

2. Match the following : $1 \times 5 = 5$

A	B
(a) Bhopal Gas Tragedy	(i) Japan (1953)
(b) Chernobyl Nuclear Power Plant Disaster	(ii) April, 1986
(c) Minamata Epidemic	(iii) Methyl isocyanate
(d) Nokrek	(iv) Assam
(e) Manas	(v) Meghalaya

3. State **True** or **False** : $1 \times 10 = 10$

- Deforestation in hilly areas often leads to landslides.
- National parks are reserved for the conservation of animals only.
- There are 10 Biosphere Reserves in India.
- Earth Summit was held in 1992 at Rio-de-Janeiro.
- Coal is an example of renewable resources.
- Vegetation Cover prevents soil erosion.
- 10 National parks and sanctuaries have been selected as 'Project Tiger' areas.

(h) Extinction of a species refers to its disappearance from the earth.

(i) Materials which are not created by man are called natural resources.

(j) The vulnerable species are one which have sufficient number of individuals in their habitat.

4. Write the full form of the following : 10
CPCB, EPC, BOD, DDT, WHO, WWF, DOE, DST, FAO, FDC

5. When are the following days observed? 5

(a) World Forest Day

(b) World Health Day

(c) National Science Day

(d) Anti-Tobacco Day

(e) Ozone Day

6. Answer the following questions : $5 \times 5 = 25$

(a) What is environment? What are the components of environment?

(b) Write a short note on atmosphere.

(c) What is ecology? What are the subdivisions of ecology?

(d) Define ecosystem. Classify ecosystem.

(e) Write a short note on food chain.

7. Answer **any two** : $10 \times 2 = 20$

(a) Differentiate between—

(i) Ecosystem and Ecology ;

(ii) Climate and micro-climate.

$5 + 5 = 10$

(b) (i) What is the importance of forests? 5

(ii) What are the important ways of conservation of soil? 5

(c) Write a note on global warming or enhanced greenhouse effect.

(d) What is deforestation? What are its causes? Write how it affects the environment.

(e) Write a note on pollution of sound.

Total number of printed pages—4

44 (1) BCA-ENV-AE-1024

2022

(Held in 2023)

ENVIRONMENTAL STUDIES

Paper : ENV-AE-1024

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : $1 \times 5 = 5$

(a) The term 'ecology' was first defined by _____.

(b) _____ of every year is observed as 'World Environment Day'.

(c) _____ are known as microconsumers or Saprotrophs.

(d) Methyl Isocyanate is used in the manufacture of _____ insecticides.

(e) Chernobyl Nuclear Power Plant Disaster occurred on _____.

(f) Showing gratitude, kindness and discovering your strengths are some of the ways to improve your _____.

(g) _____ is the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups and institutions.

(h) _____ is a state in which there is merging of actions, awareness and sense of self, such as we lose the feeling of consciously controlling our actions.

(i) Feeling some positive emotions everyday has a big effect on your _____ and well-being.

(j) Psychological well-being is a core feature of _____ health which includes hedonic and eudaimonic happiness as well as resilience.

2. Answer the following questions in **2 or 3** lines : $2 \times 5 = 10$

(a) How is happiness defined in Positive Psychology ?

(b) Define negative emotions.

(c) What do you understand by resilience ?

(d) Give *any two* examples of Positive Psychology.

(e) What is meant by mindfulness ?

3. Answer **any four** of the following questions briefly : $5 \times 4 = 20$

(a) What is the main purpose and goal of positive psychology ?

(b) Describe the *four* key concepts of positive psychology.

(c) Write a short note on how can Positive Psychology improve quality of life.

(d) Discuss the nature and sources of happiness.

(e) Describe the techniques of cultivating positive emotions.

(f) Explain the variations of optimism and pessimism.

(g) What are the attributional and explanatory styles in Psychology ?

4. Answer **any four** questions from the following in detail : $10 \times 4 = 40$

(a) Write a brief history of Positive Psychology and describe the scopes of Positive Psychology.

- (b) Present a detailed account of the Broaden-and-build theory of positive emotions.
- (c) What do you understand by subjective well-being? Discuss briefly the various factors affecting well-being.
- (d) Compare and contrast the hedonic and Eudaimonic views of happiness with suitable examples.
- (e) What is mindfulness? What are the benefits of mindfulness? Discuss the essential steps to mindfulness.
- (f) What is PERMA model of happiness and well-being? Briefly discuss the five elements of PERMA model.
- (g) Evaluate the benefits of being optimistic. Elaborate on the source of resilience in adulthood.
- (h) How can Positive Psychology be used/ applied in the field of Education and improving mental health?

Total number of printed pages-4

44 (3) BCA-HG-3026

2022

(Held in 2023)

PSYCHOLOGY

Paper : BCA-HG-3026

(Positive Psychology)

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks with appropriate words/terms : 1×10=10
- (a) Happiness, well-being and _____ are the fields of Positive Psychology.
- (b) _____ is the father of Positive Psychology.
- (c) The belief that good things will happen is called _____.
- (d) Martin Saligman's model of well-being is also known as _____ model.
- (e) The hedonic view equates _____ with pleasure comfort and enjoyment.

- (g) Who was the founder of British Rule in India ?
- (h) What is Swadeshi Movement in India ?
- (i) How many years Mughal ruled over India ?
- (j) Which Mughal Rule ruled for 50 years ?

2. Answer the following question briefly :

2×5=10

- (a) Why is the Gupta period important in Indian history ?
- (b) How the Muslim Rule was found in India ?
- (c) What was the major causes of decline of Mughal Empire ?
- (d) What was the main reason for the arrival of European in India ?
- (e) When was the Indian National Congress formed and who was the first President ?

3. Answer **any six** questions : 10×6=60

- (a) Explain the main features of Indus Vally Civilization.

- (b) Discuss the achievements of the Gupta Empire in the fields of art, architecture and science.
- (c) Briefly explain the periods of Samudragupta and Chandragupta in the Gupta era.
- (d) Define Balban concept of kingship. How was it modified by Alauddin Khilji? Explain.
- (e) Explain the establishment of British power after the Battle of Plassey.
- (f) Explain the religious policies of Aurangzeb's rule.
- (g) Who started the Revolt of 1857 ? Briefly explain the main cause of 1857 Revolt.
- (h) Explain the Quit India Movement and Independence.

Total number of printed pages-3

44 (3) BCA-HG-3016

2022

(Held in 2023)

INTRODUCTION TO INDIAN HISTORY

Paper : BCA-HG-3016

Full Marks : 80

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Answer the following questions very briefly :
1×10=10
 - (a) Which is the major impact of Vedic culture on Indian history ?
 - (b) What is Gupta period in history ?
 - (c) Who laid the foundation of Muslim Rule in India ?
 - (d) What was the normal form of government during the Vedic period ?
 - (e) When was the rise of Mughal Empire ?
 - (f) Who was the first Woman President of Indian National Congress ?

Contd.

2. Answer **any five** of the following questions :

$$2 \times 5 = 10$$

(a) Convert the following 'for loop' to an equivalent 'while loop' :

```
for (int i = 0; i <= 10; i += 2)
    cout << i;
```

(b) What will be the output produced by the following code ?

```
for (int i = 1; i <= 5; ++i)
{
    cout << "Hello";
    if (i % 2) continue;
    if (i % 3) break;
}
```

(c) Write a function to return the length of a string without using any library function. The string is to be passed to the function as a parameter.

