours attract the user very easily.

4. What are the security management features available in Operating System?

[HY. 2018; Sep. 2020]

Ans. The Operating System provides three levels of securities to the user end. They are

(i) File access level

(ii) System level

(iii) Network level.

5. What is multi-processing?

Ans. Multi-processing is a one of the features of Operating System. It has two or more processors for a single running process (job). Processing takes place in parallel is known as parallel processing.

6. What are the different Operating Systems used in computer? [Sep. 2021]

Ans. The different types of operating system used in the computer:

(i) Single User and Single Task Operating Systems

(ii) Multi User Operating Systems

(iii) Multi Processing Operating Systems

(iv) Distributed Operating Systems

(v) Prominent Operating Systems

SECTION - C

SHORT ANSWERS

1. What are the advantages and disadvantages of Time-sharing features? [QY. 2018]

Time - Sharing Operating System	
Advantages	Disadvantages
Provides the advantage of quick response.	Problem of reliability.
Avoids duplication of software.	Question of security and integrity of uses programs and data.
Reduces CPU idle time.	Problem of data communication.

2. List out the key features of Operating system

Ans. The various key features are given below

(i) User Interface

(ii) File Management

(iii) Memory Management

(iv) Fault Tolerance

(v) Process Management

(vi) Security Management.

3. Write a note on Multiprocessing.

Ans. (i) Multi-processing is a one of the features of Operating System.

(ii) It has two or more processors for a single running process (job).

(iii) Processing takes place in parallel is known as parallel processing.

(iv) Since the execution takes place in parallel, this feature is used for high speed execution which increases the power of computing.

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS.

1. Which of the following acts as an interface between a user and a computer?

- (a) Input device (b) Output device
(c) Operating system (d) Bus

[Ans. (c) Operating system]

2. Which one of the following is not a function of an operating system?

- (a) Program Management
(b) Process Management
(c) Device Management
(d) Memory Management

[Ans. (a) Program Management]

3. Which is used to perform any computer operation?

- (a) Application software
(b) Hardware
(c) Operating system
(d) File Management

[Ans. (c) Operating system]

4. Which of the following operating systems not used in laptops?

- (a) Windows (b) Linux
(c) iOS (d) Unix [Ans. (c) iOS]

5. Which of the following operating system are not in mobile phones?

- (a) Symbian (b) Linux
(c) Apple iOS (d) Google Android

[Ans. (b) Linux]

6. Which of the following is a concept of having more than one operating system on single PC?

- (a) Multiuser (b) Multi tasking
(c) Multiprocessor (d) Virtual

[Ans. (d) Virtual]

7. Which of the following is a single user Operating system?

- (a) MS-DOS (b) Unix
(c) Linux (d) Windows

[Ans. (a) MS-DOS]

8. On which operating system more than one tasks executed concurrently?

- (a) Single-user
(b) Time sharing
(c) Multi-user
(d) Multiprocessing

[Ans. (b) Time sharing]

9. Which scheduling technique employed by time sharing OS?

- (a) Spooling (b) LIFO
(c) FIFO (d) Round Robin

[Ans. (d) Round Robin]

10. Which of the following is not true about Timesharing OS?

- (a) Provides the advantage of quick response
(b) Promotes duplication of software
(c) Reduces CPU idle time
(d) Problem of reliability

[Ans. (b) Promotes duplication of software]

11. In which operating system, given tasks done within a fixed timeline?

- (a) Real time (b) Multi-tasking
(c) Multiprocessor (d) Online

[Ans. (a) Real time]

12. Which operating system is used to access shared data and files any machine around the world?

- (a) Real time (b) Multiuser
(c) Multiprocessor (d) Distributed

[Ans. (d) Distributed]

13. In which operating system the user can exchange the data which each other in real time?

- (a) Distributed (b) Real time
(c) Time sharing (d) Multi-user

[Ans. (a) Distributed]

14. Which operating system provides GUI?

- (a) Distributed (b) Real time
(c) Interactive (d) Multi-User

[Ans. (c) Interactive]

15. How many functions are there in OS?

- (a) 4 (b) 5 (c) 3 (d) 2

[Ans. (b) 5]

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER

1. From the options given below, choose the operations managed by the operating system.

- (a) Memory
- (b) Processes
- (c) Disks and I/O devices
- (d) all of the above **[Ans. (d) all of the above]**

2. Which is the default folder for many Windows Applications to save your file?

- (a) My Document
- (b) My Pictures
- (c) Documents and Settings
- (d) My Computer **[Ans. (a) My Document]**

3. Under which of the following OS, the option Shift + Delete – permanently deletes a file or folder?

- (a) Windows 7
 - (b) MS-DOS
 - (c) Linux
 - (d) Android OS
- [Ans. (a) Windows 7]**

4. What is the meaning of "Hibernate" in Windows XP/Windows 7?

- (a) Restart the Computer in safe mode
- (b) Restart the Computer in hibernate mode
- (c) Shutdown the Computer terminating all the running applications
- (d) Shutdown the Computer without closing the running applications

[Ans. (d) Shutdown the Computer without closing the running applications]

5. The shortcut key used to rename a file in windows

- (a) F2
- (b) F4
- (c) F5
- (d) F6 **[Ans. (a) F2]**

SECTION - B

VERY SHORT ANSWERS

1. What is known as Multitasking? **[QY. 2018]**

Ans. Microsoft windows is one of the most popular graphical user Interface. Multiple applications can execute simultaneously in windows, and this is known as 'Multitasking'.

2. What are called standard icons?

Ans. The icons which are available on desktop by default while installing Windows OS are called standard icons. The standard icons available in all Windows OS are My Computer, Documents and Recycle Bin.

3. Differentiate Files and Folders.

Files	Folders
File is the collection of records.	Folder is a collections of files.
Create a file : Start → All Programs → select application → ok	Create a folders : Right click → New → folder → ok

4. Differentiate Save and save As option. **[QY. 2019]**

Ans. "Save" option save a document in first time. "Save As" option save an already saved the document with a new name and also create a copy of already saved document with a new name obviously.

5. How will you Rename a File? **[Sep. 2021]**

Ans. There are number of ways to rename files or folders. You can rename using the File menu, left mouse button or right mouse button.

SECTION - C

SHORT ANSWERS

1. What are the functions of Windows Operating system? **[HY. 2019]**

Ans. Some of the functions of Windows Operating System are:

- (i) Access applications (programs) on the computer (word processing, games, spread sheets, calculators and so on).
- (ii) Load any new program on the computer.
- (iii) Manage hardware such as printers, scanners, mouse, digital cameras etc.,
- (iv) File management activities (For example creating, modifying, saving, deleting files and folders).
- (v) Change computer settings such as colour scheme, screen savers and the resolution of monitor.

2. Write a note on Recycle bin.

[QY 2018, 2019; Mar.2020]

Ans. Recycle bin is a special folder to keep the files or folders deleted by the user, which means you still have an opportunity to recover them. The user cannot access the files or folders available in the Recycle bin without restoring it. To restore file or folder from the Recycle Bin

- (i) Open Recycle bin.
- (ii) Right click on a file or folder to be restored and select Restore option from the pop-up menu.
- (iii) To restore multiple files or folders, select Restore all items.
- (iv) To delete all files in the Recycle bin, select Empty the Recycle Bin.

3. Write a note on the elements of a window.

Ans. Elements of a window :

- (i) **Title Bar :** The title bar will display the name of the application and the name of the document opened. It will also contain minimize, maximize and close button.
- (ii) **Menu Bar :** The menu bar is seen under the title bar. Menus in the menu bar can be accessed by pressing Alt key and the letter that appears underlined in the menu title. Additionally, pressing Alt or F10 brings the focus on the first menu of the menu bar.
- (iii) **The Workspace :** The workspace is the area in the document window to enter or type the text of your document.
- (iv) **Scroll bars :** The scroll bars are used to scroll the workspace horizontally or vertically
- (v) **Corners and borders :** The corners and borders of the window helps to drag and resize the windows. The mouse pointer changes to a double headed arrow when positioned over a border or a corner. Drag the border or corner in the direction indicated by the double headed arrow to the desired size. The window can be resized by dragging the corners diagonally across the screen.

4. Write the two ways to create a new folder.

Ans. There are two ways in which you can create a new folder:

Method I:

- Step 1 : Open Computer Icon.
- Step 2 : Open any drive where you want to create a new folder. (For example select D:)
- Step 3 : Click on File → New → Folder.
- Step 4 : A new folder is created with the default name “New folder”.
- Step 5 : Type in the folder name and press Enter key.

Method II:

In order to create a folder in the desktop:

- Step 1 : In the Desktop, right click → New → Folder.
- Step 2 : A Folder appears with the default name “New folder” and it will be highlighted as shown.
- Step 3 : Type the name you want and press Enter Key.
- Step 4 : The name of the folder will change.

5. Differentiate copy and move.

[Sep. 2021]

Ans.

	Copy	Move
(i)	It means to make a duplicate copy of a file.	It means to transfer a file from one location to another.
(ii)	It uses the 'copy and paste' option.	It uses the 'cut and paste' option.
(iii)	The original file remains at the source location.	The original file is moved to the destination location.

UNIT- II

ALGORITHMIC PROBLEM SOLVING

CHAPTER

6

SPECIFICATION AND ABSTRACTION

CHAPTER SNAPSHOT

* 6.1 Algorithms	* 6.4 Algorithm Design Techniques
* 6.2 Algorithmic Problems	* 6.5 Specification
* 6.3 Building Blocks of Algorithms	6.5.1 Specification as contract
6.3.1 Data	* 6.6 Abstraction
6.3.2 Variables	6.6.1 State
6.3.3 Control flow	6.6.2 Assignment Statement
6.3.4 Functions	

EVALUATION

SECTION - A

CHOOSE THE CORRECT ANSWER

1. Which of the following activities is algorithmic in nature?

- (a) Assemble a bicycle
- (b) Describe a bicycle
- (c) Label the parts of a bicycle
- (d) Explain how a bicycle works

[Ans. (a) Assemble a bicycle]

2. Which of the following activities is not algorithmic in nature?

- (a) Multiply two numbers
- (b) Draw a kolam
- (c) Walk in the park
- (d) Swaping of two numbers.

[Ans. (d) Swaping of two numbers.]

3. Omitting details inessential to the task and representing only the essential features of the task is known as

- (a) specification
- (b) abstraction
- (c) composition
- (d) decomposition

[Ans. (b) abstraction]

4. Stating the input property and the input - output relation a problem is known [Sep. 2021]

- (a) specification
- (b) statement
- (c) algorithm
- (d) definition

[Ans. (a) specification]

5. Ensuring the input-output relation is

- (a) the responsibility of the algorithm and the right of the user.
- (b) the responsibility of the user and the right of the algorithm.
- (c) the responsibility of the algorithm but not the right of the user.
- (d) the responsibility of both the user and the algorithm.

[Ans. (d) the responsibility of both the user and the algorithm.]

6. If $i = 5$ before the assignment $i := i-1$ after the assignment, the value of i is

- (a) 5
- (b) 4
- (c) 3
- (d) 2

[Ans. (b) 4]

7. If $0 < i$ before the assignment $i := i-1$ after the assignment, we can conclude that [QY. 2018]
 (a) $0 < i$ (b) $0 \leq i$ (c) $i = 0$ (d) $0 \geq i$

[Ans. (b) $0 \leq i$]

SECTION - B

VERY SHORT ANSWERS

1. Define an algorithm.

Ans. An algorithm is a sequence of instructions to accomplish a task or solve a problem.

