

- N. B.:(1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. **Attempt any three of the following:** 15
 - a) Explain inheritance and state its type in C++.
 - b) Explain what are the data types in C++.
 - c) Describe loops. write a C++ program using loop.
 - d) Describe conditions with example.
 - e) Describe variables in details.
 - f) Write a C++ program to convert seconds into hours and minutes.

2. **Attempt any three of the following:** 15
 - a. What is destructor? explain with an example.
 - b. What are functions? explain in detail.
 - c. What are arrays ?describe one-dimensional and multi-dimensional with the help of example.
 - d. Write a C++ program to overload new/delete operators in a class
 - e. Write a C++ program for structure Bank employee to print name of the employee, account number and balance .Display the same also display the balance after withdraw and deposit.
 - f. Describe constructor with the help of example program.

3. **Attempt any three of the following:** 15
 - a. Explain single inheritance in details with a suitable example.
 - b. Describe uses of pointers.
 - c. Write a C++ program that illustrates multiple inheritances.
 - d. What is binding in C++? explain virtual functions.
 - e. What is hierarchical inheritance? Write a program that illustrate hierarchical inheritance.
 - f. Define access modifiers in details.

4. **Attempt any three of the following:** 15
 - a. Explain the various file mode in C++
 - b. What is file handling in C++ ? Explain the importance of file handling in programming.
 - c. Discuss the advantages of using template in C++ programming
 - d. Write a C++ program to demonstrate the use of a template class with two generic data types.
 - e. What is exception handling in C++ explain in details.
 - f. Explain with example template function.

5. **Attempt any three of the following:** 15
 - a. Explain five STL algorithm (template function) with example.
 - b. Explain some functions of 'vector' class.
 - c. What is the importance of namespace.
 - d. Enumerate functions to manipulate String Objects.
 - e. Explain Explicit constructor
 - f. Explain i) Bool and ii) w_char

Fundamental of Microprocessor and MicrocontrollerInstructions:

- 1) All questions are compulsory.
- 2) Mixing of sub questions is not allowed.
- 3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

- a) What is Microprocessor? Explain its application.
- b) Explain Microprocessor Instruction set and state its types.
- c) How does Microprocessor Work? List the different terms used in Microprocessor.
- d) Describe the evolution of Computers.
- e) Distinguish between Microprocessor and Microcontrollers.
- f) Explain with diagram the architecture of Microprocessor.

Q2) Attempt any three: (15)

- a) Describe 8085 Assembly language.
- b) Explain the following terms: [a] Flag [b] Stack pointer [c] Program counter:
- c) Classify 8085 instructions based on functions.
- d) List the important instructions of 8061 microcontroller.
- e) Write the steps involved in debugging a program.
- f) Write a program to add two numbers in 8085 microprocessor.

Q3) Attempt any three: (15)

- a) Explain time delay with the help of diagram.
- b) Explain Stack in Microprocessor. List the set of instructions used in the stack.
- c) Write a short note on Subroutine in Microprocessor.
- d) Distinguish between Hardware interrupt and Software interrupt.
- e) What are interrupts? List 5 interrupt signals in 8085 Microprocessor.
- f) Explain CALL and RET instructions.

Q4) Attempt any three: (15)

- a) What is Embedded system? Explain its key characteristics.
- b) Compare Embedded system and general-purpose computer system.
- c) Explain the classification of Embedded System.
- d) Write a short note on: Application of Embedded System.
- e) Explain Embedded Hardware. List the peripherals in Embedded systems.
- f) Explain CRC and Flash Memory.

Q5) Attempt any three: (15)

- a) Explain Embedded Product Development Cycle.
- b) Explain different trends in Embedded Industry.
- c) Explain the process of converting source code into executable code.
- d) Describe the structure of Embedded Program. Explain infinite loop in embedded programming.
- e) Explain linker in brief. What is static and dynamic linking.
- f) Describe the process of designing embedded system with 8051 Microcontroller.

-----XXXXXXXXXXXXXXXXXXXX-----

Instructions:

- 1) All questions are **compulsory**.
- 2) Mixing of sub questions are **not allowed**.
- 3) Write in clear, legible, writing.

