Exam. Code : 118001
Subject Code : 501122

Bachelor of Science (Hons.) Information Technology
1st Semester (Batch 2025-29) (CBGS)

INTRODUCTION TO PROGRAMMING USING PYTHON

Time Allowed—3 Hours] [Maximum Marks—75

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) What are the steps involved in problem-solving using programming?

   (b) How do you represent a program's logic using a flowchart?

2. (a) What are key features of the Python programming language?

   (b) What's the basic structure of a Python program?

SECTION—B

3. (a) What is the difference between if and if-else statements in Python?

   (b) How do you use nested conditions in Python?

4. What is the difference between mutable and immutable data types in Python? How does it apply to strings?

SECTION—C

5. What is a recursive function? Give an example.

6. (a) What is the purpose of using modules in Python? How do you import a module in Python?

   (b) What is the __main__ attribute in a Python module?

SECTION—D

7. How do you handle file reading errors in Python?

8. (a) How do you open and close a file in Python?

   (b) What's the difference between read and readline functions?

Exam. Code : 118001
Subject Code : 501115

Bachelor of Science (Hons.) Information Technology
1st Sem. (Batch 2025-29) (CBGS)

APPLIED & DISCRETE MATHEMATICS

Time Allowed—3 Hours] [Maximum Marks—100

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The **fifth** question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. (a) If $A = \{4, 5, 7, 8, 10\}$, $B = \{4, 5, 9\}$ and $C = \{1, 4, 6, 9\}$, then verify that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$. 10

(b) A class has a strength of 70 students. Out of it, 30 students have taken Mathematics and 20 have taken Mathematics but not Statistics. Find :

(i) The number of students who have taken Mathematics and Statistics.

(ii) How many of them have taken Statistics but not Mathematics ? 10

2. (a) Check whether the relation R in the set of natural numbers N defined by aRb if $a^2 - 4ab + 3b^2 = 0$, $(a, b \in N)$ is reflexive, symmetric or transitive. 10

(b) If A, B, C are any three sets, then prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$. 10

SECTION—B

3. (a) Prove the distributive law i.e.,

$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$ 10

(b) Check the validity of the following argument :

$(p \rightarrow q), (\sim q \rightarrow \sim r), p \vdash r$ 10

4. (a) Prove that :

$(p \leftrightarrow q) \equiv (p \wedge q) \vee (\sim p \wedge \sim q)$. 7

(b) Show that $p \leftrightarrow \sim q$ does not logically imply $p \rightarrow q$. 6

(c) Verify that proposition $p \wedge (q \wedge \sim p)$ is a contradiction. 7

SECTION—C

5. (a) Let $(B, \div, ., ', 0, 1)$ be a Boolean algebra. Let $a, b \in B$ then prove that :

(i) $a \div b' = a'.b'$

(ii) $(a.b)' = a' \div b'$. 10

(b) Reduce the following expression to sum-of-products form and complete sum-of-products form :

$f(x, y, z) = x(xy' + x'y + y'z)$. 10

6. (a) Use a Karnaugh graph to find a minimal sum-of-products form for :

$E = xy' + xyz + x'y'z' + x'yzt'$. 8

(b) Let $B = \{1, 2, 3, 6\}$ be the set of positive factors of 6. Let the binary operations '+' and '.' on B are defined as follows :

$a + b = l.c.m(a, b)$ and $a.b = g.c.d(a, b)$, $\forall a, b \in B$.

Let the unary operation ' on B is defined by $a' = \frac{6}{a}$, $\forall a \in B$. Show that $(B, +, ., ')$ is a Boolean algebra. 12

SECTION—D

7. (a) Solve the following linear system of equations using matrix inversion method :

$3x + y + 2z = 3$

$2x - 3y - z = -3$

$x + 2y + z = 4$. 10

(b) If $A = \begin{bmatrix} -1 & 3 & 0 \\ -1 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}$, compute AB and BA and check whether AB = BA. 10

8. (a) If $A = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 7 \\ 8 & 9 \end{bmatrix}$, verify that $(AB)^{-1} = B^{-1} A^{-1}$. 10

(b) Using Cayley-Hamilton theorem, find the inverse of matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. 10

Exam. Code : 118001
Subject Code : 501120

Bachelor of Science (Hons.) Information Technology
1st Semester (Batch 2025-29) (CBGS)
COMPUTER FUNDAMENTALS & PC SOFTWARE

Time Allowed—3 Hours] [Maximum Marks—75

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. Which are various applications of computer in study and research?

2. Which are various Input/Output devices? Explain the feature of any two input and any two output devices.

SECTION—B

3. What do you mean by source data automation? Explain the following as input devices: screen assisted data entry and voice recognition system.

4. Which are different types of Printers? Explain their features and uses.

SECTION—C

5. (a) What is the difference between CUI and GUI? Give examples of both.

   (b) Explain the following in MS-Word :

   (i) Bullets and Numberings

   (ii) Macros

   (iii) Page orientation.

6. What is mail merge? Explain its procedure in MS-Word.

SECTION—D

7. Which are various uses/applications of a presentation software like MS-PowerPoint? Explain features of MS-PowerPoint.

8. Explain the meaning and use of the following in MS-Excel:

   (a) Formula and Functions

   (b) Pivot tables.

Exam. Code : 118001
Subject Code : 501121

Bachelor of Science (Hons.) Information Technology
1st Sem. (Batch 2025-29) (CBGS)
INTRODUCTION TO THE INTERNET

Time Allowed—3 Hours] [Maximum Marks—50

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The fifth question may be attempted from any section. All questions carry equal marks.

SECTION—A

1. What is the impact of the Internet? Explain the types of Internet connections in detail. 10

2. (a) What is the purpose of Internet Service Provider? Explain. 5

   (b) Discuss the importance of Web server and Web browser. 5

SECTION—B

3. (a) What is meant by spam emails? Illustrate. 5

   (b) How search engine works uses the operators? Explain. 5

4. Explain the following :

(a) Features of Email 5

(b) Advanced search features 5

SECTION—C

5. Discuss the following concepts by taking suitable examples :

(a) Cloud storage 5

(b) Virtual meeting tools 5

6. Describe the role of the following :

(a) File management 5

(b) Google Meet 5

SECTION—D

7. What is the utility of online profile? How digital portfolios are used? Explain. 10

8. Write notes on the following:

(a) Digital distractions 5

(b) Importance of Digital footprints 5