2. Distinguish between an algorithm and a process.

[Govt.MQP-2018]

Ans.	S.No	Algorithm	Process
	(i)	An algorithm is a step-by-step sequence of statements to solve a problem.	An instruction describes an action.
	(ii)	As an algorithm is executed, a process evolves which solves the problem.	When the instructions are executed, a process evolves which accomplishes the intended task or solves the given problem.

3. Initially,

farmer, goat, grass, wolf = L, L, L, L and the farmer crosses the river with goat. Model the action with an assignment statement.

- Ans.** (i) -- farmer, goat, grass, wolf = L, L, L, L
 (ii) farmer, goat := R, R
 (iii) -- farmer, goat, grass, wolf = R, R, L, L
 (iv) farmer := L
 (v) farmer, goat, grass, wolf = L, R, L, L
 (vi) farmer, grass := R, R
 (vii) -- farmer, goat, grass, wolf = R, R, R, L
 (viii) farmer, goat := L, L
 (ix) -- farmer, goat, grass, wolf = L, L, R, L
 (x) farmer, wolf := R, R
 (xi) -- farmer, goat, grass, wolf = R, L, R, R
 (xii) farmer := L
 (xiii) -- farmer, goat, grass, wolf = L, L, R, R
 (xiv) farmer, goat := R, R
 (xv) - farmer, goat, grass, wolf = R, R, R, R

4. Specify a function to find the minimum of two numbers.

Ans. (i) Minimum (A, B)

(ii) -- inputs : A and B are integers or real numbers.

(iii) -- outputs : A is minimum, ($A < B$)
 B is minimum, ($B < A$)

5. If $\sqrt{2} = 1.414$, and the square_root() function returns -1.414, does it violate the following specification?

-- square_root (x)

-- inputs: x is a real number, $x \geq 0$

-- outputs: y is a real number such that $y^2 = X$

Ans. Yes, it violate the specification.

SECTION - C

SHORT ANSWERS

1. When do you say that a problem is algorithmic in nature?

Ans. We usually say that a problem is algorithmic in nature when its solution involves the construction of an algorithm. Some types of problems can be immediately recognized as algorithmic.

2. What is the format of the specification of an algorithm?

Ans. Let P be the required property of the inputs and Q the property of the desired outputs. Then the algorithm S is specified as

1. algorithm_name (inputs)
2. -- inputs : P
3. -- outputs: Q

3. What is abstraction? [HY. 2018; QY. 2019]

Ans. A problem can involve a lot of details. Several of these details are unnecessary for solving the problem. Only a few details are essential. Ignoring or hiding unnecessary details and modeling an entity only by its essential properties is known as abstraction.

4. How is state represented in algorithms?

Ans. (i) State is a basic and important abstraction.

(ii) Computational processes have state. A computational process starts with an initial state. As actions are performed, its state changes. It ends with a final state.

(iii) The state at any point of execution is simply the values of the variables at that point.

5. What is the form and meaning of assignment statement?

Ans. Assignment statement is used to store a value in a variable. It is written with the variable on the left side of the assignment operator and a value on the right side.

Format / Form :

variable := value

Example : $m := 2$

When this assignment is executed, the value on the right side is stored in the variable on the left side.

6. What is the difference between assignment operator and equality operator?

Ans. Assignment operator is used to assign the right hand side value into left hand side variable.

Example : $A = 5, B = 10$

Equality operator is used compare the values of both right hand side variable and left hand side variable and results in either true or false.

Example : $A == B$ ($a = 5, b = 5$) True

$A \neq B$ ($a = 5, b = 0$) True.

SECTION - D

EXPLAIN IN DETAIL

1. Write the specification of an algorithm hypotenuse whose inputs are the lengths of the two shorter sides of a right angled triangle, and the output is the length of the third side.

Ans. (i) Let us name the algorithm hypotenuse.

(ii) It takes the number as the input. Let us name the input S_1, S_2 should not be negative.

(iii) It produces the Hypotenuse of S_1, S_2 as the output. Let us name the output l . Then S_1, S_2 should be the square of l .

Now the specification of the algorithm is

Hypotenuse (S_1, S_2)

- **inputs :** S_1 and S_2 are real numbers or integers.

- **outputs :** l is a real number such that $l^2 = S_1^2 + S_2^2$

2. Suppose you want to solve the quadratic equation $ax^2 + bx + c = 0$ by an algorithm. [QY. 2018]

quadratic_solve (a, b, c)

-- **inputs :** ?

-- **outputs :** ?

You intend to use the formula and you are prepared to handle only real number roots. Write a suitable specification.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Ans. Quadratic_solve (a, b, c)

-- **inputs :** a, b, c are real numbers, $a \neq 0$

-- **outputs :** x is a real number, the quadratic equation $ax^2 + bx + c = 0$ is satisfied by exactly two values x , namely

$$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \text{ and}$$

$$x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

3. Exchange the contents: Given two glasses marked A and B. Glass A is full of apple drink and glass B is full of grape drink. For exchanging the contents of glasses A and B, represent the state by suitable variables, and write the specification of the algorithm. [HY. 2018]

Ans. (i) Let us name the algorithm exchange.

(ii) It takes the number as the input. Let us name the input a, b . a, b should not be zero.

(iii) It produces the exchange of a, b by using third variable t as the output. Let us name the output. Then a, b, t should be exchange of the drinks.

Now the specification of the algorithm is

Exchange (a, b)

-- **inputs :** a, b are integers, $a \neq 0, b \neq 0$

-- **outputs :** a, b are integers,

$t := a$

$a := b$

$b := t$

LONG ANSWERS

5 MARKS

1. Explain in detail how will you construct an algorithm. Whatever with in (or) Explain the Building Blocks of Algorithms.

Ans. To construct algorithms using basic building blocks such as. Data, Variables, Control flow, Functions.

Data :

Algorithms take input data, process the data, and produce output data. Computers provide instructions to perform operations on data. For example, there are instructions for doing arithmetic operations on numbers, such as add, subtract, multiply and divide. There are different kinds of data such as numbers and text.

Variables :

Variables are named boxes for storing data. When we do operations on data, we need to store the results in variables. The data stored in a variable is also known as the value of the variable. We can store a value in a variable or change the value of variable, using an assignment statement.

Control flow :

An algorithm is a sequence of statements. However, after executing a statement, the next statement executed need not be the next statement in the algorithm. The statement to be executed next may depend on the state of the process. Thus, the order in which the statements are executed may differ from the order in which they are written in the algorithm. This order of execution of statements is known as the control flow.

Functions :

Algorithms can become very complex. The variables of an algorithm and dependencies among the variables may be too many. Then, it is difficult to build algorithms correctly. In such situations, we break an algorithm into parts, construct each part separately, and then integrate the parts to the complete algorithm.

The parts of an algorithm are known as functions. A function is like a sub algorithm. It takes an input, and produces an output, satisfying a desired input output relation.

2. Explain the types of control flow statements.

Ans. There are three important control flow statements to alter the control flow depending on the state.

- (i) In sequential control flow, a sequence of statements are executed one after another in the same order as they are written.
- (ii) In alternative control flow, a condition of the state is tested, and if the condition is true, one statement is executed; if the condition is false, an alternative statement is executed.
- (iii) In iterative control flow, a condition of the state is tested, and if the condition is true, a statement is executed. The two steps of testing the condition and executing the statement are repeated until the condition becomes false.