(d) With examples show the use of two logical operators available in C++.

(e) With examples show the use and functions of the 'new' and 'delete' operators in C++.

(f) Give *one* example of a template class.

3. Answer **any four** : $5 \times 4 = 20$

(a) What do you mean by function overloading ? Explain with the help of *one* program.

(b) What do you mean by inline function ? Explain with the help of *one* example.

(c) What is friend function ? How can we do overloading using friend function ?

(d) What do you mean by virtual base classes and abstract classes ? Explain briefly.

(e) What is virtual function ? Explain.

4. Answer **any four** : $5 \times 4 = 20$

(a) Write a program that reads a text file and creates another file by removing all blank spaces.

(b) Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.

(c) Write a class template for storing an array of elements. Overload the << and >> operators. Write a member function to sort the array in descending order.

- (d) Explain the concept of single and multiple inheritance with the help of *one* example.
- (e) Explain data hiding with the help of one example.
5. Write short notes on : **(any four)** $5 \times 4 = 20$
- (a) Dynamic initialization of objects
- (b) Prefix and postfix operator overloading
- (c) Scope resolution operator and its application
- (d) Memory allocation of objects
- (e) Pure virtual function

Total number of printed pages-4

44 (BCA-3) 3-4

2022
(Held in 2023)

OBJECT ORIENTED PROGRAMMING
IN C++

Paper : 3-4

Full Marks : 80

Time : Three hours

The figures in the margin indicate
full marks for the questions.

1. Answer **any two** of the following : $5 \times 2 = 10$
- (a) Explain the concept of inheritance used in C++ with examples.
- (b) State the similarities and the differences between object oriented programming and procedure oriented programming.
- (c) Define a constructor and a destructor. Explain with *one* example.

2. Answer **any five** questions : $2 \times 5 = 10$

- (a) Define C# variables and C# operators.
- (b) What do you mean by class and object in C#?
- (c) Define constructor and destructor in C#.
- (d) What do you mean by abstract classes in C#?
- (e) Define 'while' and 'do while' loops in C#.
- (f) Define I/O stream class in C#.
- (g) Define managed and unmanaged codes in C#.

3. Answer **any seven** questions : $5 \times 7 = 35$

- (a) Briefly explain C# polymorphism with example.
- (b) Briefly explain interface in C# with example.
- (c) Write the different steps to install visual studio for C# in Windows.

- (d) Briefly explain Arrays in C# with example.
- (e) Write a program in C# which takes your information (name, age, address, marks etc.) as input and print your information.
- (f) Write a program in C# to illustrate single inheritance.
- (g) Write a program in C# to read the contents of the file.
- (h) Write a program in C# to perform bubble sort.
- (i) Write a program in C# to perform matrix addition.
- (j) Write a program in C# to kill a thread.

Total number of printed pages-3

44 (3) BCA-SE-3024

2022
(Held in 2023)

PROGRAMMING WITH C#

Paper : BCA-SE-3024

Full Marks : 50

Time : Two hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer the following questions :

1×5=5

- (a) What is C# ?
- (b) Write *two* applications of C# programming.
- (c) What do you mean by private access modifiers in C# ?
- (d) Write basic data types used in C#.
- (e) What is stack in C#?

Contd.

- (d) In Python, _____ package manager is used to install and manage software packages. (Fill in the blank)
2. Define the following terms : $2 \times 3 = 6$
- amssymb
 - Ranging operator (:) in Scilab
 - Range command in Python
3. Answer **any four** of the following questions : $5 \times 4 = 20$
- Write LaTeX documents to display the following equations :
 - $$\int_3^8 x^2 dx$$
 - $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
 - What is class file in LaTeX ? What is the difference between class and package in LaTeX ?
 - Which class is suitable for preparing presentation in LaTeX ? Give example.

- Write brief description of **any five** matrix operators in Scilab.
 - How to define complex numbers in Scilab ? Describe **any four** Scilab functions related to complex numbers.
 - Compare Scilab with MATLAB.
 - Write a Python program to find sum of a list of numbers.
4. Answer **any two** of the following questions : $10 \times 2 = 20$
- Explain with suitable example the process of generating new commands in LaTeX.
 - How to solve an ordinary differential equation in Scilab ? Discuss the features available in Scilab for numerical linear algebra.
 - Explain **any four** graph plot functions available in Scilab.
 - Describe **any four** of the following Python commands with suitable example :

- (i) type
- (ii) round
- (iii) input
- (iv) eval
- (v) append
- (vi) insert

Total number of printed pages-4

44 (3) BCA-SE-3034

2022

(Held in 2023)

OPEN SOURCE SOFTWARE

Paper : BCA-SE-3034

Full Marks : 50

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed :

1×4=4

(a) In LaTeX, font size can be changed using the command

(i) \LARGE

(ii) \huge

(iii) \Huge

(iv) All of the above

(Choose the correct option)

(b) In Scilab, _____ function is used to create identity matrix.

(Fill in the blank)

(c) In Scilab, _____ function is used to create GUI object. (Fill in the blank)

- (e) What is web browser? Give examples.
2. (a) How to create an unordered list in HTML? Explain with example. 5
(b) Write the basic building blocks of an XML document. 5
3. (a) What is a CSS? Write the code of external CSS to change the background behaviour of a web page. 2+3=5
(b) What is the importance of a scripting language? Mention its types. Write the syntax to embed the scripting code within an HTML file. 2+1+2=5
4. (a) Define a DTD? Why is it used? Create a DTD file to validate the details of an XML document for a newspaper article. 1+1+3=5
(b) Write about the architecture of a web server with diagram. 5
5. Write the JavaScript programs : **(any two)** 5×2=10
(i) To design a digital clock

- (ii) To extract the substring starting at an index 'i' and ending at an index 'j' from the original string
(iii) In finding the factorial of a number by using function

6. Write short notes on : **(any two)**

5×2=10

- (a) Firewall
(b) CGI
(c) JDBC
(d) DHTML
-

Total number of printed pages-3

44 (3) BCA-SE-3014

2022

(Held in 2023)

WEB TECHNOLOGY

Paper : BCA-SE-3014

Full Marks : 50

Time : Two hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any four from the rest.

1. Write short answers of the following :
2×5=10
 - (a) Write *two* major functions of a web server.
 - (b) What is a proxy server ?
 - (c) What do you mean by client-side scripting ?
 - (d) Define URL. Why is it used ?

Contd.

- (e) What do you mean by mail merge ?
2. (a) Write the steps to insert a new slide in PowerPoint. 3
- (b) How to create slides, add clipart, pictures and adding animation in PowerPoint ? Explain. 7
3. (a) What are the ways to align paragraphs ? What is the use of Chart Wizard in Excel ? 2+3=5
- (b) What is a table ? How is it created in MS Word ? 1+4=5
4. (a) What is MS Excel ? Explain the components of Excel window. 7
- (b) How can you insert cells, rows and columns in MS Excel ? 3
5. (a) Explain *any five* library functions used in MS Excel with suitable example. 5
- (b) What is a presentation software ? What is the purpose of PowerPoint software ? 2+3=5
6. (a) What is spell check ? How to spell check a document ? Explain. 5
- (b) How will you enter a formula in MS Excel ? Explain with example. 5

7. (a) Write the advantages of DTP software. What do you mean by portable document format ? 3+2=5
- (b) Describe the autofformat feature of MS Excel. Explain with example. 5
-

Total number of printed pages-3

44 (1) BCA-HG-1026

2022

(Held in 2023)

OFFICE AUTOMATION

Paper : BCA-HG-1026

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any five from the rest.

