F.Y.B.Sc.(I.T.) – Semester II (April 2024)
GREEN IT

(Time: 2½ hours)

Total **Marks: 75**

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 how green computing effect on cost savings?
　b.　What effects on climate change are being seen due to carbon footprint?
　c.　What is Green Computing? What steps can be taken to reduce carbon emission?
　d.　Write down the typical functions that green IT based applications perform.
　e.　Write a short note on REACh.
　f.　What are the steps taken to green the data centres? Explain.

2.　**Attempt *any three* of the following:**　　　　　　　　　　　　　　　15
　a.　Explain any two low-cost devices for checking power on workstations.
　b.　Write a short note on MAID.
　c.　Explain any two ways to reduce power usage.
　d.　Explain on demand cooling. What is HP's solution to cooling?
　e.　How to prevent Recirculation of Equipment Exhaust?
　f.　How to achieve proper humidity levels in data centers?

3.　**Attempt *any three* of the following:**　　　　　　　　　　　　　　　15
　a.　Explain the efforts towards greening the PC, notebooks and servers.
　b.　Explain the strategies towards green software.
　c.　List the tips to keep water usage under control. Also list the issues to prevent wasted water.
　d.　How should we go about outsourcing? Explain briefly.
　e.　Write a note on Environmentally Preferable Purchasing Plan.
　f.　What are the benefits of using a Value-Added Network (VAN).

4.　**Attempt *any three* of the following:**　　　　　　　　　　　　　　　15
　a.　Give advantages and disadvantages of buying equipments.
　b.　What are the things to be kept in mind when designing your system?
　c.　How can the CDs and DVDs be recycled?
　d.　What is certification program? List different certification programs. Explain any one.
　e.　Write a short note on thin clients.
　f.　Write down the steps to configure remote desktop server.

5.　**Attempt *any three* of the following:**　　　　　　　　　　　　　　　15
　a.　Write a short note on selecting metrics.
　b.　Explain characteristics of Software as a Service.
　c.　Write a short note on VMware Installation.
　d.　How to convince the CEO about the green initiatives?
　e.　What are the issues to be kept in mind when collecting data?
　f.　List and explain key strategies to review action plan.

F.Y.B.Sc.(I.T.) – SEMESTER II (APRIL 2024)
WEB APPLICATION DEVELOPMENT

(Time: 2½ hours)   **Total Marks: 75**

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(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 email as an application of internet.
   b. Explain DNS Root Servers and working of DNS Servers.
   c. Write a short note on IIS.
   d. Explain the following terms:
      i) HTML Elements   ii) HTML Empty Element   iii) HTML Attributes
   e. Write HTML Code to create a web page demonstrating ordered list with all its attributes.
   f. List and explain any five CSS Text properties.

2. **Attempt _any three_ of the following:**   **15**
   a. Write HTML code to create a web page with a Graphical Navigation Bar.
   b. Write HTML code to create a web page with images demonstrating all attributes of image tag.
   c. Write a short note on embedding audio files.
   d. How are tables created in HTML? How can tables be used for page layout? How is the table size changed?
   e. Explain the password field with its properties.
   f. Write HTML code to design the following web page. Minimum value for age should be 18 and maximum value 25.

   ### Scholarship Application Form

   Name: [   ]

   Contact Number: [   ]

   Email Address: [   ]

   Age: [▲▼]

   Admission Date: [dd - mm - yyyy 📅]

   [Apply]

3. **Attempt _any three_ of the following:**   **15**
   a. Explain the term "Declaring Variables". Explain the different ways of declaring variables in JavaScript.
   b. Write JavaScript code to accept three values from the user and display the greatest number using if()..else if() ladder.
   c. What will be the output of the following JavaScript code? Explain the JavaScript Array Object properties and methods used in the program.

```
<script>
        var sub1 = ["PPC", "DLA", "FDBMS", "CLDS", "TCS"];
        var sub2=["OOPs","FMPMC","WAD","NM","GIT"];
        Array.prototype.display = function()
        {
                for(i=0;i<this.length;i++)
```

```
        }
        var fy = sub1.concat(sub2);
        fy.display();
        document.write("<hr>");
        var s1 = sub2.join();
        var s2 = sub2.join("<br>");
        document.write ("<p>" + s1);
        document.write ("<p>" + s2);
        document.write("<hr>");
        sub1.reverse();
        sub1.display();
</script>
```

d. List and explain any ten methods of Date Object in JavaScript.

e. Explain the different mouse events and keyboard events in JavaScript.

f. Write JavaScript code to validate a form with fields for name, password and a submit button. Name should contain only alphabetic characters and should not be blank. Password must be minimum 8 characters with a combination of atleast one lowercase letter, one uppercase letter and one digit.