1

INTRODUCTION TO MICRO-ECONOMICS

CHAPTER SNAPSHOT

Introduction to Micro Economics

1.1 Introduction

1.2 Economics : Meaning

1.3 Economics : Its Nature

1.3.1 Wealth Definition : Adam Smith

1.3.2 Welfare Definition :

Alfred Marshall

1.3.3 Scarcity Definition :

Lionel Robbins

1.3.4 Growth Definition : Samuelson

1.4 Scope of Economics

1.4.1 Economics : Its Subject Matter

1.4.2 Economics is an Art and a Science

1.4.3 Economics : Positive Science and Normative Science

1.5 Basic Concepts in Economics

1.5.1 Goods and Services

1.5.2 Utility

1.5.3 Price

1.5.4 Market

1.5.5 Cost

1.5.6 Revenue

1.5.7 Equilibrium

1.5.8 Income

1.6 Economics : Its Methods, Facts, Theories and Laws

1.6.1 Methods of Economics :

Deduction and Induction

1.6.2 Economics : Facts, Theories

1.6.3 Nature of Economic Laws

1.7 Economics : Its Sub Divisions

1.7.1 Consumption

1.7.2 Production

1.7.3 Exchange

1.7.4 Distribution

1.8 Economics : Its Types

1.8.1 Micro-Economics

1.8.2 Macro - Economics

1.8.3 International Economics

1.8.4 Public Economics

1.8.5 Developmental Economics

1.8.6 Health Economics

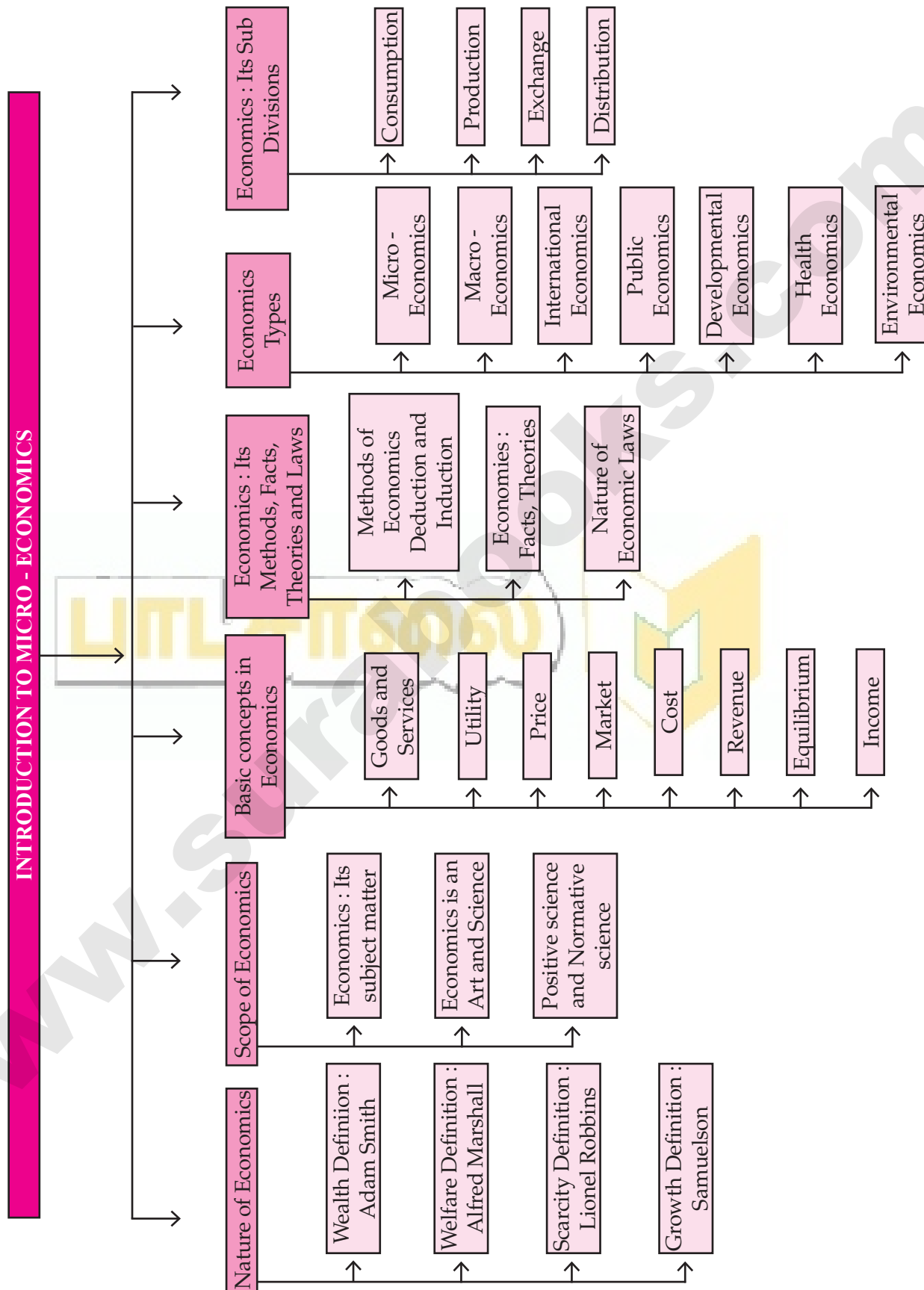
1.8.7 Environmental Economics

1.9 Basic Economic Problems

1.10 Production Possibility Curve

1.11 Conclusion

CONCEPT MAP



IMPORTANT TERMS

Nature of Economics	: Nature of economics is understood by studying the various definition given by the notable economists.
Economics its subject matter	: Economics focuses on the behaviour and interactions among economic agents, individuals and groups belonging to economic system.
Positive science	: Positive science deals with 'What it is'.
Normative Science	: Normative science responses to a question like 'what ought to be'.
Basic concepts in Economics	: Economics also has concepts to explain its theories.
Goods and Services	: In economics both goods and services satisfy human wants.
Free Goods	: Resources that are not scarce are called free goods
Economic Goods	: Goods which scarce are called economic goods.
Consumer Goods	: Consumer goods directly satisfy human wants.
Capital Goods	: Capital Goods help to produce consumer goods.
Perishable Goods	: Perishable goods are short lived.
Durable Goods	: Durable goods and semi-durable goods have a little longer life-time than the perishable goods.
Utility	: In economics, Utility is the want-satisfying power of a commodity or a service.
Price	: Price is the value of the goods expressed in terms of money.
Market	: Market means a place where commodities are bought and sold.
Cost	: Cost is the value of money incurred to produce or acquire a given quantum of goods.
Revenue	: Revenue is income obtained from the sale of goods and services
Deductive Method	: It consists in deriving conclusions from general truths, it takes few general principles and applies them to draw conclusions.
Inductive Method	: It involves the process of reasoning from particular facts to general principle.
Consumption	: Consumption deals with the satisfaction of human wants.
Production	: Production is the process of transformation of inputs into output.
Exchange	: Exchange is concerned with price determination in different market forms
Distribution	: Distribution studies about the pricing of factors of production.
Micro Economics	: Micro Economics is the study of the economic actions of small groups of individuals say households, firms or industries.
Macro economics	: It is concerned with the economy as a whole.
Public Economics	: Public finance is concerned with the income as revenue raising and expenditure incurring activities of the public authorities.
Health Economics	: Health economics is on area of applied economics.

TEXTUAL QUESTIONS AND ANSWERS

MODEL QUESTIONS

PART - A

MULTIPLE CHOICE QUESTIONS.

1. 'Economics is a study of mankind in the ordinary business of life' - It is the statement of. [BEQ]

- (a) Adam Smith (b) Lionel Robbins
(c) Alfred Marshall (d) Samuelson

[Ans. (c) Alfred Marshall]

2. The basic problem studied in Economics is

- (a) Unlimited wants [BEQ] [QY-2018]
(b) Unlimited means
(c) Scarcity
(d) Strategy to meet all our wants

[Ans. (c) Scarcity]

3. Microeconomics is concerned with

[First Mid-2018; Sep-2020]

- (a) The economy as a whole
(b) Different sectors of an economy
(c) The study of individual economic units behaviour
(d) The interactions within the entire economy

[Ans. (c) The study of individual economic units behaviour]

4. Which of the following is a microeconomics statement? [BEQ] [Govt. MQP-2018]

- (a) The real domestic output increased by 2.5 percent last year
(b) Unemployment was 9.8 percent of the labour force last year
(c) The price of wheat determines its demand
(d) The general price level increased by 4 percent last year

[Ans. (c) The price of wheat determines its demand]

5. Find the odd one out :

[BEQ] [Govt. MQP-2018; First Mid-2018; QY-2018]

- (a) "An inquiry into the nature and the causes of the Wealth of Nations".
(b) "Principles of Economics"
(c) "Nature and Significance of Economic Science"
(d) "Ceteris Paribus" **[Ans. (d) "Ceteris Paribus"]**

6. The equilibrium price is the price at which

- (a) Everything is sold [HY-2019]
(b) Buyers spend their money
(c) Quantity demanded equals quantity supplied
(d) Excess demand is zero

[Ans. (c) Quantity demanded equals quantity supplied]

7. Author of "An Inquiry into the Nature and Causes of Wealth of Nations"

- (a) Alfred Marshall (b) Adam Smith
(c) Lionel Robbins (d) Paul A Samuelson

[Ans. (b) Adam Smith]

8. "Economics studies human behaviour as a relationship between ends and scarce means which have alternative uses" is the definition of economics of

- (a) Lionel Robbins (b) Adam Smith
(c) Alfred Marshall (d) Paul A Samuelson

[Ans. (a) Lionel Robbins]

9. Who is the Father of Economics?

[BEQ] [HY-2018; Mar-2020]

- (a) Max Muller (b) Adam Smith
(c) Karl Marx (d) Paul A Samuelson

[Ans. (b) Adam Smith]

10. "Economics is a science" The basis of this statement is _____. [BEQ]

- (a) Relation between cause and effect
(b) Use of deductive method and inductive method for the formations of laws
(c) Experiments
(d) All of the above **[Ans. (d) All of the above]**

11. Utility means [Mar-2019]

- (a) Equilibrium point at which demand and supply are equal
(b) Want - satisfying capacity of goods and services
(c) Total value of commodity.
(d) Desire for goods and services

[Ans. (b) Want - satisfying capacity of goods and services]

12. A market is [QY-2019]

- (a) Only a place to buy things
- (b) Only a place to sell things
- (c) Only a place where prices adjust
- (d) A system where persons buy and sell goods directly or indirectly

[Ans. (d) A system where persons buy and sell goods directly or indirectly]

13. Which one of the following is not a point in the Welfare Definition of Economics?

- (a) Study of an ordinary man
- (b) Economics does not focus on wealth alone
- (c) Economics is the study of material welfare
- (d) Economics deals with unlimited wants and limited means

[Ans. (d) Economics deals with unlimited wants and limited means]

14. Growth definition takes into account

- (a) The problem of choice in the dynamic frame work of Economics.
- (b) The problem of unlimited means in relation to wants
- (c) The production and distribution of wealth
- (d) The material welfare of human beings

[Ans. (a) The problem of choice in the dynamic frame work of Economics.]

15. Which theory is generally included under micro economics? [Sep-2021]

- (a) Price Theory
- (b) Income Theory
- (c) Employment Theory
- (d) Trade Theory

[Ans. (a) Price Theory]

16. ____ have exchange value and their ownership rights can be established and exchanged

- (a) Goods
- (b) Services
- (c) Markets
- (d) Revenue

[Ans. (a) Goods]

17. Identify the correct characteristics of utility [BEQ]

- (a) It is equivalent to 'usefulness'
- (b) It has moral significance
- (c) It is same as pleasure
- (d) It depends upon consumer's mental attitude

[Ans. (d) It depends upon consumer's mental attitude]

18. Who has given scarcity definition of economics? [QY-2019]

- (a) Adam Smith
- (b) Marshall
- (c) Robbins
- (d) Robertson

[Ans. (c) Robbins]

19. The process of reasoning from particular to general is [First Mid-2018]

- (a) Deductive method
- (b) Inductive method
- (c) Positive economics
- (d) Normative economics

[Ans. (b) Inductive method]

20. Total revenue is equal to total output sold multiplied by

- (a) Price
- (b) Total cost
- (c) Marginal revenue
- (d) Marginal cost

[Ans. (a) Price]

PART - B

ANSWER THE FOLLOWING QUESTIONS IN ONE OR TWO SENTENCES.

21. What is meant by Economics? [BEQ]

[QY-2019; Sep-2020]

Ans. (i) The word 'Economics' comes from the ancient greek **oikonomikos**.

(ii) The term 'Economics' means "**Management of households**".

(iii) The 'Political Economy' is renamed as economics.

22. Define microeconomics. [HY-2019]

Ans. (i) Microeconomics is the study of the economic actions of small group of individuals say **households, firms, or industries**.

(ii) It studies how business firms operate under different market conditions and how the combined actions of buyers and sellers determine prices.

23. What are goods? [Mar-2020]

Ans. (i) In Economics, the term '**goods**' and '**services**' also implies, unless specified otherwise.

(ii) Goods are also called '**products**', '**commodities**', '**things**' etc.

(iii) Goods and services satisfies human wants.

ADDITIONAL QUESTIONS AND ANSWERS

PART - A

MULTIPLE CHOICE QUESTIONS. 1 MARK

(i) Choose the Correct Option

1. Who is the father of 'New Economics'? [BEQ]

- (a) Max Muller (b) Adam Smith
(c) J.M. Keynes (d) Karl Marx

[Ans. (c) J.M. Keynes]

2. Macro Economics is concerned with

- (a) The theory as a whole
(b) Different sectors of an economy
(c) The study of individual economic behaviour
(d) The interactions within the entire economy

[Ans. (a) The theory as a whole]

3. 'Nomos' means

- (a) Polite (b) Management
(c) Household (d) None of these

[Ans. (b) Management]

4. Welfare means

- (a) Happiness
(b) Comfortable living conditions of an individual
(c) Comfortable living conditions of group of people
(d) All of these

[Ans. (d) All of these]

5. TR = [BEQ]

- (a) $P + Q$ (b) $P - Q$
(c) $P \div Q$ (d) $P \times Q$

[Ans. (d) $P \times Q$]

6. Deductive method is also called as

- (a) Analytical method (b) Abstract method
(c) Both 'a' and 'b' (d) None of these

[Ans. (c) Both 'a' and 'b']

7. Inductive Method is also called as [BEQ]

- (a) Empirical Method (b) Analytical Method
(c) Abstract Method (d) All of these

[Ans. (a) Empirical Method]

8. Creations of utility or wealth is

- (a) Production (b) Consumption
(c) Distribution (d) Public finance

[Ans. (a) Production]

9. General theory of 'Employment Interest and Money' published in

- (a) 1930 (b) 1936 (c) 1988 (d) 1990

[Ans. (b) 1936]

10. 'The General theory of Employment, Interest and Money' published by [BEQ]

- (a) Alfred Marshall (b) Adam Smith
(c) Robbins (d) J.M. Keynes

[Ans. (d) J.M. Keynes]

11. Micro Economics covers

- (a) Value theory
(b) Theory of economic welfare
(c) Both 'a' and 'b'
(d) Income theory

[Ans. (c) Both 'a' and 'b']

12. Micro means

- (a) Small (b) Big
(c) Large (d) Aggregate

[Ans. (a) Small]

13. Macro means

- (a) Tiny (b) Small
(c) Large (d) None of these

[Ans. (c) Large]

14. Which one of the following is capital goods.

- (a) Machinery (b) T.V.
(c) Diamond (d) Table

[Ans. (a) Machinery]

15. Which one of the following statement not related to equilibrium

- (a) Quantity demanded is equals to quantity supplied
(b) Demand line intersect supply line
(c) Price increases demand decreases
(d) Static equilibrium

[Ans. (c) Price increases demand decreases]

16. Which of the following is not a macro Economics statement?

- (a) The general price level increased by 8% last year.
(b) The price of tomato declined last year.
(c) The real domestic output increased by 33% last year.
(d) Unemployment was 10% of the labour force last year.