1. Answer the following questions. 2×5=10
- (a) What do you mean by formatting a document?
 - (b) Write two features of word processing.
 - (c) Write two importances of spreadsheet.
 - (d) How can we copy-paste, undo-redo in MS-Word without using mouse? Explain with example.

Contd.

(e) _____ shortcut key is used for payment in Tally software.

(Fill in the blank)

2. Answer **any five** questions : $2 \times 5 = 10$

(a) What is Journal ?

(b) Write *two* features of Trial Balance.

(c) Write *two* features of Tally ERP9.

(d) What is the importance of computer based accounting system ?

(e) What are the three components of computer based accounting information system ?

(f) Write the different types of purchase ledger.

(g) What do you mean by F11 features and F12 configuration in Tally software ?

3. Answer **any seven** questions : $5 \times 7 = 35$

(a) What is accounting? Write the advantages of accounting.

(b) What are the basic differences between Journal and Ledger ?

(c) What are financial statements? Write the importance of financial statement.

(d) Write the difference between Profit & Loss A/c and Balance Sheet.

(e) Write a short note on ODBC.

(f) What are the different rules of BRS (Bank Reconciliation Statement) ?

(g) Briefly explain the transactionwise bill by bill for trading and non-trading organizations.

(h) Explain the difference between credit note and debit note voucher.

(i) How do you activate the billwise detailed features in Tally? Explain.

4. (a) What do you mean by Company in Tally? Explain the steps to create a company. 10

OR

(b) What is voucher? Explain the different types of vouchers available in Tally.

Total number of printed pages-3

44 (I) BCA-HG-1016

2022

(Held in 2023)

**COMPUTER BASED ACCOUNTING
AND FINANCIAL MANAGEMENT**

Paper : BCA-HG-1016

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Objective-type questions : $1 \times 5 = 5$
 - (a) Depreciation is an Expense/Income.
(Choose the correct option)
 - (b) Only monetary transactions are recorded in the books of account.
(True/ False)
 - (c) _____ option is used in Tally to make changes in created company.
(Fill in the blank)
 - (d) The full form of CGST is _____ .
(Fill in the blank)

Contd.

Total number of printed pages-5

44 (BCA-1) 1-4

2022

(Held in 2023)

MATHEMATICS-I

Paper : BCA-1-4

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 2×5=10

(a) If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$, find $(A-2I)(A-3I)$.

I is the identity matrix of type 2×2 .

(b) Define null matrix and identity matrix.

(c) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 0 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 2 & 1 \\ 2 & 3 & 0 \end{bmatrix}$, find BA .

Can we find AB also ?

Contd.

(d) Find the minor and co-factor of b of

the matrix $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$.

(e) Find the value of the determinant of

the matrix $A = \begin{bmatrix} 4 & 7 & 8 \\ -9 & 0 & 0 \\ 2 & 3 & 4 \end{bmatrix}$.

2. (a) If $A = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$

verify that $(AB)' = B'A'$.

3

(b) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$

show that $A^2 - 4A - 5I = 0$.

3

(c) Prove that every square matrix can be expressed as a sum of symmetric and skew-symmetric matrices.

3

(d) Prove that

$$\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$$

3

(e) Find the rank of matrix

$$A = \begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 9 \\ -1 & -3 & -4 & -3 \end{bmatrix}$$

3

3. Determine the eigenvalues and eigenvectors

of the matrix $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$.

5

4. (a) Find the argument and modulus of the complex number $1 + i\sqrt{3}$.

2+2=4

(b) Express the polar form $1 + i$.

2

(c) Find the condition that the roots of the equation $x^3 - px^2 + qx - r = 0$ are in G.P.

3

(d) Find the quadratic equation whose roots are 3 and 4.

2

5. (a) Evaluate : (any three) $3 \times 3 = 9$

(i) $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x - 2}$

(ii) $\lim_{x \rightarrow \infty} \frac{x^2 + x - 5}{x^2 + 2x + 3}$

(iii) $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$

(iv) $\lim_{x \rightarrow 0} \frac{e^{ax} - e^{bx}}{x}$

(v) $\lim_{x \rightarrow \pi/2} \frac{2x - \pi}{\cos x}$

(b) Find the derivatives of the function $f(x) = x^2$ by first principle of derivatives. 3

(c) Find $\frac{dy}{dx}$ for $y = x^2 - 3x + 2$. 2

(d) Find $\frac{dy}{dx}$ for the following : (any two) $3 \times 2 = 6$

(i) $\frac{x^2 + 3}{x - 2}$

(ii) $e^{2x} + \sin x - 4x^2 + 5$

(iii) $x^2 \cos x + 3e^{-2x}$

6. (a) State and give Geometrical interpretation of Lagrange's Mean value theorem or Rolle's theorem. $2+3=5$

(b) Find the maximum or minimum values of $f(x) = x^{1/x}$ 5

Or

$f(x) = \sin x + \cos x$

(c) Evaluate : $\lim_{x \rightarrow 0} \frac{xe^x - \log(1+x)}{x^2}$ 5

Or

$\lim_{x \rightarrow 0} \frac{\tan x - x}{x - \sin x}$

(d) Verify Rolle's theorem for $f(x) = x^2 - 3x + 2$ in $[1, 2]$. 4

(ii) The components of ER model are _____.

(iii) BCNF stands for _____.

(iv) DDL stands for _____.

(v) ALTER operation of SQL is used for _____.

2. Answer the following : 2×5=10

(a) Define foreign key. Why is this concept used for ?

(b) Why should we avoid keeping NULL values in the database ?

(c) What is the difference between join and Cartesian product ?

(d) What are the basic data types available for attributes in SQL ?

(e) Define functional dependency. What do you mean by full functional dependency ?

3. (a) Consider the following relation : 6

Car_sale (Car#, Salesman#, Date_sold, Commission%, Discount_amt)

Assume that a car may be sold by multiple salesmen, and hence {car#, salesman#} is the primary key.

Additional dependencies are :

Date_sold → Discount_amt

Salesman# → Commission%

Based on the given primary key, is the relation in 1NF, 2NF or 3NF ? Why or why not ? How would you successfully normalize it completely ?

(b) What do you mean by insertion, deletion and updation anomalies ? Why are they considered bad ? 4

4. (a) Define data independence. Explain three-level architecture of DBMS briefly. 5

(b) What are the major advantages and disadvantages of DBMS ? 5

Total number of printed pages-7

44 (3) BCA-HC-3036/3.3 (O)

2022

(Held in 2023)

DATABASE MANAGEMENT SYSTEM

Paper : BCA-HC-3036/3.3 (Old Syllabus)

Full Marks : 60 (for CBCS)/ 80 (for Non-CBCS)

Time : Three hours

The figures in the margin indicate full marks for the questions.

Students of **CBCS** system will attempt **six** questions and **Non-CBCS** students will attempt **only eight** questions from the following.

1. (a) Define the following terms : $1 \times 5 = 5$

Database, Primary key, Schema, Cardinality, DBMS

(b) Fill in the blanks : $1 \times 5 = 5$

(i) The association between two entities is called ____ relationship.