4. **Attempt _any three_ of the following:**   15
a. What are the rules for variable names in PHP? What are the data types in PHP?
b. List and explain arithmetic and comparison operators in PHP.
c. Write PHP code to demonstrate scope of variables in PHP.
d. Explain the following string functions in PHP with suitable examples:
   i) chr()   **ii)** lcfirst()   **iii)** str_replace   **iv)** strpos()   **v)** strlen()
e. What will be the output of the following PHP code? Explain the Math Object properties and methods used in the code.

```
<body>
    <?php
        echo("<br>" . bindec("011011"));
        echo("<br>" . floor(4.5));
        echo("<br>". rand(1, 100));
        echo("<br>" . round(10.1274, 2));
        echo("<br>" . pow(10,2));
    ?>
</body>
```

f. Write a short note on Character Class in PHP Regular Expressions.

5. **Attempt _any three_ of the following:**   15
a. List and explain any eight date format specifiers in PHP. Write PHP code to create a variable with current date and display the date using date format specifiers.
b. Write a short note on sessions in PHP.
c. Write PHP code to demonstrate cookie in PHP.
d. Write PHP code to add one row to table emp (eno, ename, salary) using HTML form.
e. Write a short note on MySQL Prepared.
f. Explain queries with syntax for
   i) Viewing data from a table
   ii) Filtering records
   iii) Updating records
   iv) Deleting records

F.Y.B.Sc.(I.T.) – Semester II (April 2024)
NUMERICAL METHODS

(Time: 2½ hours)

Total Marks: 75

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     (6) Use of **Non-programmable** calculators is **allowed**.

1 Attempt *any three* of the following: **15**

a Let $u = \frac{1}{3}xy^2z^3$. Find % relative error of given function at $x = 2, y = 1, z = 2$ when $\Delta x = 0.003, \Delta y = 0.001$ & $\Delta z = 0.002$

b Define : Truncation Error
Hence, find the truncation error in the series of trigonometric function given as
$$sinx = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + - - - - - - \quad \text{for the computation of first 4 terms in the}$$
expansion at $x = \pi/4$

c True value of x is 6.2768645. Approximate value of x is 6.28. Find the absolute error, relative error & percentage error in the calculation of $z = 5x^3 + 4x^2 - x + 4$

d What is meant by rounding-off errors? Explain with examples.

e Use fourth order Taylor's series expansion to predict $f(2)$ for
$f(x) = 5x^4 - x^3 + 4x^2 + x + 10$ taking $h = 0.05$. Also compute relative error

f Explain the following terms
    i)   Blunders
    ii)   Accuracy
    iii)   Precision

2 Attempt *any three* of the following: **15**

a Use appropriate interpolating formula to estimate y at $x = 8$

x	5	10	15	20
y	50	70	100	145

b Find the real root of $3x - cosx - 1 = 0$ by Newton Raphson Method [Let $x0 = 0.4$]

c Construct backward difference table from the given set of values & hence find
$\nabla y2, \nabla^2 y4, \nabla^3 y3, \nabla^5 y5, \nabla^4 y5$

x	1	2	3	4	5	6
y	1.4130	1.5232	1.6858	1.7176	1.8195	1.9174

d Find approximate root of $x^3 - 4x - 9 = 0$ by bisection method up to 4 stages.

e Find Lagrange's interpolating polynomial passing through set of values
$(x, y) = (1, 3), (3, -3), (4, -3)$

f Explain the following terms with suitable example of each
    i)   Interpolation
    ii)   Transcendental Non-Linear Equation