[Ans. (b) The price of tomato declined last year]

(ii) Match List I with List II and Select the Correct Answer using the Codes given below

1. **List I** **List II**
- | | |
|---------------------|--------------------------|
| (A) Adam Smith | (i) Growth definition |
| (B) Alfred Marshall | (ii) Scarcity definition |
| (C) Lionel Robbins | (iii) Welfare definition |
| (D) Samuelson | (iv) Wealth definition |

- | | | | |
|---------|-----|-----|----|
| A | B | C | D |
| (a) iv | iii | ii | i |
| (b) i | ii | iii | iv |
| (c) ii | iii | iv | i |
| (d) iii | iv | i | ii |

[Ans. (a) A - iv; B - iii ; C - ii; D - i]

2. **List I** **List II**
- | | |
|----------------------|---|
| (A) Consumption | (i) 'What it is' |
| (B) Positive Science | (ii) Price theory |
| (C) Deductive method | (iii) Starting point of economic activity |
| (D) Micro | (iv) Human Wants |

- | | | | |
|---------|-----|-----|-----|
| A | B | C | D |
| (a) i | ii | iii | iv |
| (b) iv | iii | ii | i |
| (c) iii | i | iv | ii |
| (d) ii | iv | i | iii |

[Ans. (c) A - iii ; B - i ; C - iv ; D - ii]

3. **List I** **List II**
- | | |
|---------------------------|----------------|
| (A) The classical era | (i) Samuelson |
| (B) The Neo classical era | (ii) Robbins |
| (C) The new age | (iii) Marshall |
| (D) The Modern age | (iv) Adamsmith |

- | | | | |
|---------|-----|-----|----|
| A | B | C | D |
| (a) ii | iii | i | iv |
| (b) iv | iii | ii | i |
| (c) i | ii | iii | iv |
| (d) iii | ii | i | iv |

[Ans. (b) A - iv ; B - iii ; C - ii ; D - i]

4. **List I** **List II**
- | | |
|--------------------|---|
| (A) Production | (i) Knowledge Utility |
| (B) Utility | (ii) T.V. |
| (C) Equilibrium | (iii) Quantity demand is equal to quantity supply |
| (D) Consumer goods | (iv) Subject matter of economics |

- | | | | | |
|-----|----|-----|-----|-----|
| | A | B | C | D |
| (a) | ii | iv | i | iii |
| (b) | iv | iii | ii | i |
| (c) | iv | i | iii | ii |
| (d) | i | iv | ii | iii |

[Ans. (c) A - iv ; B - i ; C - iii; D - ii]

5. **List I** **List II**
- | | |
|----------------------------------|---|
| (A) Wealth of Nation | (i) Different possibilities of production |
| (B) Macro Economics | (ii) Empirical method |
| (C) Production possibility curve | (iii) General theory |
| (D) Inductive method | (iv) 1776 |

- | | | | |
|--------|-----|-----|-----|
| A | B | C | D |
| (a) iv | ii | i | iii |
| (b) iv | iii | ii | i |
| (c) i | ii | iii | iv |
| (d) iv | iii | i | ii |

[Ans. (d) A - iv ; B - iii ; C - i ; D - ii]

6. **List I** **List II**
- | | |
|----------|--|
| (A) 1723 | (i) Principles of economics |
| (B) 1842 | (ii) An essay on the nature and significance of economic science |
| (C) 1932 | (iii) Adamsith birth |
| (D) 1890 | (iv) Alfred Marshall birth |

- | | | | |
|---------|-----|----|-----|
| A | B | C | D |
| (a) ii | iii | i | iv |
| (b) iii | iv | ii | i |
| (c) iv | i | ii | iii |
| (d) iii | iv | i | ii |

[Ans. (b) A - iii ; B - iv ; C - ii ; D - i]

(iii) Choose the correct option and fill in the blanks.

1. The term or word 'Economics' comes from _____ language

- | | |
|-------------|-------------------|
| (a) Latin | (b) Ancient Greek |
| (c) Spanish | (d) British |

[Ans. (b) Ancient Greek]

2. Economics is a _____ science

- | | |
|--------------|-------------|
| (a) Social | (b) Moral |
| (c) Physical | (d) Natural |

[Ans. (a) Social]

- 3. Environmental economics is a study of inter disciplinary tools for the problems of ____**
 (a) Ecology (b) Economy
 (c) Environment (d) All of these
[Ans. (d) All of these]
- 4. ____ science deals with 'What it is'**
 (a) Normative (b) Positive
 (c) Negative (d) None of these
[Ans. (b) Positive]
- 5. ____ are transferable**
 (a) Goods (b) Products
 (c) Commodities (d) All of these
[Ans. (d) All of these]
- 6. Capital goods also called as ____ goods.**
 (a) Consumer (b) Producer's
 (c) Free goods (d) None of these
[Ans. (b) Producer's]
- 7. ____ utility derived by having knowledge of a particular thing.**
 (a) Place (b) Time
 (c) Knowledge (d) Service
[Ans. (c) Knowledge]
- 8. ____ means using up of goods and services.**
 (a) Production (b) Consumption
 (c) Distribution (d) Exchange
[Ans. (b) Consumption]
- 9. ____ studies about the pricing of factors of production.**
 (a) Production (b) Exchange
 (c) Distribution (d) Consumption
[Ans. (c) Distribution]
- 10. The scope of ____ covers public expenditure, public revenue, public debt and financial administration.**
 (a) Federal finance (b) Public finance
 (c) Government (d) None of these
[Ans. (b) Public finance]
- 11. 'Political Economy' is renamed as 'Economics' in the late 19th century by ____**
 (a) Robbins (b) Samuelson
 (c) Adam Smith (d) Alfred Marshall
[Ans. (c) Adam Smith]
- 12. Samuelson's Growth definition representing the ____**
 (a) Alfred Marshall (b) Adam Smith
 (c) Lionel Robbins (d) Samuelson
[Ans. (a) Alfred Marshall]
- 13. ____ favours the introduction of 'division of labour' to increase quantum of output.**
 (a) Adam smit (b) Marshall
 (c) Keynes (d) None of these
[Ans. (a) Adam Smit]
- 14. A.C. Pigou, Alfred Marshall and others regard Economics as an ____**
 (a) Art (b) Science
 (c) Maths (d) Social
[Ans. (a) Art]
- 15. A single type of service yields multiple experiences**
 (a) Homogeneous (b) Heterogeneous
 (c) Both (d) None of these
[Ans. (b) Heterogeneous]
- 16. ____ is income obtained from the sale of goods and services.**
 (a) Rent (b) Household
 (c) Revenue (d) None of these
[Ans. (c) Revenue]
- (iv) Pick the Odd one Out.**
- 1. (a) Production (b) Consumption (c) Distribution (d) Place utility**
[Ans. (d) Place utility]
Reason: Place utility is a types of utility. Other three are divisions of economics.
- 2. (a) Place utility (b) Time utility (c) Possession utility (d) Deductive method**
[Ans. (d) Deductive method]
Reason: Deductive method consists in deriving conclusions from general truths; it takes few general principles and applies them to draw conclusions. Other three are types of utility.
- (v) Choose the Incorrect Pairs**
- 1. (a) Possession utility - Types of utility (b) Inductive method - Methods of analysis (c) Scarcity definition - Lionel Robbins (d) Marshall - Wealth of nation**
[Ans. (d) Marshall - Wealth of nation]
- 2. (a) Perishable goods - Fruits and flowers (b) Intangible - Physical object (c) Money income - Nominal Income (d) Inductive method - Historical school**
[Ans.(b) Intangible - Physical object]