-
- Q I** Attempt any **three** 15
- A) Explain the role of ISP.
 - B) What are the applications of Internet technology?
 - C) Explain E-commerce in detail.
 - D) What is web browser? List and explain any 4 of your choice.
 - E) Explain how to create hyper link? Give suitable example.
 - F) Explain what is style sheet is and what are different types of style sheets?
- Q II** Attempt any **three** 15
- A) Explain how to create navigational aids in HTML?
 - B) Explain difference between Server side and Client side mapping.
 - C) Explain how to use HTML5 semantic tags with suitable example?
 - D) What is table? What are the different attributes are available with it?
 - E) Explain cell padding and cell spacing with suitable example.
 - F) Explain how to incorporate audio/video in HTML5?
- Q III** Attempt any **three** 15
- A) Explain different operators available in JavaScript.
 - B) Explain the use of for in statement with the help of example.
 - C) What are the different types of arrays used in JavaScript?
 - D) What are loop statements in JavaScript?
 - E) Write a program to generate table of given number.
 - F) Write a program to check given number is even or odd.
- Q IV** Attempt any **three** 15
- A) Write a PHP program to do Arithmetic operations.
 - B) Explain different conditional statements in PHP

- C) Explain PHP error handling Techniques.
- D) Write a short note on PHP Superglobals.
- E) Write a short note on Array function in PHP.
- F) Write a PHP program to check given number is even or odd.

Q V Attempt any **three**

15

- A) Write a short note on Session in PHP.
- B) Explain how to create database and table using PHP and MySQL?
- C) Explain mail () function in PHP. Give suitable example.
- D) Explain types of regular expression used in PHP.
- E) Explain use of cookies in PHP.
- F) Write a SQL program to display all the selected items from the database.

NUMERICAL METHOD**Instructions:**

- 1) All questions are compulsory.
- 2) Mixing of sub questions is not allowed.
- 3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

- A) Find the value of $f(6)$ given that $f(4) = 125$, $f'(4) = 74$, $f''(4) = 30$, $f'''(4) = 6$, And all other higher derivatives of $f(x)$ at $x = 4$ are zero.
- B) What is True error, Relative True Error, Approximate Error, Relative Approximate Error.
- C) Find the value of $\sin(2)$ using Taylor series
- D) solve the following examples by using Regular-Falsi method (5 iterations)
 $f(x) = x^3 - x - 1$ root lies in the interval $[1,2]$
- E) solve the following examples by using Bisection method (5 iterations)
 $f(x) = x^3 - x - 2$ root lies in the interval $[1,2]$
- F) The derivative of a function $f(x)$ at a particular value of x can be approximately calculated by
- G) $f'(x) \approx \frac{f(x+h)-f(x)}{h}$
- For $f(x) = 7e^{0.5x}$ and at $x=2$ find the following (a) $f'(2)$ using $h=0.3$
 (b) $f'(2)$ using $h=0.15$ (c) find the approximate error for the value of $f'(2)$ for part b)

Q2) Attempt any three: (15)

- A) Find y at $x=1.5$ by using Newton forward interpolation formula for the following data

X	1	2	3	4	5
y	2	4	8	16	32

- B) find the root of $x^4 - x - 10 = 0$ by secant method. Take $x_0 = 1$, $x_1 = 2$ by using Secant method (5 iterations)
- C) Prepare a forward difference table for $f(x) = x^3 + 5x - 7$ $x = -1(1)5$
- D) Prepare a Backward difference table for $f(x) = x^3$ $x = 1(1)8$
- E) Find the value of $f(3)$ by using Lagrange's interpolation formula

X	1	2	5	6
F(x)	10	15	22	35

- F) solve the following examples by using Newton-Raphson method (5 iterations)

$$x^3 + 3x^2 - 3 = 0 \quad \text{take } x_0 = 0.5$$

Q3) Attempt any three: (15)

- A) Solve the following linear equation by using Gauss Jordan method:

$$x + y + z = 2, \quad 2x - 3y + 2z = -6, \quad x + y - 3z = 6.$$

B) Solve the following system of equation using Gauss-Seidel method. (3 iterations)

$$3x + 8y + 29z = 71, \quad 83x + 11y - 4z = 95, \quad 7x + 52y + 13z = 104.$$

C) using the following table find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=1.1$

X	1	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

D) Find $f'(0)$ & $f''(0)$ from the following table.