3 Attempt _any three_ of the following: 15

a Solve the given system of linear equations by Gauss Elimination Method
$4x + y + z = 8, 2x + 5y - z = 10, 2x + 2y + z = 8$

b Solve the given system of linear equations by Gauss Seidel Method
$6x + y + z = 20, x + 4y - z = 6, x - y + 5z = 7$

c. Evaluate: $\int_0^6 \frac{x}{x^2+3} dx$ dividing the interval into 6 equal parts by Simpson's 3/8th rule

d Evaluate: $\int_{1.2}^2 x \log x \, dx$ dividing the interval into 8 equal parts by appropriate rule

e. Evaluate: $\int_0^\pi (8 + 4 \sin x) \, dx$ dividing the interval into 7 equal parts by appropriate rule

f. Find $\frac{d^2y}{dx^2}$ at $x = 1.6$ from the given set of values of (x, y)

x	1.2	1.3	1.4	1.5	1.6
y	0.9320	0.9636	0.9855	0.9975	0.9996

4 Attempt _any three_ of the following: 15

a Solve $\frac{dy}{dx} = 2 + \sqrt{xy}$ with initial condition $y(3) = 1.4133$ at $x = 3.01$ taking
$h = 0.01$ by Runge-Kutta Method of 4th order

b Solve $\frac{dy}{dx} = \log(x + y)$ with initial condition $y(1.1) = 2.54$ at $x = 1.2$ taking $h = 0.1$ by
Modified Euler's Method

c. Fit an exponential curve of the form $y = ae^{bx}$ passing through given set of values

x	1	2	3	4	5
y	2.4428	2.9836	3.6442	4.4511	5.4366

d Fit an equation of straight line of the form $y = a + bx$ passing through given set of values
& hence find y at $x = 2.4$

x	4	3	6	12	10	9	7
y	14	11	20	38	32	29	23

e. Fit an equation of 3-D plane of the form $x = a + by + cz$ passing through given set of
values & hence find x at $y = 1.2$ & $z = 3.3$

x	20.1	17.1	13.9	9.7
y	4	8	2	1
z	5	0	4	3

f. Solve $\frac{dy}{dx} = 4x + 3y$ with initial condition $y(1.5) = 2.3120$ at $x = 1.51$ taking
$h = 0.01$ by Taylor's Series Method

5 Attempt _any three_ of the following:

15

a Doctor has recommended his patient to purchase three types of food packets F1,F2 & F3. Each food packet contains two nutrients proteins & Vitamin C. One packet of F1 contains 12 mg of protein & 10 mg of Vitamin C. One packet of F2 contains 15 mg of protein & 20 mg of Vitamin C. One packet of F3 contains 8 mg of protein & 12 mg of Vitamin C. Minimum daily requirement of protein is 50 mg & Vitamin C is 45 mg. Cost of one packet of F1 is Rs.32 , one packet of F2 is Rs.20 & one packet of F3 is Rs.25. Formulate the above problem as LPP

b Explain :Unbounded solution of LPP in Graphical Method. Support your answer with suitable example

c. Solve the following LPP by graphical method

$Max\ z = 3x + 4y$ Subject to $x + y \leq 100$, $x + 2y \leq 120$, $x, y \geq 0$
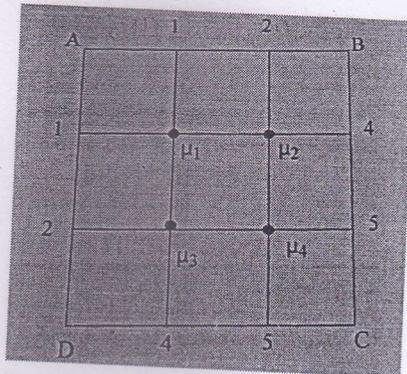
d Classify the following equations as Elliptic equation, Parabolic Equation & Hyperbolic Equation

   i) $3\frac{\partial^2 u}{\partial x^2} - 4\frac{\partial^2 u}{\partial x \partial y} + 6\frac{\partial^2 u}{\partial y^2} - 6\frac{\partial u}{\partial x} + 3u = 0$

   ii) $(1 + x^2)\frac{\partial^2 u}{\partial x^2} + (5 + 2x^2)\frac{\partial^2 u}{\partial x \partial t} + (4 + x^2)\frac{\partial^2 u}{\partial t^2} = 0$

   iii) $2\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 2\frac{\partial^2 u}{\partial y^2} - 4x\frac{\partial u}{\partial y} + 5\frac{\partial u}{\partial y} - 4u = 0$

e. Solve the Laplace equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ up to 2 decimal places from the square mesh given below

f. Define the following terms:
   i)   Feasible Region
   ii)   Objective Function
   iii)   Redundant Constraint