2

CONSUMPTION ANALYSIS

CHAPTER SNAPSHOT

Consumption Analysis

2.1 Introduction

2.2 Human Wants

2.3 Characteristics of Human wants

2.4 Classification of Goods

2.5 Cardinal Utility Analysis

2.5.1. The Law of Diminishing Marginal Utility(DMU)

2.6 The Law of Equi - Marginal utility

2.7 Consumer's Surplus

2.8 Law of Demand

2.8.1 Characteristics of Demand

2.8.2 Demand Function

2.8.3 Law of Demand

2.8.4 Determinants of Demand

2.8.5 Exceptions to the law of demand

2.8.6 Reasons for Exceptional Demand Curve

2.8.7 Extension and Contraction of Demand

2.8.8 Movement along Demand Curve

2.8.9 Shift in the Demand Curve

2.9 Elasticity of Demand

2.9.1 Types of Elasticity of Demand

2.9.2 Levels or Degrees of Price Elasticity of Demand

2.9.3 Determinants of Elasticity of Demand

2.9.4 Measurement of Elasticity of Demand

2.9.5 Importance of Elasticity of Demand

2.10 Ordinal Analysis

2.11 An Indifference Curve

2.12 An Indifference Map

2.13 Diminishing Marginal Rate of Substitution

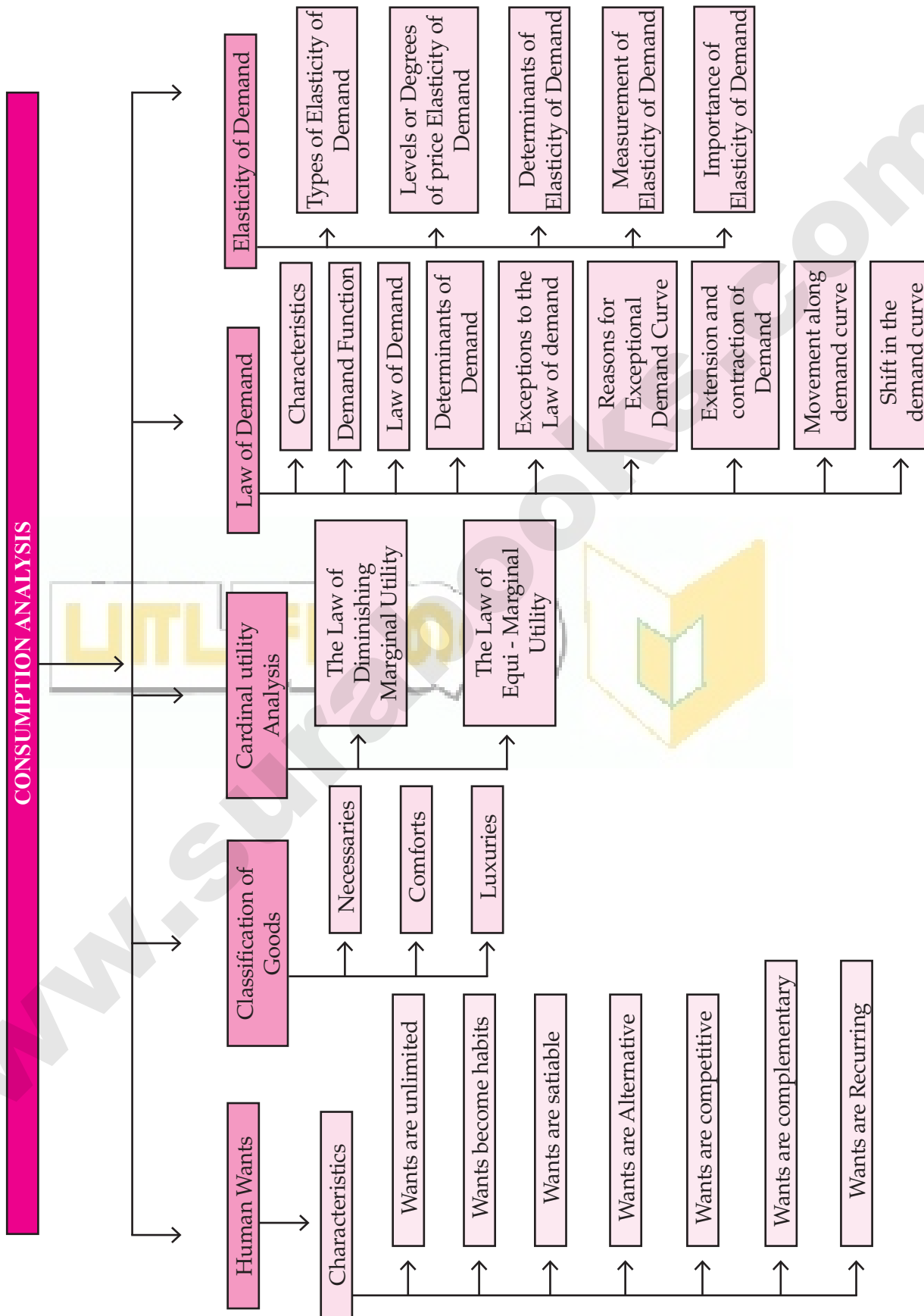
2.14 Properties of the Indifference curves

2.15 Price line or Budget line

2.16 Consumer Equilibrium

2.17 Conclusion

CONCEPT MAP



IMPORTANT TERMS

Characteristics of wants	:	Man is a bundle of desires. There is no limits to human wants. If one set of wants are fulfilled, immediately another set of want would be felt.
Classification of wants	:	Wants are classified into three categories. viz necessities, comforts and luxuries.
Utility	:	"Utility" means 'usefulness', In economics utility is defined as the power of a commodity or a service to satisfy human wants.
Law of Diminishing Marginal Utility	:	The Law of diminishing marginal utility explains an ordinary experience of a consumer.
Law of Equi-Marginal Utility	:	The law of equi-marginal utility explains the behaviour of a consumer when he consumes more than one commodity.
Cardinal Utility Analysis	:	It involves the use of measurable (cardinal) utility to study consumer behaviour. It is otherwise known as Marginal (or) Marshallian Utility Analysis.
Ordinal Utility Analysis	:	Ordinal Utility approach means that the utility can be ranked qualitatively.
Marginal Utility	:	Marginal Utility is the addition made to the total utility by consuming one more unit of a commodity.
		$MU_n = TU_n - TU_{n-1}$
Total Utility	:	Total Utility refers to the sum of utilities of all units of a commodity consumed.
Average Utility	:	Average Utility is nothing but utility derived by per unit of consumption
		$AU = \frac{TU}{Q}$
Indifference Map	:	Indifference Map is a group of indifference curves for two commodities showing different levels of satisfaction.
Budget Line	:	It represents the various amounts the consumer can buy with his income; it is also known as the price - ratio line or simply the price line.
Consumer Equilibrium	:	The consumer gets the maximum possible satisfaction from his given income is called consumer equilibrium.
Revealed Preference	:	Revealed Preference theory regards utilities to be merely comparable and not quantifiable.
Law of Demand	:	The law of demand states that there is a negative (or) inverse relationship between the price and quantity demanded of a commodity over a period of time.
Demand	:	Demand for a commodity refers to backed by ability to pay and willingness to buy it.
Exception to the law of demand	:	There are certain peculiar cases in which the law of demand will not hold good. In those cases, more will be (demanded at higher price) less will be demanded at lower price.
Giffen Paradox	:	Sir Robert Giffen discovered that the poor people will demand more of inferior goods if their prices rise and demand less if their prices fall.

Elasticity of Demand	: The concept of elasticity of demand measures the rate of change in demand.
Indifference Curve Approach	: An indifference curve is the locus of different combination of two commodities giving the same level of satisfaction.
Budget Line	: Budget line is a line showing difference combinations of two goods which a consumer can attain at his given income and market price of the goods.
Demand Schedule	: The tabular presentation of price and quantity demand is called the demand schedule.

MUST KNOW DEFINITIONS

Law of Diminishing Marginal Utility	: According to Marshall "The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has".
Law of Equi-Marginal Utility	: In the words of Prof. Marshall, "If a person has a thing which can be put to several uses, he will distribute it among these uses in such a way that it has the same marginal utility in all".
Consumer's Surplus	: Marshall defines consumer's surplus as follows : "The excess of price which a person would be willing to pay rather than go without the thing, over that which he actually does pay is the economic measure of this surplus of satisfaction. It may be called consumer's surplus.
Define Utility	: According to Prof. Waugh "Utility is the power of commodity to satisfy human wants".
Define Revealed Preference Theory	: Samuelson is revealed preference theory as "Behaviourist Ordinalist". The description "Behaviourist Ordinalist".
Define Elasticity of Demand	: According to Alfred Marshall "the elasticity (or responsiveness) of demand in a Market is great or small according as the amount demanded increases much or little for a given fall in price, and diminishes much or little for given rise in price".

TEXTUAL QUESTIONS AND ANSWERS

MODEL QUESTIONS

PART - A

MULTIPLE CHOICE QUESTIONS

1. Pick the odd one out [BEQ] [First Mid-2018; HY-2018]
 (a) Luxuries (b) Comforts [Sep-2020]
 (c) Necessaries (d) Agricultural goods
[Ans. (d) Agricultural goods]
2. Choice is always constrained or limited by the _____ of our resources.
 (a) Scarcity (b) Supply
 (c) Demand (d) Abundance
[Ans. (a) Scarcity]
3. The chief exponent of the Cardinal utility approach was _____ [Govt. MQP-2018; QY-2018]
 (a) J.R. Hicks (b) R.G.D. Allen
 (c) Marshall (d) Stigler
[Ans. (c) Marshall]
4. Marginal Utility is measured by using the formula of _____ [BEQ] [First Mid-2018; Mar-2020]
 (a) $TU_n - TU_{n-1}$ (b) $TU_n - TU_{n+1}$
 (c) $TU_n + TU_{n+1}$ (d) $TU_n - TU_{n+1}$
[Ans. (a) $TU_n - TU_{n-1}$]
5. When marginal utility reaches zero, the total utility will be _____ [QY-2019; Sep-2020]
 (a) Minimum (b) Maximum
 (c) Zero (d) Negative
[Ans. (b) Maximum]
6. Gossen's first law is known as
 (a) Law of equi-marginal utility
 (b) Law of diminishing marginal utility
 (c) Law of demand
 (d) Law of Diminishing returns
[Ans. (b) Law of diminishing marginal utility]
7. The basis for the law of demand is related to
 (a) Law of diminishing marginal utility
 (b) Law of supply
 (c) Law of equi-marginal utility
 (d) Gossen's Law
[Ans. (a) Law of diminishing marginal utility]
8. The concept of consumer's surplus is associated with _____ [BEQ]
 (a) Adam Smith (b) Marshall
 (c) Robbins (d) Ricardo
[Ans. (b) Marshall]
9. Given potential price is Rs. 250 and the actual price is Rs. 200 find the consumer surplus.
 (a) 375 (b) 175 [First Mid-2018]
 (c) 200 (d) 50
[Ans. (d) 50]
10. Indifference curve approach is based on _____ [QY-2018]
 (a) Ordinal approach
 (b) Cardinal approach
 (c) Subjective approach
 (d) Psychological approach
[Ans. (a) Ordinal approach]
11. The concept of elasticity of demand was introduced by _____ [BEQ] [QY-2019; HY-2019]
 (a) Ferguson (b) Keynes
 (c) Adam Smith (d) Marshall
[Ans. (d) Marshall]
12. Increase in demand is caused by
 (a) Increase in tax [First Mid-2018; QY-2018]
 (b) Higher subsidy
 (c) Increase in interest rate
 (d) Decline in population
[Ans. (b) Higher subsidy]
13. The movement on or along the given demand curve is known as _____
 (a) extension and contraction of demand
 (b) shifts in the demand
 (c) increase and decrease in demand
 (d) all the above
[Ans. (a) extension and contraction of demand]
14. In case of relatively more elastic demand the shape of the curve is
 (a) Horizontal (b) Vertical
 (c) Steeper (d) Flatter
[Ans. (d) Flatter]

15. A consumer is in equilibrium when marginal utilities from two goods are

- (a) Minimum (b) Inverse
(c) Equal (d) Increasing

[Ans. (c) Equal]

16. Indifference curve was first introduced by [BEQ]

- (a) Hicks (b) Allen
(c) Keynes (d) Edgeworth

[Ans. (d) Edgeworth]

17. Elasticity of demand is equal to one indicates

- (a) Unitary Elastic Demand
(b) Perfectly Elastic Demand
(c) Perfectly Inelastic Demand
(d) Relatively Elastic Demand

[Ans. (a) Unitary Elastic Demand]

18. The locus of the points which gives same level of satisfaction is associated with

- (a) Indifference Curves (b) Cardinal Analysis
(c) Law of Demand (d) Law of Supply

[Ans. (a) Indifference Curves]

19. Ordinal Utility can be measured by [HY-2019]

- (a) Ranking (b) Numbering
(c) Wording (d) None of these

[Ans. (a) Ranking]

20. The indifference curve are

[BEQ] [First Mid-2018; QY-2019; Sep-2021]

- (a) vertical (b) horizontal
(c) positive sloped (d) negatively sloped

[Ans. (d) negatively sloped]

PART - B

ANSWER THE FOLLOWING QUESTIONS IN ONE OR TWO SENTENCES.

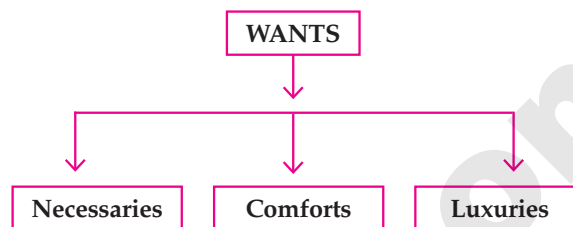
21. Define Utility. [BEQ] [QY-2018; Sep-2020]

Ans. (i) Utility, the simple meaning of 'utility is usefulness'.

- (ii)** In Economics utility is the capacity of a commodity to satisfy human wants.