Contd.

Total number of printed pages-7

44 (3) BCA-HC-3036/3.3 (O)

2022

(Held in 2023)

DATABASE MANAGEMENT SYSTEM

Paper : BCA-HC-3036/3.3 (Old Syllabus)

Full Marks : 60 (for CBCS)/ 80 (for Non-CBCS)

Time : Three hours

The figures in the margin indicate full marks for the questions.

Students of **CBCS** system will attempt **six** questions and **Non-CBCS** students will attempt **only eight** questions from the following.

1. (a) Define the following terms : $1 \times 5 = 5$
Database, Primary key, Schema, Cardinality, DBMS
- (b) Fill in the blanks : $1 \times 5 = 5$
 - (i) The association between two entities is called ___ relationship.

Contd.

- (ii) The components of ER model are _____.
- (iii) BCNF stands for _____.
- (iv) DDL stands for _____.
- (v) ALTER operation of SQL is used for _____.

2. Answer the following : 2×5=10

- (a) Define foreign key. Why is this concept used for ?
- (b) Why should we avoid keeping NULL values in the database ?
- (c) What is the difference between join and Cartesian product ?
- (d) What are the basic data types available for attributes in SQL ?
- (e) Define functional dependency. What do you mean by full functional dependency ?

- 10. (a) Define entity-relationship diagram. What are the major components of ER diagram ? Give the notations of all components of ER diagram. 2+4+1=7
- (b) What are the major responsibilities of DBA ? 3

9. (a) Consider the following table and solve queries using SQL : $1 \times 5 = 5$

Student (Rollno, student_name, address, date_of_admission, contact_no., class_section)

- (i) Give syntax to create the student table.
- (ii) To insert values in the table.
- (iii) To list the name of all students having roll no. > 20.
- (iv) To change the name of the student whose roll no. is 10 to amar.
- (v) To list the name of the students from Guwahati.

- (b) What do you mean by storage of databases ? How can we place file records of disks ? 5

3. (a) Consider the following relation : 6
Car_sale (Car#, Salesman#, Date_sold, Commission%, Discount_amt)

Assume that a car may be sold by multiple salesmen, and hence {car#, salesman#} is the primary key.

Additional dependencies are :

Date_sold \rightarrow Discount_amt

Salesman# \rightarrow Commission%

Based on the given primary key, is the relation in 1NF, 2NF or 3NF ? Why or why not ? How would you successfully normalize it completely ?

- (b) What do you mean by insertion, deletion and updation anomalies ? Why are they considered bad ? 4

4. (a) Define data independence. Explain three-level architecture of DBMS briefly. 5

- (b) What are the major advantages and disadvantages of DBMS ? 5

5. (a) Consider the following relational scheme and solve queries using relational algebra :

Employee (ENO, Ename, Salary, Address, Dnumber)



Department (Dnum, Dname, Mgreno)

FK

where,

ENO → Employee number

Mgreno → Manager employee number

Dnum → Department number.

Employee (Dnumber) references Department (Dnum) and

Department (Mgreno) references Employee (ENO).

- (i) List the name of managers of each department. 2
- (ii) Give the name of employees working in department number 5. 2
- (iii) Give the details of employees who are getting salary more than Rs.30,000. 1

- (b) What are the major characteristics of DBMS ? 3

- (c) Define composite primary key. 2

6. What are the rules to convert ER diagram to tables ? Explain with example. 10

7. (a) Define integrity constraint. Explain the concept referential integrity constraint. 2+4=6

- (b) Define natural join. 2

- (c) Define first normal form. 2

8. (a) What do you mean by relational algebra? Explain *any two* operations with example. 2+4=6

- (b) What are strong and weak entities ? Give example. 2

- (c) What are fixed length records ? 2

(d) Draw the functional block diagram of Pentium IV motherboard showing the component—power connector, RAM, chipset etc.

(e) What is NTFS ? How is NTFS created in a new hard disk ?

5. Write short notes on : **(any four)** $5 \times 4 = 20$

(a) Switches

(b) IP address

(c) Optical media

(d) Floppy disk drive

(e) ASCII

(f) Secondary storage

Total number of printed pages—4

44 (BCA-1) 1.1 (O)

2022

(Held in 2023)

COMPUTER FUNDAMENTALS AND ICT HARDWARE

Paper : BCA-1.1

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer the following question : $1 \times 5 = 5$

(a) What is the full form of CPU ?

(b) Which of the following languages does the computer understand ?

(i) Computer understands only C language

(ii) Computer understands only assembly language

(iii) Computer understands only binary language

(iv) Computer understands only BASIC

(Choose the correct answer)

(c) Which of the following units is responsible for converting the data received from the user into a computer understandable format ?

(i) Output unit

(ii) Input unit

(iii) Memory unit

(iv) Arithmetic and logic unit

(Choose the correct answer)

(d) What is BCD ?

(e) What do you mean by cache memory ?

2. Answer the following questions : **(any five)**

$3 \times 5 = 15$

(a) What are the main differences between hardware and software ?

(b) What is backup system ? Why is it needed ?

(c) What is number system ? Convert $(45)_{10}$ to octal.

(d) Define different kinds of RAM.

(e) What do you mean by de-fragmentation ? Explain.

(f) Explain CDROM.

3. Answer the following question :

(a) What do you mean by linker and loader ? Explain. 5

(b) Explain the logical structure of hard disk drive. 5

(c) Explain the major components of a digital computer. 3

(d) State the meaning of the following terms with respect to hard disk : 5

Tracks, Cylinder, Sectors, Cluster, RPM

Or

Explain the working principle of CRT/LCD monitor.

(e) Define EDCCDIC. 2

4. Answer the following questions : **(any four)**

$5 \times 4 = 20$

(a) What do you mean by algorithm ? Give an example.

(b) Explain the history of Intel processor family.

(c) Explain CD. How is it different from DVD ?

(e) The central processing unit consists of

(i) control unit

(ii) ALU

(iii) CPU

(iv) All of the above

(Choose the correct option)

(f) The full form of HDMI is _____.

(Fill in the blank)

2. Answer the following questions : **(any five)**

2×5=10

(a) What do you mean by virus ?

(b) What is NIC ? Why is it necessary ?

(c) What is the primary work of SMPS ?

(d) What is disk cleanup ?

(e) Why is system backup necessary ?

(f) Write *two* differences between CRT and LCD monitor.

3. Answer **any five** : 3×5=15

(a) Write the differences between RAM and ROM.

(b) What do you mean by antivirus quarantine ? Explain.

(c) Explain about applications of ICT.

(d) What is a MODEM ? How does it work ?

(e) What is cache memory ? Why is cache memory necessary ?

(f) What is router ? Explain its working principle.

4. Answer **any six** questions : 5×6=30

(a) What is a network cable ? Explain about different types of network cable.

(b) What do you mean by disk defragmentation ? Briefly explain.

(c) Briefly explain about bootstrapping process.

(d) Draw a block diagram of a computer and briefly explain the components of a computer.