X	0	1	2	3	4	5
Y=f(x)	4	8	15	7	6	2

E) Evaluate $\int_0^1 \frac{1}{1+x} dx$, by i) Trapezoidal rule ii) Simpson's $\frac{1}{3}$ rule iii) Simpson's $\frac{3}{8}$ rule. With $h=0.125$

F) The distance covered by an athlete for the 50 metre race is given: Determine the speed of athlete at $t = 5$ sec.

Time(sec)	0	1	2	3	4	5	6
Distance(meter)	0	2.5	8.5	15.5	24.5	36.5	50

Q4) Attempt any three:

(15)

A) Using Taylor Series method to solve the following Differential Equation:

$$\frac{dy}{dx} = x - y \text{ given } y(2)=2, \text{ find } y(2.1).$$

B) Using Euler's method to solve the following Differential Equation:

$$\frac{dy}{dx} = x^2 + y, y(0) = 1, \text{ find } y(0.1) \text{ take } h=0.05$$

C) Find the Regression lines Y on X of equation

Advertising Expenditure('000₹)	3	5	7	9	11
Quarterly Sales('0000 units)	9	12	16	14	15

D) Find the most likely price in Mumbai corresponding to the price of 70rs at Lucknow the following data: Average price at Lucknow (\bar{x}) = 65, Average price at Mumbai (y) = 67, Standard deviation of Lucknow price (σ_x) = 2.5 Standard deviation of Bombay price (σ_y) = 3.5, $r = 0.8$ between the two form.

E) Fit the second degree curve of Regression for the following:

X	0	1	2	3	4
Y	-4	-1	4	11	20

F) Using Runge-Kutta Method of 2nd Order to solve the following Differential Equation:

$$\frac{dy}{dx} = y + x, y(0) = 2, h = 0.1, \text{ find } y(0.2).$$

Q5) Attempt any three:

(15)

A) Write Industrial Applications of L.P.P.

B) Solve graphically the following L.P. problems

$$\text{Minimize } z = 8x + 5y,$$

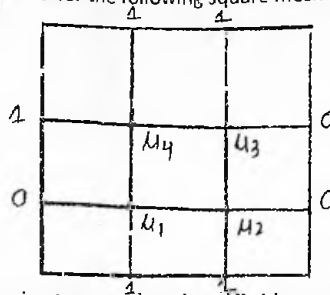
$$\text{Subject to: } 8x + y \geq 12, 4x + 2y \geq 8, x \geq 0, y \geq 0.$$

C) A sick person daily requires 10 units of vitamin V1, 12 units of vitamin V2 and 20 units of mineral M daily. He consumes tablets with brand names X and Y to meet his requirements. Each tablet of brand X has 4 units of V1, 3 units of V2 and no M. Each tablet of brand Y has 1 unit of V1, 2 units of V2 and 4 units of M. Cost of tablet X is Rs 40 and that of a tablet Y is Rs 60.

How many tablets of each brand should he consume to minimize the daily expenditure on them?

D) Advantages and limitations of L.P.P.

E) Solve the elliptic $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ for the following square mesh with boundary values given below. By Jacobi method



F) A machine is used for producing two product A and B. A is produced by using 4 units of chemical salt and 2 units of chemical mixture. Product B is produced by using 2 units of chemical salt and 3 units of chemical mixture. Only 1000 units of chemical salt and 1500 units of chemical mixture are available. The profit on product A is Rs 30/unit and on B is Rs 20/unit. Formulate this L.P.P. and find the number of products of A and B type that maximizes the profit.

Green ITInstructions:

- 1) All questions are **compulsory**.
 - 2) Mixing of sub questions is not allowed.
 - 3) Write in clear, legible, writing.
-

Q1) Attempt any three: (15)

- A) Explain working of non-regularity of government initiative industry associative and standard bodies?
- B) What is toxin? Explain how it can spoil the environment?
- C) What are the main causes for occurrence of carbon footprint explained with diagram?
- D) Write a short note on Hot-Aisle and Cold-Aisle Layout?
- E) Explain how temperature flows in a data center?
- F) Explain several points which have to be considered while designing a cooling system for an organization?