22. Mention the classifications of wants.

Ans. Goods (or) wants are broadly classified into three categories. They are,



23. Name the basic approaches to consumer behaviour.

Ans. The basic approaches to consumer behaviour are

- (i) Cardinal Approach
(ii) Ordinal Approach

24. What are the degrees of price elasticity of demand?

Ans. (i) Perfectly Elastic Demand ($E_p = \infty$) [HY-2019]

(ii) Perfectly Inelastic Demand ($E_p = 0$)

(iii) Relatively Elastic Demand ($E_p > 1$)

(iv) Relatively Inelastic Demand ($E_p < 1$)

(v) Unitary Elastic Demand ($E_p = 1$)

25. State the meaning of indifference curves.

[First Mid-2018; Mar-2020]

Ans. 1. An indifference curve is the locus of all combinations of commodities from which the consumer derives the same level of satisfaction.

2. It is also called "Iso-Utility Curve" or "Equal Satisfaction Curve".

26. Write the formula of consumers surplus. [Sep-2021]

Ans. Consumer surplus = what a person is willing to pay – what he actually pay.

(OR)

Consumer's surplus = Potential price – Actual price.
Mathematically,

Consumer's surplus = $TU - (P \times Q)$

TU = Total Utility, P = Price and Q = Quantity of the Commodity

27. What are Giffen goods? Why it is called like that?

[BEQ] [First Mid-2018; QY-2019]

Ans. (i) The Giffen good or inferior good is an exception to the law of demand.

(ii) A Giffen goods is typically an inferior product that does not have easily available substitutes.

(iii) The unique characteristic that an increase in price actually increases the quantity of the good that is demanded.

3

PRODUCTION ANALYSIS

CHAPTER SNAPSHOT

Production Analysis**3.1 Introduction****3.2 Features of the Factors of Production**

3.2.1 Land

3.2.2 Labour

3.2.3 Capital

3.2.4 Organization

3.3 Production Function**3.4 Law of Variable Proportions****3.5 Laws of Returns to Scale****3.6 Economies of Scale**

3.6.1 Internal Economies of Scale

3.6.2 External Economies of Scale

3.7 Diseconomies of Scale

3.7.1 Internal Diseconomies of Scale

3.7.2 External Diseconomies of Scale

3.8 Iso-quants

3.8.1 Definition of Iso-quant

3.8.2 Iso-quant Curve

3.8.3 Iso-quant Map

3.8.4 Properties of Iso-quant Curve

3.9 The Iso-cost Line**3.10 Producer's Equilibrium****3.11 Cobb-Douglas Production Function****3.12 Law of Supply**

3.12.1 Supply Function

3.12.2 Supply Curve

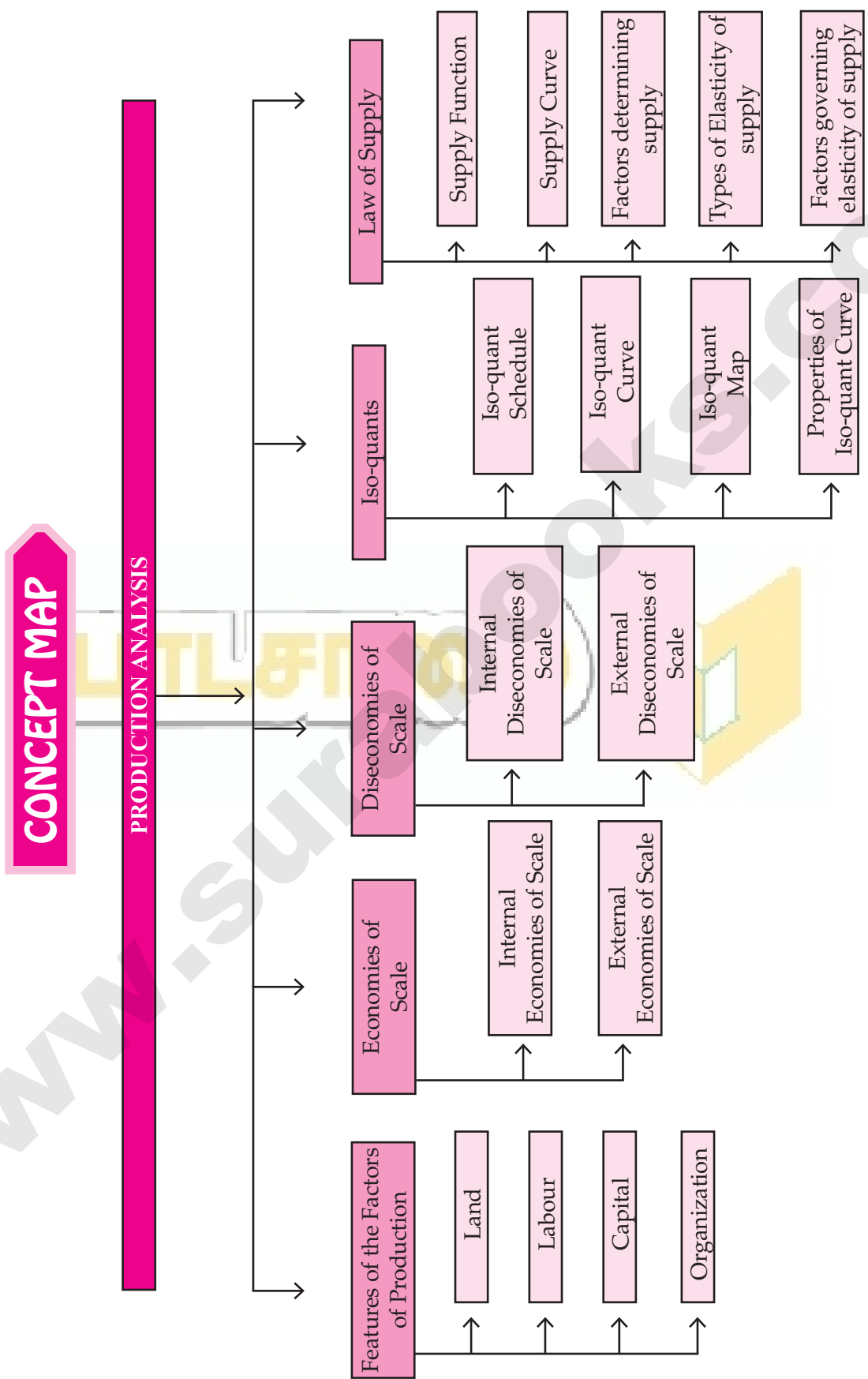
3.12.3 Factors determining supply

3.12.4 Elasticity of supply

3.12.5 Types of Elasticity of supply

3.12.6 Factors governing elasticity of supply

3.13 Conclusion



TEXTUAL QUESTIONS AND ANSWERS

MODEL QUESTIONS

PART - A

MULTIPLE CHOICE QUESTIONS.

1. The primary factors of production are :

[BEQ] [QY-2019; HY-2019]

- (a) Labour and Organisation
 (b) Labour and Capital
 (c) Land and Capital
 (d) Land and Labour [Ans. (d) Land and Labour]

2. The man-made physical goods used to produce other goods and services are referred to as

- (a) Land (b) Labour
 (c) Capital (d) Organization

[Ans. (c) Capital]

3. Formula for calculating AP is

[BEQ]

- (a) $\frac{\Delta TP}{N}$ (b) $\frac{\Delta TP}{\Delta N}$ (c) $\frac{TP}{MP}$ (d) $\frac{TP}{N}$

[HY-2018; Sep-2020]

[Ans. (d) $\frac{TP}{N}$]

4. Which factor is called the changing agent of the Society?

[Mar-2019]

- (a) Labourer (b) Land
 (c) Organizer (d) Capital

[Ans. (c) Organizer]

5. Who said, that one of the key of an entrepreneur is "uncertainty -bearing"

[BEQ]

- (a) J.B. Clark (b) Schumpeter
 (c) Knight (d) Adam Smith

[Ans. (c) Knight]

6. The functional relationship between "inputs" and "outputs" is called as

- (a) Consumption Function
 (b) Production Function (c) Savings Function
 (d) Investment Function

[Ans. (b) Production Function]

7. In a firm 5 units of factors produce 24 units of the product. When the number of factor increases by one, the production increases to 30 units. Calculate the Average Product

- (a) 30 (b) 6 (c) 5 (d) 24

[Ans. (c) 5]

8. The short-run production is studied through

- (a) The Laws of Returns to Scale [Mar-2020]
 (b) The Law of Variable Proportions
 (c) Iso - quants
 (d) Law of Demand

[Ans. (b) The Law of Variable Proportions]

9. The long-run production function is explained by

- (a) Law of Demand [QY-2019]
 (b) Law of Supply
 (c) Returns to Scale
 (d) Law of Variable Proportions

[Ans. (c) Returns to Scale]

10. An Iso - quant curve is also known as

[BEQ]

- (a) Inelastic Supply Curve
 (b) Inelastic Demand Curve
 (c) Equi Marginal Utility
 (d) Equal Product Curve

[Ans. (d) Equal Product Curve]

11. Mention the economies reaped from inside the firm

- (a) financial (b) technical
 (c) managerial (d) all of the above

[Ans. (d) all of the above]

12. Cobb - Douglas production function assumes.

- (a) Increasing returns to scale [HY-2019]
 (b) Diminishing returns to scale
 (c) Constant returns to scale
 (d) All of the above

[Ans. (c) Constant returns to scale]

13. Name the returns to scale when the output increases by more than 5%, for a 5% increase in the inputs,

- (a) Increasing returns to scale
 (b) Decreasing returns to scale
 (c) Constant returns to scale
 (d) All of the above

[Ans. (a) Increasing returns to scale]

14. Which of the following is not a characteristic of land? [BEQ] [QY-2018; Mar-2019; Sep-2020]

- (a) Its limited supply (b) It is mobile
(c) Heterogeneous (d) Gift of Nature

[Ans. (b) It is mobile]

15. Product obtained from additional factors of production is termed as [Sep-2021]

- (a) Marginal product (b) Total product
(c) Average product (d) Annual product

[Ans. (a) Marginal product]

16. Modern economists have propounded the law of [Mar-2020]

- (a) Increasing returns (b) Decreasing returns
(c) Constant returns (d) Variable proportions

[Ans. (a) Increasing returns]

17. Producer's equilibrium is achieved at the point where :

- (a) Marginal rate of technical substitution (MRTS) is greater than the price ratio
(b) MRTS is lesser than the price ratio
(c) MRTS and price ratio are equal to each other
(d) The slopes of iso quant and iso cost lines are different

[Ans. (c) MRTS and price ratio are equal to each other]

18. The relationship between the price of a commodity and the supply of commodity is [QY-2019]

- (a) Negative (b) Positive
(c) Zero (d) Increase

[Ans. (b) Positive]

19. If average product is decreasing, then marginal product [QY-2018]

- (a) must be greater than average product
(b) must be less than average product
(c) must be increasing (d) both a and c

[Ans. (b) must be less than average product]

20. A production function measures the relation between.

- (a) input prices and output prices
(b) input prices and the quantity of output
(c) the quantity of inputs and the quantity of output
(d) the quantity of inputs and input prices

[Ans. (c) the quantity of inputs and the quantity of output]

PART - B

ANSWER THE FOLLOWING QUESTIONS IN ONE OR TWO SENTENCES.

21. Classify the factors of production.

Ans. Land, Labour : 'primary factors of production'.

Capital and Organisation : 'secondary factors of production'.

22. Define Labour.

Ans. According to Marshall, labour represents **services provided by the factor labour**, which helps in **yielding an income** to the owner of the labour-power.