- (e) Describe any two latest Intel microprocessors.
- (f) Explain the internal working principle of a hard disk.
- (g) What is BIOS? How does it work in a computer?
- (h) Write the steps to install Linux operating system on a new hard disk.
-

Total number of printed pages-4

44 (1) BCA-HC-1026

2022

(Held in 2023)

**COMPUTER FUNDAMENTALS AND
ICT HARDWARE**

Paper : BCA-HC-1026

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer the following question : **(any five)**
1×5=5
- (a) What is the full form of FAT ?
- (b) How many numbers of pins are available in RJ45 port ?
- (c) The full form of SMPS is _____.
(Fill in the blank)
- (d) When the computer shuts down the _____ contents are lost.
- (i) input
- (ii) output
- (iii) memory
- (iv) storage
- (Choose the correct option)

Contd.

(iv) What will be the output of the following code ?

```
len(["hello", 2, 6, 4])
```

(v) The process of pickling in Python includes conversion of a Python object hierarchy into byte stream.

(State True or False)

(vi) What will be the output of the following statement ?

```
>>>print('new' 'line')
```

(vii) How to check whether string S1 contains another string S2 ?

(viii) Which function overloads the + operator ?

(ix) `_del_method` is used to destroy instances of a class.

(State True or False)

(x) In Python, if a function doesn't have a return statement, what does the function return ?

(xi) Define Flowchart.

(xii) What is the syntax of 'for statement' ?

2. Answer the following questions : $2 \times 8 = 16$

(i) State the differences between tuples and lists in Python.

(ii) Define the scope and lifetime of a variable.

(iii) Mention *three* advantages of NumPy arrays over Python lists.

(iv) Why is * called string repetition operator ?

(v) Write a recursive function to demonstrate a countdown to 0 (zero).

(vi) State the methods that are used in Python Tuple.

(vii) Explain how Bubble sort works.

(viii) What is the difference between an Array and a list ?

3. Answer the following : **(any three)**

$4 \times 3 = 12$

(i) Write the advantages and disadvantages of Flowchart.

(ii) Discuss the following list functions :

(a) `len()`

(b) `sum()`

(c) `any()`

(d) `all()`

- (iii) Mention the advantages and disadvantages of bottom up approach.
- (iv) Explain call by value and call by reference in Python.
- (v) How to perform a user input in Python? Explain with example.

4. Answer the following : **(any four)**

5×4=20

- (i) Write an algorithm to check whether a person is eligible to vote.
- (ii) How to declare constructor method in Python? Explain.
- (iii) Explain how to implement multiple inheritance in Python with suitable example.
- (iv) Create a flowchart to find the largest among 3 numbers.
- (v) Explain different string formats available in Python.
- (vi) Write a program to repeatedly check for the largest number until the user enters 'done'.

Total number of printed pages-4

44 (5) BCA-HE-5046

2022

(Held in 2023)

PROGRAMMING IN PYTHON

Paper : BCA-HE-5046

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 1×12=12
 - (i) Which type of programming does Python support?
 - (a) Object-oriented programming
 - (b) Structured programming
 - (c) Functional programming
 - (d) All of the above
 - (ii) Is Python code compiled or Interpreted?
 - (iii) Which keyword is used for function in Python language?

(iii) Data transformation

(iv) Data integration

(c) _____ is an object-oriented, integrated, time-variant and nonvolatile collection of data in support of management decisions.

(i) Data warehousing

(ii) Data mining

(iii) Web mining

(iv) Text mining

(d) Which of the following statements is true about the classification ?

(i) It is a measure of accuracy

(ii) It is a subdivision of a set

(iii) It is the task of assigning a classification

(iv) None of the above

(e) Which of the following is required by K-means clustering ?

(i) Defined distance metric

(ii) Number of clusters

(iii) Initial guess as to cluster centroids

(iv) All of the above

2. Answer **any five** from the following :

3×5=15

(a) Why is data warehouse subject-oriented, time-varying and integrated ?

(b) Write the difference between R-OLAP and M-OLAP.

(c) What do you mean by data extraction and data cleaning ? Explain.

(d) What are the main differences between hierarchical and partitioning clustering ?

(e) What do you mean by association rule, frequent sets and border sets.

(f) What are entropy gain and gain ratio ?

3. Answer **any four** :

5×4=20

(a) What is KDD ? Explain different stages of KDD.

(b) Explain different data mining techniques.

(c) Explain the following terms : Euclidean distance, Manhattan distance, Cosine similarity, Categorical attribute and Support

(d) What is CF tree ? Explain cluster feature in terms of n , l_s , ss .

(e) Explain decision tree construction principle.

4. Answer **any three** questions from the following :

- (a) Discuss the working of PAM algorithm. Compare its performance with CLARA and CLARANS. $6+4=10$
- (b) Explain apriori algorithm with suitable example. $6+4=10$
- (c) What do you mean by data warehouse? Why is it needed? How does it differ from database system? $3+4+3=10$
- (d) What is a decision tree? Write down the advantages and shortcomings of decision tree classification. Explain splitting attribute and splitting criterion. $2+4+4=10$

5. Write short notes on : **(any two)** $5 \times 2 = 10$

- (a) CART
- (b) Border algorithm
- (c) Data warehouse maintenance
- (d) K-means

Total number of printed pages-4

44 (5) BCA-HE-5026

2022

(Held in 2023)

DATA MINING AND WAREHOUSING

Paper : BCA-HE-5026

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 5 = 5$
 - (a) What are the functions of data mining?
 - (i) Association and connectional analysis classification
 - (ii) Prediction and characterization
 - (iii) Cluster analysis and evolution analysis
 - (iv) All of the above
 - (b) Which of the following also used as the first step in the knowledge discovery process?
 - (i) Data selection
 - (ii) Data cleaning

(d) _____ is an effective method for solving initial value problems of differential equation. (Fill in the blank)

(e) _____ is an interpolation technique used when the interval difference is not same for all sequence of values. (Fill in the blank)

(f) Simpson's $1/3$ and $3/8$ rules are two special cases of closed Newton-Cotes formula. (State **true** or **false**)

(g) Which of the following is not a type of correlation ?

- (i) Simple
- (ii) Positive
- (iii) Partial
- (iv) Negative
- (v) None of the above

(Choose the correct option)

2. Define the following terms : $2 \times 4 = 8$

- (a) Round off error
- (b) Truncation error
- (c) Interpolation
- (d) Mathematical expectation

3. Answer **any three** of the following questions : $5 \times 3 = 15$

(a) Find the value of $\sqrt{7}$ using Newton's method.

(b) Describe regula falsi method of finding solution of non-linear equations.

(c) Find approximate solution of the initial value problem $\frac{dx}{dt} = 1 + \frac{x}{t}$, $1 \leq t \leq 3$ with the initial condition $x(1) = 1$ using Runge-Kutta fourth order method.

(d) Using Lagrange's interpolation formula find $y(8)$ from the following table :

x	5	6	9	11
y	11	13	15	17

(e) Define conditional probability. What is the difference between probability and conditional probability ?

4. Answer **any three** of the following questions : $10 \times 3 = 30$

(a) Solve the following system of linear equations using Gauss elimination method :

$$x + y + z = 2$$

$$x + 2y + 3z = 5$$

$$2x + 3y + 4z = 11$$

(b) Evaluate $\int_0^1 e^x dx$ using Simpson's $1/3$ rule.

- (c) Find mean, median and mode for the following frequency table :

x	f
1	5
20	9
25	8
30	1
40	10
50	7

- (d) If a coin is tossed 5 times, find the probability of
- exactly 2 heads ;
 - at least 4 heads.
- (e) What is the purpose of regression ? Find a linear regression equation for the following two sets of data :

x	2	4	6	8
y	3	7	5	10

- (f) Write short notes on —
- Moments ;
 - Correlation.