Q2) Attempt any three: (15)

- A) Explain how power usage can be measured with different techniques?
- B) What aisle explains it with different types of it?
- C) Which kind of computer is known as a notebook explains the difference between notebook and laptop computer?
- D) Explain how temperature flows in the data center and write a short note on the hot and cold aisle?
- E) Why does green software sometimes refer to a sustainable software explain?
- F) Which kind of computer is known as a notebook explains the difference between notebook and laptop computer?

Q3) Attempt any three: (15)

- A) What is meant by green PC? Explain various suggestions that should be kept in mind while computing via green PCs?
- B) What are the general impacts of paper making on the environment?
- C) What is EDI? Explain how green computing can be maintained using EDI?
- D) Explain advantages and disadvantages of outsourcing?
- E) Which kind of computer is known as Notebook? Explain the differences between notebook and laptop computers?
- F) Why is green software, sometimes referred to as sustainable software? Explain?

Q4) Attempt any three: (15)

- A) Write a short note on hazardous waste's life cycle?
- B) Write a short note on the check list and certifications for recycling?
- C) Differentiate between following:
 - a) Mobile VS Computer
 - b) Laptop VS Desktop
 - c) Laser Jet VS Ink Jet Printer

- D) Write a short note on a virtualized server?
- E) Write some common keyboard shortcuts used in the local desktop?
- F) Write a short note on Energy Star and green computing?

Q5) Attempt any three:

(15)

- A) Explain flow of task for computing metrics parameter with diagram?
- B) Write a short note on customer interaction with respect to green computing?
- C) What is meant by TCCO? What does it provide?
- D) Explain the global impact of billions of PCs?
- E) Write a short note on simple incoming work flow for a paperless office?
- F) Write a short note on:
 - a) server virtualization
 - b) storage consolidation
 - c) data center cooling infrastructure

Green Computing**Instructions:**

- 1) All questions are **compulsory**.
 - 2) Mixing of sub questions is not allowed.
 - 3) Write in clear, legible, writing.
-

Q1) Attempt any three: (15)

- A) What is meant by green computing? Explain why it is mandatory for today's generation?
- B) What is meant by carbon footprint explain existing ISO stands related to carbon footprint measurement?
- C) What is GHG? Explain how GHG can increase global warming?
- D) Explain the concept of Wee Directive?
- E) Explain the RoHS in detail?
- F) What is Toxins explain in detail?

Q2) Attempt any three: (15)

- A) What is meant by virtualization and explain data duplication?
- B) Explain various types of service and roles played by them in networking?
- C) Write a short note on green server and green linux?
- D) Explain how temperature flows in the data center and write a short note on the hot and cold aisle?
- E) Explain how Datacenter Design?
- F) Which kind of computer is known as a notebook explains the difference between notebook and laptop computer?

Q3) Attempt any three: (15)

- A) Explain Global impact of local Action?
- B) What are the general impacts of paper making on the environment?
- C) What is EDI? Explain how green computing can be maintained using EDI?
- D) What is paperless billing? Explain why would an organisation choose paper-free billing?
- E) What is a pollutant? Explain its different types?
- F) Explain benefits of water recycling?

Q4) Attempt any three: (15)

- A) Write a short note on a virtualized server?
- B) Write some common keyboard shortcuts used in the local desktop?
- C) Write a short note on Energy Star and green computing?
- D) List the right major groups of waste management methods?
- E) What is meant by Hard Drive Recycling. Explain its consequences?
- F) Write a short note on hazardous waste's life cycle?

Q5) Attempt any three:

(15)

- A) Explain flow of task for computing metrics parameter with diagram?
- B) Write a short note on customer interaction with respect to green computing?
- C) What is meant by TCCO? What does it provide?
- D) Explain brief activities in green supply chain management with diagram?
- E) Explain benefits of green it business certifications
- F) Write a short note on the following for staying green
 - a) tracking data
 - b) baseline data