23. State the production function. [QY-2019]

Ans. According to George J. Stigler, "Production function is the relationship between inputs of productive services per unit of time and outputs of product per unit of time."

Production function may be expressed as:

$$Q = f(N, L, K, T)$$

Where, Q = Quantity of output, N = Land; L = Labour; K = Capital; and T = Technology.

24. Define Marginal Product of a factor. [BEQ]

Ans. (i) Marginal product is the addition or the increment made to the total product when one more unit of the input is employed.

(ii) In other words, it is the ratio of the change in the total product to the change in the units of the input.

$$(iii) MP = \Delta TP / \Delta N \text{ or } MP_n = TP_n - TP_{n-1}$$

25. What is Iso- cost line?

Ans. (i) The iso - cost line is an important component in analysing producer's behaviour.

(ii) The iso-cost line illustrates all the **possible combinations of two factors** that can be used at given costs and for a given producer's budget.

(iii) It is otherwise called as "**Iso-Price line**" or "**Iso-income line**" or "**Iso-expenditure line**" or "**Total outlay curve**".

26. What are the conditions for producer's equilibrium? [QY-2018]

Ans. The two conditions that are to be fulfilled for the attainment of producer equilibrium.

(i) The Iso - cost line must be tangent to iso - quant curve.

(ii) At point of tangency, the **Iso - quant curve must be convex to the origin** or $MRTS_{LK}$ must be declining.

27. What are the reasons for upward sloping supply curve? [HY-2018; QY-2019]

- Ans. (i)** The price of the commodity increases, the quantity supply of the commodity is also increases.
- (ii)** Thus the supply curve has a positive slope from left to right.

PART - C

ANSWER THE FOLLOWING QUESTIONS IN ONE PARAGRAPH.

28. What are the characteristics of land? [Sep-2020]

- Ans. (i)** Land is a primary factor of production.
- (ii)** Land is a passive factor of production.
- (iii)** Land is the free gift of nature.
- (iv)** Land has no cost of production.
- (v)** Land is fixed or inelastic in supply.
- (vi)** Land is permanent.
- (vii)** Land is immovable.
- (viii)** Land is heterogeneous as it differs in fertility.

29. What are the factors governing elasticity of supply?

Ans. Factors governing elasticity of supply are

- (i)** Nature of the commodity
- (ii)** Cost of production
- (iii)** Technical condition
- (iv)** Time factor

30. What are the functions of Entrepreneur?

Ans. (i) Initiation : [BEQ] [QY-2019; Mar-2020; Sep-2021]
An organizer is the initiator of the business,

(ii) Innovation :
A successful entrepreneur is always an innovator.

(iii) Coordination :
An organizer applies a particular combination of the factors of production

(iv) Control, Direction and Supervision :
An organiser controls so that nothing prevents the organisation from achieving its goal.

(v) Risk-taking and Uncertainty-bearing :
Risks may be insured but uncertainties cannot be insured.

31. State and explain the elasticity of supply. [QY-2018]

Ans. (i) Elasticity of supply may be defined as the degree of responsiveness of change in supply to change in price on the part of sellers.

$$(ii) e_s = \frac{\Delta Q_s}{Q_s} / \frac{\Delta P}{P}; e_s = \frac{\Delta Q_s}{\Delta P} \times \frac{P}{Q_s}$$

(iii) Q = Quantity, P = Price, Δ = Changes.

32. Bring out the Relationship among Total, Average and Marginal Products. [Govt. MQP-2018]

Ans. Relationship among Total, Average and Marginal Products.

Stages	Total Product	Marginal Product	Average Product
Stage - I	Initially it increases at an increasing rate and then increases at a decreasing rate.	At the beginning it increases, then reaches a maximum and starts to decrease.	At the first instant it increases, then attains maximum.
Stage - II	It continues to increase at a diminishing rate and reaches maximum.	It continues to diminish and becomes equal to zero.	It is equal to MP and then begins to diminish.
Stage - III	It diminishes.	It becomes negative.	It continues to diminish but always greater than zero (positive).

33. Illustrate the concept of Producer's Equilibrium.

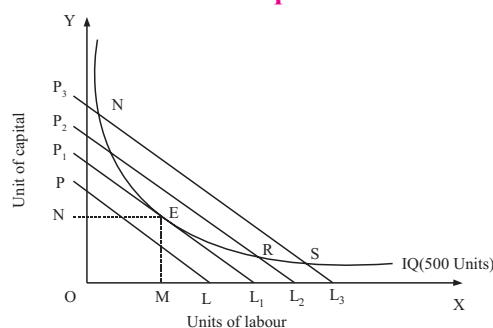
Ans. Introduction

(i) Producer equilibrium implies the situation where producer maximizes his output.

(ii) It is also known as optimum combination of the factors of production.

(iii) Producer's attain equilibrium (or least cost combination of factors is attained by the firm) where the iso-cost line is tangent to an iso product curve.

Producer's Equilibrium



State - II

- (i) In the second stage, MP_L decreases up to sixth unit of labour where MP_L curve intersects the x-axis.
- (ii) MP_L curve is lower than the AP_L .
- (iii) TP_L increases at a decreasing rate.

Stage - III

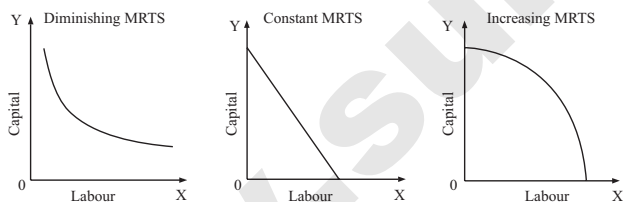
- (i) Third stage of production shows that the sixth unit of labour is marked by negative.
- (ii) MP_L and AP_L continues to fall but remains positive.
- (iii) TP_L declines with the employment of more units of variable factor, Labour.

36. List out the properties of iso - quants with the help of diagrams.

[BEQ] [Govt. MQP-2018; Mar- 2019; QY-2019]

Ans. (A) Properties of Iso quant curve :

- (i) The Iso - quant curve has **negative slope**.
- (ii) It slopes downwards from left to right indicating that the **factors are substitutable**.
- (iii) This explains the Principle of marginal, rate of Technical Substitution ($MRTS_{KL}$)
- (iv) Constant $MRTS$ (Straight line) and increasing $MRTS$ (Concave) are also possible.

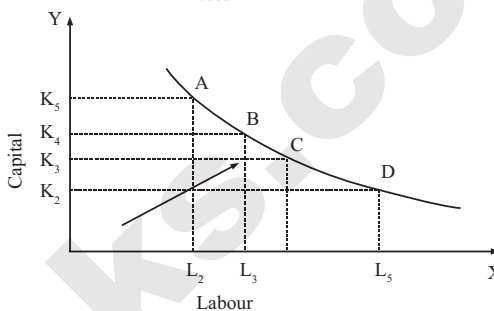
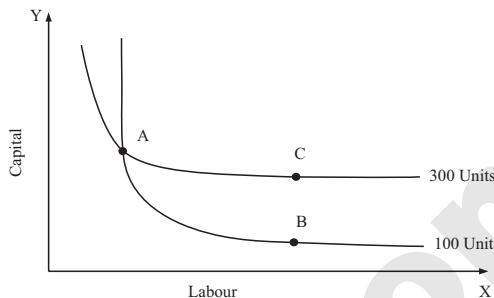


(B) The Iso - quant curve is convex to the origin.

- (i) This means that factors of production are substitutable to each other.
- (ii) The capital substituted per unit of labour goes on decreasing when the Iso quant is convex to the origin.

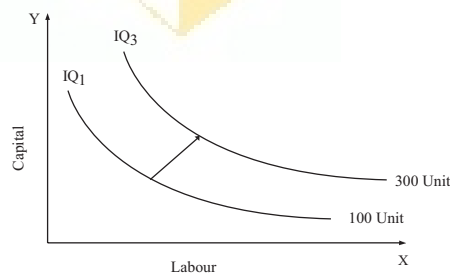
(C) Non inter-section of indifference curve

- (i) For instance, point A lie on the Iso quants IQ_1 and IQ_2 .
- (ii) The point C shows a higher output and the point B shows a lower level of output IQ_1 .
- (iii) $C = A$, $B = A$, so $C = B$; But $C > B$ which is illogical.



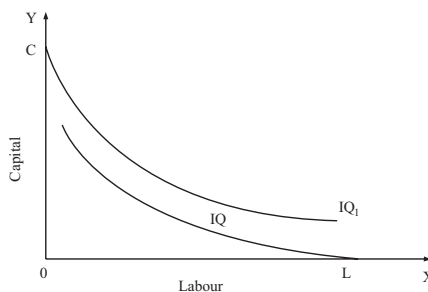
(D) An upper - Iso - quant curve represents a higher level of output:

- (i) Higher IQs shows higher output and lower IQs show lower outputs.
- (ii) The upper iso quant curve implies the use of more factors than the lower of more factors than the lower iso quant curve.



(E) ISO - quant curve does not touch either x axis or y axis :

No Iso quant touches the X axis or Y axis because, IQ_1 , only capital is used and in IQ only labour is used.



GOVERNMENT EXAM QUESTIONS AND ANSWERS

PART - A

MULTIPLE CHOICE QUESTIONS. 1 MARK

(i) Choose the Correct Option

1. Name the returns to scale when the output increases by 3%, for a 5% increase in the inputs, [Govt. MQP-2018]

- (a) Increasing returns to scale
(b) decreasing returns to scale
(c) Constant returns to scale
(d) All of the above

[Ans. (b) decreasing returns to scale]

2. In a firm 6-units of factors produce 30 units of the product. When the number of factor increases by one, the production increases to 42 units. Calculate the Average Product. [Govt. MQP-2018]

- (a) 30 (b) 6 (c) 5 (d) 24

[Ans. (b) 6]

3. $\alpha + \beta = 1$ refers _____ . [Mar-2019]

- (a) Increasing returns to scale
(b) Constant returns to scale
(c) Diminishing returns to scale
(d) None

[Ans. (b) Constant returns to scale]

4. Land is a : _____ . [Sep-2021]

- (a) Passive factor (b) Free gift of nature
(c) Primary factor (d) All the above

[Ans. (d) All the above]

(ii) Choose the Correct Statement.

1. Demand curve can be derived from the law of diminishing marginal utility from which the following assumptions? [Govt. MQP-2018]

- (i) Utility can be measured in quantitative terms
(ii) Utility of money is constant
(a) Only (i) is true
(b) Both (i) and (ii) are true
(c) Only (ii) is true
(d) Neither (i) nor (ii) is true

[Ans. (b) Both (i) and (ii) are true]

PART - C

ANSWER THE FOLLOWING QUESTIONS IN ONE PARAGRAPH. 3 MARKS

1. Mention different stages of returns to scale.

[Govt. MQP-2018]

Labour (Units)	Capital (Units)	Total Product
1	2	4
2	4	11
3	6	19
4	8	29
5	10	39
6	12	49
7	14	57
8	16	63
9	18	67

Solution :

$$MP_n = TP_n - TP_{n-1}$$

Labour units	Capital units	Total Product	Marginal Product	Stages
1	2	4	(4-0)=4	Increasing Returns to scale
2	4	11	(11-4)=7	
3	6	19	(19-11)=8	
4	8	29	(29-19)=10	constant returns to scale
5	10	39	(39-29)=10	
6	12	49	(49-39)=10	
7	14	57	(57-49)=8	Decreasing returns to scale
8	16	63	(63-57)=6	
9	18	67	(67-63)=4	

2. Find out the missing Marginal product and Average Product for the given table. [Mar-2019]

Units of Variable Factor (L)	Total Product (TP)	Marginal Product (MP)	Average Product (AP)
1	2	2	?
2	6	4	3
3	12	?	?
4	16	?	?
5	18	?	3.6
6	18	0	3
7	16	-2	2.28

Ans.