Total number of printed pages—4

44 (5) BCA-HE-5036

2022
(Held in 2023)

**COMPUTER ORIENTED NUMERICAL
METHODS AND STATISTICAL
TECHNIQUE**

Paper : BCA-HE-5036

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

- Answer the following questions as directed : 1×7=7
 - Double precision floating point numbers occupy _____ bits in computer memory. *(Fill in the blank)*
 - Convergence of Newton-Raphson method is quadratic. *(State true or false)*
 - Gauss-Jordan method reduces the matrix to reduced row echelon form. *(State true or false)*

(d) What are the general purpose registers used in 8085 microprocessor?

(e) What do you mean by peripheral interface? Give an example.

2. Answer **any three** from the following questions : $5 \times 3 = 15$

(a) Discuss the different *addressing modes* used in 8085.

(b) Explain the *RESET IN* and *RESET OUT* instructions in 8085. Write briefly about the instruction set in 8085.

(c) Explain about the *vectored interrupts*.

(d) What are *Counters and Time Delays*?

(e) Draw the *pinout diagram* of 8085 microprocessor.

(f) What are the *different flags* used in 8085? Explain.

3. Answer **any three** from the following questions : $5 \times 3 = 15$

(a) Explain the timing diagram of *IN 84H* instructions.

(b) Write an assembly language program to add two 8-bit numbers from memory location 8025H and 8026H respectively, and store the resultant number in 8050H.

(c) Write an assembly language program to check the larger of two numbers.

(d) Write a program to load two unsigned numbers in register B and register C. Subtract B from C. If the result is in 2's complement form, then convert the result in absolute magnitude and display it.

(e) Write a program to perform $x - y = 5$, where x and y are 16-bit numbers.

4. Write short notes on : **(any two)** $5 \times 2 = 10$

(a) Stack and Subroutine

(b) Demultiplexing of 8085

(c) 8255A

(d) CALL and RET instructions

(e) Seven segment LED

Total number of printed pages-3

44 (BCA-5) 5-4-1

2022

(Held in 2023)

**MICROPROCESSOR AND ASSEMBLY
LANGUAGE PROGRAMMING**

Paper : BCA-5-4-1

Full Marks : 50

Time : Two hours

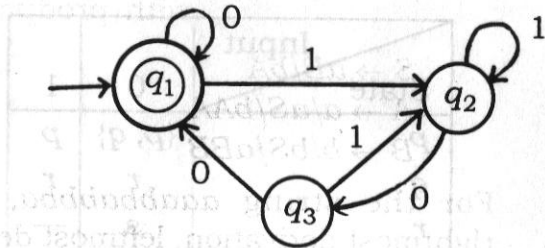
**The figures in the margin indicate
full marks for the questions.**

1. Answer the following questions : $2 \times 5 = 10$

- (a) Give a suitable definition of a microprocessor.
- (b) Why is 16-bits used in an 8085 microprocessor ?
- (c) What do the following imply ?
 - (i) MOV
 - (ii) ADD
 - (iii) LXI
 - (iv) MVI

Contd.

- (c) What is minimization of finite automata? Explain the method for construction of minimum state automata. 5
2. (a) Define regular expression. Give regular expressions to accept the following : 5
- Strings starting with 0 and ending with 11
 - Strings having odd number of 1
 - Strings having exactly one 0 over the input set {0, 1}
- (b) Construct a finite automata equivalent to the regular expression $10 + (0+11)0^*1$. 5
- (c) Construct a regular expression corresponding to the state diagram given as follows : 5



3. (a) Prove that $L = \{a^p/p \text{ is a prime}\}$ is not regular. 5
- (b) Prove that union of two regular sets is also regular. 5
- (c) State pumping lemma for regular sets. Explain the application of pumping lemma. 5
4. (a) Explain the properties of context free language. 5
- (b) Find a reduced grammar equivalent to the grammar G whose productions are

$$\begin{aligned}
 S &\rightarrow AB/CA \\
 B &\rightarrow BC/AB \\
 A &\rightarrow a \\
 C &\rightarrow aB/b
 \end{aligned}$$

5

Or

Given grammar G with productions

$$\begin{aligned}
 S &\rightarrow aB/bA \\
 A &\rightarrow a/aS/bAA \\
 B &\rightarrow b/bS/aBB
 \end{aligned}$$

For the string $aaabbabbba$, find a rightmost derivation, leftmost derivation and parse tree.

5. (a) Eliminate the unit production from the (context free grammar) CFG with P given by

$$S \rightarrow AA, A \rightarrow B/BB, B \rightarrow abB/b/bb \quad 5$$

- (b) Convert the following grammar to GNF (Greibach normal form)

$$S \rightarrow ASB/\varepsilon$$

$$A \rightarrow aAS/a$$

$$B \rightarrow SbS/A/bb$$

5

- (c) S.T the language $\{a^{n^2}/n \geq 1\}$ is not context free. 5

6. (a) Design a PDA for accepting a language $\{L = a^n b^n / n \geq 1\}$. 5

- (b) Give the instantaneous description of pushdown automata, and give the description of acceptance by PDA by final state. 5

Total number of printed pages—4

44 (BCA-5) 5.4.2

2022

(Held in 2023)

AUTOMATA THEORY AND LANGUAGES

Paper : BCA-5.4.2

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. (a) Define DFA and NFA (Deterministic finite automata and Non deterministic finite automata). What are the differences between DFA and NFA ? 5
- (b) Construct DFA equivalent to the given NFA : 5

State \ Input	Input	
	0	1
p	{p, q}	p
q	r	r
r	s	—
s	s	s

Total number of printed pages-7
44 (BCA-5) 5.4.3

2022
(Held in 2023)

**COMPUTER ORIENTED NUMERICAL
METHODS AND STATISTICAL
TECHNIQUE**

Paper : BCA-5.4

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer the following questions as directed :
1×10=10

(a) The actual amount of error during a measurement is called absolute error.
(State True or False)

(b) For double precision, _____ bits are used to represent the floating point number.
(Fill in the blank)

Contd.

(c) If a function is real and continuous in the region from a to b and $f(a)$ and $f(b)$ have opposite signs, then there is no real root between a and b .

(State True **or** False)

(d) Convergence is guaranteed in Newton's method. (State True **or** False)

(e) _____ is a step-by-step elimination method for solving system of linear equations. (Fill in the blank)

(f) _____ is a estimation method of finding new data points based on range of a discrete set of known data points. (Fill in the blank)

(g) In Euler's method, the local error is proportional to the square of the step size. (State True **or** False)

(d) Describe Runge-Kutta 4th order method for finding solution of ordinary differential equation.

(e) Write the basic properties of probability.

(f) What is binomial distribution? Derive mean and variance for binomial distribution.

4. Answer **any four** of the following questions :

$$10 \times 4 = 40$$

(a) Solve the following system by Gauss-Jordan method :

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

$$x + 2y + z = 8$$

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

(b) Solve the following system by Gauss-Seidel method :

$$2x + 5y = 16$$

$$3x + y = 11$$

(c) Derive Newton's divided difference interpolation formula.

(h) _____ divides the data into four equal parts.