(Time: 2½ hours)

Total Marks: 75

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    (5) Draw **neat labeled diagrams** wherever **necessary**.
    (6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt *any three* of the following:**   15
a. Describe c++ program structure in detail.
b. Write a program to check entered number is even or odd.
c. Give the syntax of **for** loop with suitable example.
d. Write a short note on Grady Booch Approach.
e. Write a program to calculate gross salary of person. Given Basic Salary (BS) as input. If BS > 5000 DA = 55% and HRA=15% else DA = 45% and HRA=10% of BS.
f. Discuss different types of type conversion in C++.

2. **Attempt *any three* of the following:**   15
a. What is call by value? Explain with suitable example.
b. What is function overloading? Give an example.
c. Define class, object, data members, member functions, access specifier.
d. Write a C++ program using classes and object **Student** to print name of the student, roll number, Display the same.
e. Write a program to overload – decrement operator
f. Write a note on friend function.

3. **Attempt *any three* of the following:**   15
a. What is an inheritance? Explain any type with suitable example and diagram.
b. Write a note on virtual base class.
c. Define virtual function. List virtual function rules.
d. Write a program to demonstrate destructor.
e. Explain this pointer with example.
f. List types of manipulators. Give suitable example.

4. **Attempt *any three* of the following:**   15
a. Write a program to read and write from and to file.
b. What is a template programming? Give example.
c. Write a note on exception handling with suitable example.
d. List file types also List access mode of files with description of it.
e. Write a note on **getline()** function with suitable example.
f. Write a program to swap two integers and two float number using function template.

5. **Attempt *any three* of the following:**   15
a. Write a note on components of STL in brief.
b. Distinguish between arrays and vectors.
c. Explain how to obtain string characteristics with suitable example.
d. Write a program to take strings from user, perform compare and swap operation on it.
e. Explain bool datatype with example
f. What is explicit conversion? How is it achieved?

(Time: 2½ hours)

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1. **Attempt _any three_ of the following:** 15
a. Explain following signals of microprocessor 8085:
   i) SOD ii) IO/M' iii) READY iv) INTR v) HOLD
b. Write a short note on Tri-state devices.
c. What is a microprocessor? State different characteristics of microprocessor 8085.
d. Explain in detail organization of a Microprocessor-Based System.
e. Define following terms:
   i) Address bus ii) Assembly Language iii) ALU iv) OPCODE v) Mnemonic
f. Explain in detail Opcode Fetch Machine Cycle.

2. **Attempt _any three_ of the following:** 15
a. Explain in brief Memory mapped I/O technique.
b. State various Logical operations perform by the microprocessor 8085.Explain any two instructions from Logical group.
c. I) Write Addressing modes of following instructions:
   i) RLC ii) SUI 87H iii) LDAX B iv) CMP M v) CALL 2050H

   II) Write length of the following instructions:
   i) MOV B, D ii) LXI H, 2050H iii) ORI 56H iv) CMA v) RET
d. Explain the following instructions with suitable example.
   i) XCHG ii) DAD D
e. State whether following instructions are valid or invalid. If invalid then state the reason and write the valid instruction.
   i) CPI 4FH ii) SUB B iii) STAX 3050H iv) ADD 59H v) DCX M
f. Write an Assembly Language program for the following and also specify the contents of Accumulator and status of Carry, Parity and Zero flags.
   Load data byte 82H into register D. Load data byte 57H into memory location 2050H.Perform addition operation of contents of register D and contents of memory location.