Units of Variable Factor (L)	Total Product (TP)	Marginal Product (MP)	Average Product (AP)
1	2	2	2
2	6	4	3
3	12	6	4
4	16	4	4
5	18	2	3.6
6	18	0	3
7	16	-2	2.28

3. What are the factors governing elasticity of supply? [HY-2019]

Ans. Factors governing elasticity of supply are

- (i) **Nature of the commodity** : Durable goods can be stored for a long time. So, the producers can wait until they get a high price. Once they get higher price, larger supply is possible. The elasticity of supply of durable goods is high. But perishables are to be sold immediately. So perishables have low elasticity of supply.
- (ii) **Cost of production** : When production is subject to either constant or increasing returns, additional production and therefore increased supply is possible. So elasticity of supply is greater. Under diminishing returns, increase in output leads to high cost. So elasticity of supply is less.
- (iii) **Technical condition** : In large scale production with huge capital investment, supply cannot be adjusted easily. So elasticity of supply is lesser. Where capital equipment is less and technology simple, the supply is more elastic.
- (iv) **Time factor** : During very short period when supply cannot be adjusted, elasticity of demand is very low. In short period, variable factors can be added and so supply can be adjusted to adjusted to some extent. So elasticity of supply is more. In long period, even the fixed factors can be added and hence supply is highly elastic.

PART - D

ANSWER THE FOLLOWING QUESTIONS IN ABOUT A PAGE. **5 MARKS**

1. Explain the diseconomies of scale. [QY-2018]

Ans. **Diseconomies of Scale** :

The diseconomies of the scale are a **disadvantage to a firm or an industry or an organization**. This necessarily increases the cost of production of a commodity or service. Further it delays the speed of the supply of the product to the market. These diseconomies are of two types :

- a) Internal Diseconomies of Scale; and
- b) External Diseconomies of Scale

Internal Diseconomies of Scale :

When the scale of production increases beyond optimum limit, its efficiency may come down.

External Diseconomies of Scale :

The term "External diseconomies of scale" refers to the **threat or disturbance** to a firm or an industry from factor lying outside it. For example a bus strike prevents the easy and correct entry of the workers into a firm. Similarly the rent of a firm increases very much if new economic units are established in the locality.

2. Explain the law of supply with a diagram. [HY-2019]

Ans. **Definition** : The Law of Supply can be stated as "Other things remaining the same, if the price of a commodity increases its quantity supplied increases and if the price of a commodity decreases, quantity supplied also decreases".

Assumptions : Law of Supply is based on the following assumptions.

- (i) There is no change in the prices of factors of production.
- (ii) There is no change in price of capital goods.
- (iii) Natural resource and their availability remain the same.
- (iv) Prices of substitutes are constant.
- (v) There is no change in technology
- (vi) Climate remains unchanged.
- (vii) Political situations remain unchanged.
- (ix) There is no change in tax policy.

4

COST AND REVENUE ANALYSIS

CHAPTER SNAPSHOT

Cost and Revenue Analysis

4.1 Introduction

4.2 Cost Analysis

4.3 Cost concepts

4.3.1 Money Cost

4.3.2 Real Cost

4.3.3 Explicit Cost

4.3.4 Implicit Cost

4.3.5 Economic Cost

4.3.6 Social Cost

4.3.7 Opportunity Cost

4.3.8 Sunk Cost

4.3.9 Floating Cost

4.3.10 Prime Cost

4.3.11 Fixed Cost

4.3.12 Variable Cost

4.4 Short run cost curves

4.4.1 Total Fixed Cost

4.4.2 Total Variable Cost

4.4.3 Total Cost Curves

4.4.4 Average Fixed Cost (AFC)

4.4.5 Average Variable Cost (AVC)

4.4.6 Average Total Cost (ATC)

or Average Cost (AC)

4.4.7 Marginal Cost (MC)

4.4.8 The relationship between Average cost and Marginal cost

4.5 Long Run cost curve

4.6 Revenue Analysis

4.6.1 Revenue Concepts

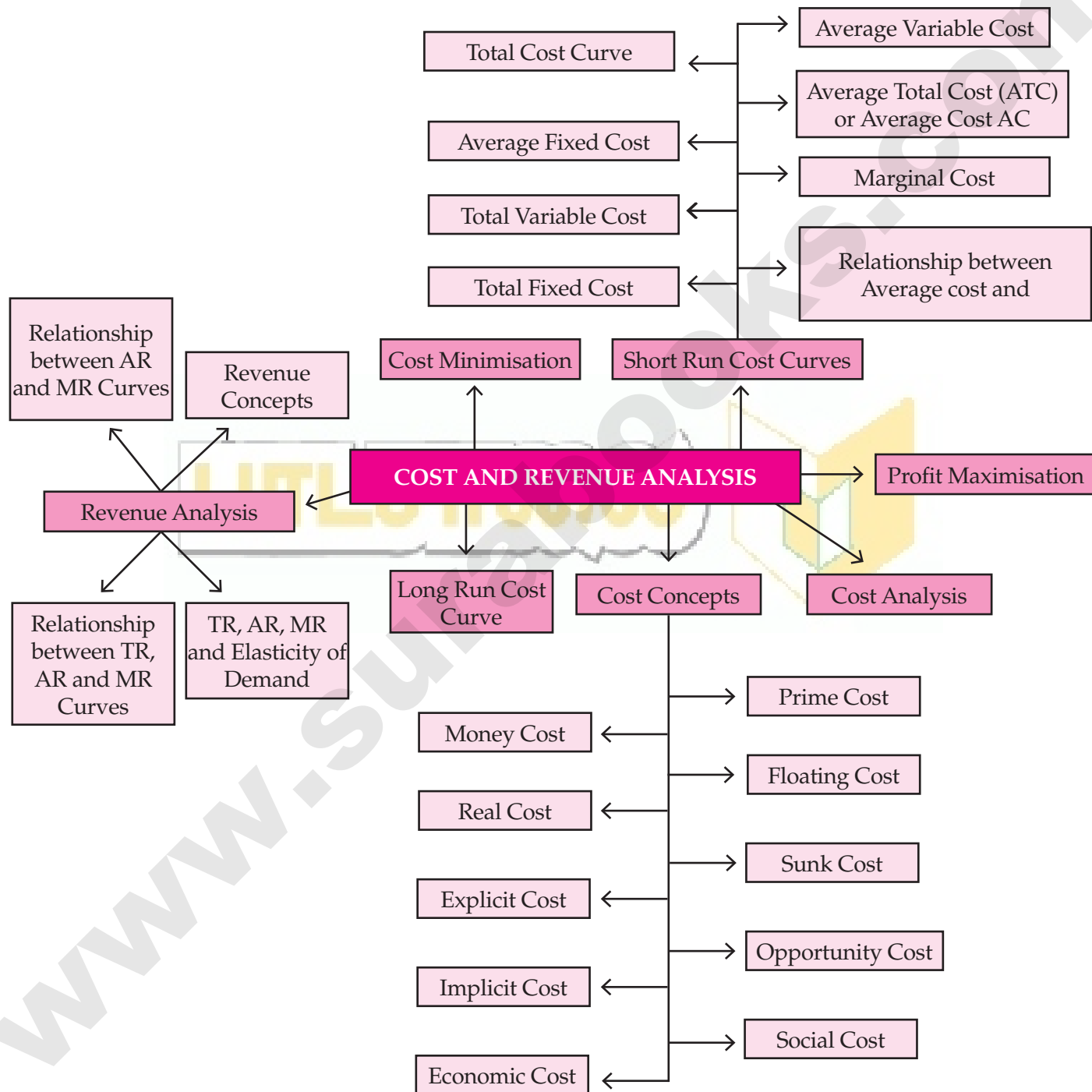
4.6.2 Relationship between AR and MR curves

4.6.3 Relationship among TR, AR and MR curves

4.6.4 TR, AR, MR and Elasticity of Demand

4.7 Conclusion

CONCEPT MAP



TEXTUAL QUESTIONS AND ANSWERS

MODEL QUESTIONS

PART - A

MULTIPLE CHOICE QUESTIONS.

1. Cost refers to _____. [Sep-2020]
 (a) price (b) value
 (c) fixed cost (d) cost of production
[Ans. (d) cost of production]
2. Cost functions are also known as ____ function.
 (a) production (b) investment [BEQ]
 (c) demand (d) consumption
[Ans. (a) production]
3. Money cost is also known as ____ cost. [BEQ] [HY-2018]
 (a) explicit (b) implicit
 (c) social (d) real
[Ans. (a) explicit]
4. Explicit cost plus implicit cost denote ____ cost. [QY-9; Sep-2021]
 (a) social (b) economic
 (c) money (d) fixed
[Ans. (b) economic]
5. Explicit costs are termed as _____. [BEQ]
 (a) out of pocket expenses
 (b) real cost
 (c) social cost
 (d) sunk cost **[Ans. (a) out of pocket expenses]**
6. The costs of self-owned resources are termed as ____ cost.
 (a) real (b) explicit
 (c) money (d) implicit
[Ans. (d) implicit]
7. The cost that remains constant at all levels of output is ____ cost.
 (a) fixed (b) variable
 (c) real (d) social **[Ans. (a) fixed]**
8. Identify the formula of estimating average variable cost. [Govt. MQP-2018; Mar-2019; QY-2019]
 (a) TC/Q (b) TVC/Q
 (c) TFC/Q (d) TAC/Q
[Ans. (b) TVC/Q]
9. The cost incurred by producing one more unit of output is ____ cost.
 (a) variable (b) fixed
 (c) marginal (d) total
[Ans. (c) marginal]
10. The cost that varies with the level of output is termed as ____ cost.
 (a) money (b) variable cost
 (c) total cost (d) fixed cost
[Ans. (b) variable cost]
11. Wage is an example for ____ cost of the production.
 (a) fixed (b) variable
 (c) marginal (d) opportunity
[Ans. (b) variable]
12. The cost per unit of output is denoted by ____ cost. [Sep-2021]
 (a) average (b) marginal
 (c) variable (d) total
[Ans. (a) average]
13. Identify the formula of estimating average cost.
 (a) AVC/Q (b) TC/Q
 (c) TVC/Q (d) AFC/Q
[Ans. (b) TC/Q]
14. Find total cost where $TFC = 100$ and $TVC = 125$.
 (a) 125 (b) 175 [BEQ] [HY-2019]
 (c) 225 (d) 325 **[Ans. (c) 225]**
15. Long-run average cost curve is also called as ____ curve. [Mar-2020]
 (a) demand (b) planning
 (c) production (d) sales
[Ans. (b) planning]
16. Revenue received from the sale of products is known as ____ revenue. [QY-2019; Mar-2020]
 (a) profit (b) total revenue
 (c) average (d) marginal
[Ans. (b) total revenue]
17. Revenue received from the sale of additional unit is termed as ____ revenue. [HY-2018]
 (a) profit (b) average
 (c) marginal (d) total
[Ans. (c) marginal]