(i) Mean

(ii) Median

(iii) Quartile

(iv) Mode

(Choose the correct option)

(i) The probability of getting two tails when two coins are tossed is _____.

(Fill in the blank)

(j) In Poisson distribution, mean and variance are same.

(State True or False)

2. Define the following terms : $2 \times 5 = 10$

(a) Truncation error

(b) Round off error

(c) Pivotal condensation

(d) Probability distribution

(e) Mathematical expectation

3. Answer **any four** of the following questions :

5×4=20

(a) Use Newton's method to determine an approximation to the solution of $\cos x = x$ that lies in the interval $[0, 2]$.

(b) The height of a tree was measured every five years after it was planted and recorded as shown in the table below :

Years	0	5	10	15
Height	1	3.5	6	7.5

Use interpolation to estimate the height of the tree eight years after it was planted.

(c) Use Simpson's $\frac{1}{3}$ rule to estimate

$$\int_0^1 x^2 dx \text{ using four subintervals.}$$

(d) Find $y(0.2)$ for $y' = \frac{x-y}{2}$, $x_0 = 0$, $y_0 = 1$

with step length 0.1 using Runge-Kutta method.

(e) Find mean, median and mode for the following data :

Class interval **Frequency**

0-10	7
10-20	8
20-30	12
30-40	13
40-50	10

2. Write short notes on : **(any two)** 5×2=10
- (a) GIF
 - (b) Video Files
 - (c) Nested Movie Clips
3. Answer the following questions : 5×2=10
- (a) What is animation? What are the different types of animation?
 - (b) What do you mean by Multimedia? Explain *any one* components of Multimedia.
4. (a) What are Adobe After effects? Explain. 5
- (b) What are event handles and navigation in Flash Movies? Explain. 5
5. (a) What is Drop Shadow Effect? How to create a Drop Shadow Effect in After Effects? 5
- (b) What are Masked and Drop Shadowed texts? 5

6. (a) What do you mean by Audio Editing? Name any Audio Editing Platform. What are the *three* types of Audio editing techniques? State the *four* areas of Audio editing. 5
- (b) What are the Major Animation Tools? How do we work with Timeline in animation? 5

Total number of printed pages-3

44 (BCA-5) 5-4-4

2022

(Held in 2023)

ANIMATION

Paper : BCA-5-4-4

Full Marks : 50

Time : Two hours

The figures in the margin indicate full marks for the questions.

Answer **any five** questions.

1. Define the following terms : 2×5=10
 - (a) Selection tools
 - (b) Twinning Effect
 - (c) Flash Tools
 - (d) Action Script
 - (e) Frame-by-Frame Animation

Contd.

(iv) What will be the output of the following code ?

```
len(["hello", 2, 6, 4])
```

(v) The process of pickling in Python includes conversion of a Python object hierarchy into byte stream.

(State True or False)

(vi) What will be the output of the following statement ?

```
>>>print('new' 'line')
```

(vii) How to check whether string S1 contains another string S2 ?

(viii) Which function overloads the + operator ?

(ix) `_del_method` is used to destroy instances of a class.

(State True or False)

(x) In Python, if a function doesn't have a return statement, what does the function return ?

(xi) Define Flowchart.

(xii) What is the syntax of 'for statement' ?

2. Answer the following questions : $2 \times 8 = 16$

(i) State the differences between tuples and lists in Python.

(ii) Define the scope and lifetime of a variable.

(iii) Mention *three* advantages of NumPy arrays over Python lists.

(iv) Why is * called string repetition operator ?

(v) Write a recursive function to demonstrate a countdown to 0 (zero).

(vi) State the methods that are used in Python Tuple.

(vii) Explain how Bubble sort works.

(viii) What is the difference between an Array and a list ?

3. Answer the following : **(any three)**

$4 \times 3 = 12$

(i) Write the advantages and disadvantages of Flowchart.

(ii) Discuss the following list functions :

(a) `len()`

(b) `sum()`

(c) `any()`

(d) `all()`

- (iii) Mention the advantages and disadvantages of bottom up approach.
- (iv) Explain call by value and call by reference in Python.
- (v) How to perform a user input in Python? Explain with example.

4. Answer the following : **(any four)**

5×4=20

- (i) Write an algorithm to check whether a person is eligible to vote.
- (ii) How to declare constructor method in Python? Explain.
- (iii) Explain how to implement multiple inheritance in Python with suitable example.
- (iv) Create a flowchart to find the largest among 3 numbers.
- (v) Explain different string formats available in Python.
- (vi) Write a program to repeatedly check for the largest number until the user enters 'done'.

Total number of printed pages-4

44 (5) BCA-HE-5046

2022

(Held in 2023)

PROGRAMMING IN PYTHON

Paper : BCA-HE-5046

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 1×12=12
- (i) Which type of programming does Python support?
 - (a) Object-oriented programming
 - (b) Structured programming
 - (c) Functional programming
 - (d) All of the above
 - (ii) Is Python code compiled or Interpreted?
 - (iii) Which keyword is used for function in Python language?

2. Answer the following questions : **(any five)**

2×5=10

- (a) What do you mean by memory locations ?
- (b) Define micro-operation.
- (c) What do you understand by enabling and disabling interrupts ?
- (d) What is hardware control ?
- (e) Explain semiconductor memory.
- (f) How can we represent binary floating point in IEEE standard ?

3. Answer **any four** questions from the following :

5×4=20

- (a) Explain program controlled $1/0$.
- (b) What do you mean by micro-programmed control block diagram ? Explain.
- (c) Write different steps of memory operation.
- (d) Explain the process of inter-register transfer logic.
- (e) What is DMA ? Why is it needed ?

4. (a) How can you organize processor with common buses ? Explain with diagram.

3+5=8

(b) Why do we need addressing modes ? Explain its various types.

2+8=10

Or

Explain various steps to design an accumulator.

10

(c) What is interrupt ? How can you handle interrupts from multiple sources ? Explain.

2+5=7

5. Answer the following question :

(a) Explain and draw the circuit diagram of arithmetic micro-operation.

5+5=10

Or

Explain briefly the structure and working of hard disk.

6. Write short notes on : **(any two)**

5×2=10

(i) Cache memory

(ii) CDROM

(iii) Hardware control

(iv) Shift micro-operation

Total number of printed pages-3

44 (BCA-3) 3-2

2022

(Held in 2023)

**COMPUTER ORGANIZATION
AND ARCHITECTURE**

Paper : 3.2

(Old Course)

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer the following question : $1 \times 5 = 5$
 - (a) What is bus ?
 - (b) One address instructions use an implied _____ register for all data manipulation. *(Fill in the blank)*
 - (c) Program counter (PC) holds the _____ of the next instruction. *(Fill in the blank)*
 - (d) What is DRAM ?
 - (e) Shift operation is a memory operation. *(State true or false)*

Contd.