3. **Attempt _any three_ of the following:** 15
a. Explain the following:
   i) Vectored and Non-Vectored Interrupts
   ii) Maskable and Non-Maskable Interrupts
b. Write a short note on Stack Memory.
c. Compare **RLC** and **RRC** instructions with suitable examples.
d. Explain the concept of subroutine and also discuss the instructions associated with it.
e. What do you mean by an Interrupt? Discuss INTR interrupt process.
f. I) Explain the following instructions: i) INX B ii) SUB M

   II) Ten numbers are stored from memory location 8051H. Write an assembly language program to find largest number from the series of numbers. Store largest number at memory location 8090H.

15

4.   **Attempt _any three_ of the following:**
a.   What is an embedded system? Discuss various applications of embedded system.
b.   Differentiate between microprocessor and microcontroller.
c.   Explain in detail Von-Neumann architecture design.
d.   Define the following: i) EPROM ii) EEPROM iii) Flash Memory
e.   What is RISC? State various characteristics of it.
f.   Explain different classification of embedded system on the basis of complexity and performance.

15

5.   **Attempt _any three_ of the following:**
a.   Differentiate between RISC and CISC processors.
b.   State various features of Pentium Processor.
c.   Explain the block diagram of Pentium Processor.
d.   Explain in detail i3, i5 and i7 processors.
e.   Explain general purpose registers of Pentium.
f.   Explain in detail SPARC processor.

F.Y.B.Sc.(I.T.) – Semester II (April 2024)
FUNDAMENTALS OF MICROPROCESSORS AND MICROCONTROLLERS

(Time: 2½ hours)

Total Marks: 75

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    (5) Draw **neat labeled diagrams** wherever **necessary**.
    (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: 15
a. What is a microprocessor? State different characteristics of microprocessor 8085.
b. Define Tri-state and explain any one Tri-state device.
c. Explain in detail organization of a Microprocessor-Based system.
d. What is SRAM and DRAM? Discuss various characteristics of them.
e. Write a short note on externally initiated signals of a microprocessor 8085.
f. Explain in detail special-purpose and general-purpose registers of 8085 microprocessor.

2. Attempt *any three* of the following: 15
a. State whether the following instructions are valid or invalid. If invalid then state the reason and write the valid instruction.
    a) XCHG D b) DAD B c) MVI B,8050H d) LDA 2040H e) ORI 4050H

b. With suitable examples, explain different addressing modes of 8085 microprocessor.
c. Differentiate between INR H and INX H instructions with suitable examples.
d. Write a short note on a Logical Group of instructions.
e.   i)   Write a short note on DAA instruction.
    ii)   Write the length of the following instructions in Bytes.
        a) LDA 7080H b) MVI M ,60H c) CMA

f. Specify the Accumulator content and flag register status as the following instructions are executed:
        MVI A, C7 H
        XRI 45H
        ADI 59H
        HLT

3. Attempt *any three* of the following: 15
a. What are the similarities and differences between PUSH POP and CALL RETURN?
b. Two-digit BCD number stored in memory location 8050H. Write an assembly language program to unpack the BCD number and store the two digits in memory location 8070H and 8071H in such a way that 8070H will have a lower BCD digit.
c. What do you mean by an Interrupt? Explain the process of Interrupt in 8085.
d. Explain the concept of a subroutine and also discuss the instructions associated with it.
e. Compare **RLC** and **RAL** instructions with suitable examples.
f. Write a short note on SIM (Set Interrupt Mask)

4. **Attempt _any three_ of the following:**　　　　　　　　　　　　　**15**
a. Differentiate between: RISC and CISC architecture.
b. With the help of a suitable diagram, explain the Harvard architecture design of the microcontroller.
c. What is an Embedded System? How does it differ from a general computing system?
d. Define the following: i) EPROM ii) EEPROM iii) Flash Memory
e. Write a short note on applications of Embedded Systems.
f. Explain the different classifications of Embedded Systems.

5. **Attempt _any three_ of the following:**　　　　　　　　　　　　　**15**
a. With the help of block diagram, explain architecture of 8051 microcontroller.
b. Explain in detail Embedded Product Development Cycle.
c. Write a short note on RAM space allocation in 8051.
d. Discuss various factors to be considered while selecting a microcontroller.
e. Explain in detail PSW register of 8051.
f. Discuss various features of microcontroller 8051.