2. (a) Draw a before and after diagram and describe the main action of deleting a node from middle position of single linked list. 5
- (b) What is double linked list ? Explain the cases of deletion for double linked list. 5
3. (a) Explain stack overflow and underflow conditions. 5
- (b) Show the following postfix arithmetic expression evaluation in stack : 5
 $396 - \wedge 62 / 5 * + 73 \%$
4. (a) Explain the non-recursive function for preorder traversal. 5
- (b) Write the differences between BFS and NFS. 5
5. (a) What is binary search tree ? Write an algorithm to insert a node in binary search tree. 5
- (b) Describe the concept of binary search technique with a suitable example. 5

6. (a) Sort the following data using selection sort : 5
35, 63, 31, 89, 70, 90, 92
- (b) What is a quicksort ? Give its algorithm. How you can say that it is based on the concept of divide and conquer ? Explain. 5
7. (a) What is complexity of algorithm ? What are the cases for complexity of algorithm ? 5
- (b) What is asymptotic analysis of an algorithm ? What are asymptotic notations ? 5

Total number of printed pages-3

44 (3) BCA-HC-3026

2022

(Held in 2023)

DATA STRUCTURE AND ALGORITHM

Paper : BCA-HC-3026

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any six** questions.

- (a) Briefly explain memory representation of 2D arrays. Write address translation function for 2D arrays. 6

(b) Each element of an array ARR [10] [10] requires 4 bytes of storage. Base address of ARR is 500. Determine the location of ARR [3] [5] when the array is stored as (a) row major, (b) column major. 2+2=4

Contd.

Total number of printed pages-7

44 (1) BCA-HC-1016/1.3 (O)

2022

(Held in 2023)

INTRODUCTION TO C PROGRAMMING

Paper : BCA 1.3/BCA-HC-1016

Full Marks : 80/60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : 10
 - (i) Define 'Nested if' with suitable example.
 - (ii) If a is a double precision floating point number variable, then $a = 15/2$ will return _____ ? (Fill in the blank)
 - (iii) How are "=" and "==" operators different in C ?
 - (iv) Define 'bitwise operator' with suitable example.
 - (v) Write the full form of ASCII.

Contd.

- (vi) Which 'keyword' is used to prevent any changes in the variable within C program ?
- (vii) What are the results of logical or relational expressions in C ?
- (viii) "scanf()" is a predefined function in _____ reader file. (Fill in the blank)
- (ix) What is the lowest precedence operator in C ?
- (x) If `int a = 10; *P = &a;`
`*P++ & P++` stores _____ and _____.
 (Address of a is 3000 in memory)

2. Differentiate the following with suitable example : **(any five)** $2 \times 5 = 10$

- (a) Call by value and call by reference
- (b) Array and structure
- (c) Dynamic and static memory allocation
- (d) Break and continue statement
- (e) Actual and formal parameters
- (f) Switch case and if-else ladder

- (ii) Write a C program to generate the following series :
 0, 1, 1, 2, 3, 5, 8, 13 (30 terms)
- (iii) Write a program to test whether a string is palindrome or not. (without using library functions)
- (iv) Write a recursive and a non-recursive function to calculate factorial of a number.
- (v) Write a program in C to multiply *two* 3×3 matrix and display the output.
- (vi) Write a C program to reverse the digit of a number.
- (vii) Write a C program to concatenate *two* strings without using library function.
- (viii) Write a C program to perform linear search on an array of integers.
- (ix) What is command line argument ? Why is it used ? Write a C program to add *two* numbers using command line argument.

- (c) The return type of malloc function is void.
- (d) Functions can return more than one value at a time.
- (e) Are the three declarations char **apple, char *apple [], and char apple [][] same ?
- (f) 'remove (variable_name)' is used to free the allocated memory.
- (g) Any expression terminated by a semi-colon is a statement.
- (h) 'malloc()' returns a null if it fails to allocate the requested memory.

6. Answer the following questions :

[For CBCS students **only two** questions to be answered from Q. No. 6] $5 \times 2 = 10$

[For Non-CBCS students **only six** questions to be answered from Q. No. 6] $5 \times 6 = 30$

- (i) Define functions in C. What are different types of functions ? Define function prototype and function definitions. Give *one* example of user defined function (with syntax).

3. Write the output of the following program segment (assume no syntax error) :

$2 \times 5 = 10$

```
(a) void main ()
{
    float f = 0.2;
    if (f == 0.2)
        printf ("Equal");
    else
        printf ("Not Equal");
    getch ();
}
```

```
(b) void main ()
{
    int i=0;
    do
    {
        i++;
        if (i==2)
            continue;
        printf ("In while loop");
    }
    while (i<2)
    printf ("%d", i);
    getch ()
}
```

```

(c) # include <stdio.h >
void calculate (int x, int y)
{
    int temp = x + y;
    x+ = temp;
    if (y! = 200)
        printf ("%d", temp);
}
void main ()
{
    int A = 50, B = 20;
    calculate (A, B);
    printf ("%d \n %d \n", A, B);
}

```

```

(d) Struct size_dt
{
    int i;
    char c;
};
union u_dt {
    int i;
    char c;
};
printf ("size of the structure is %u \n", size of (struct size_dt));
printf ("size of the union is %v", size of (union u_dt));

```

```

(e) void main ()
{
    int i=2, j=3, k;
    k=++i + j++;
    printf ("%d %d %d", i, j, ++k);
    getch ();
}

```

4. Answer the following questions : **(any four)**
3×4=12

- What is structure ? Explain with example.
- How to declare and initialize an array ?
- Write the differences between compiler and interpreter.
- Explain different file access modes.
- How to declare and initialize a pointer ? What is pointer dereferencing ? Which pointer in C can act as a generic pointer ?

5. State True **or** False : 8

- '# define' is known as preprocessor compiler directive.
- The maximum value that an integer constant can have varies from one compiler to another.

2. (a) Differentiate between LAN and WAN. 4
- (b) How is tree topology different from bus topology? 3
- (c) What is DNS? What is a DNS server? 5
- (d) Define Amplitude and frequency modulation. 3
3. (a) What is data communication? What are the main components of data communication? 5
- (b) What are the categories of wired media? Explain them. 5
- (c) What are the major responsibilities of data link layer? Explain them briefly. 5
4. (a) What is piggybacking? Explain the working of stop and wait protocol. 5
- (b) What are Routing Protocols? Why are they required? Explain the working of link state routing briefly. 5

- (c) What are symmetric and asymmetric key cryptography? Explain. 5
5. (a) Explain CSMA/CD and its use briefly. 5
- (b) What is the mechanism of sliding window protocol? Why is flow control needed? 5
- (c) What is collision? What are the advantages of FDDI over a basic Token Ring? 5

SECTION-2 (Compulsory)

6. Write short notes on : *(any four)* 5×4=20
- (a) Functionality of transport layer
- (b) FTP and SMTP
- (c) Leaky Bucket algorithm
- (d) Services and Functions of Network Layer
- (e) Error detecting (CRC)
- (f) Concept of IP Address

2022

(Held in 2023)

COMPUTER NETWORK

Paper : BCA-5-2

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

SECTION-1

Answer **any four** questions from **SECTION-1**.

1. (a) Define computer networks. What are the major network criteria? Explain. 5
- (b) Define Protocol. Explain briefly TCP/IP Protocol suite. 5
- (c) What is topology? Why do we need it? What are different types of topology? 5

Contd.

(f) Build and fix is also called as _____ .

2. Answer **any three** : $3 \times 3 = 9$

(a) Distinguish between program and software product.

(b) What are the main differences between flowchart and dataflow diagram ?

(c) What are the major job responsibilities of a software project manager ?

(d) What is software crisis ? What are the main reasons for software crisis ?

3. Answer **any four** : $5 \times 4 = 20$

(a) Which are the major phases in the waterfall model of software development ? Why is it considered as idealistic model ?

(b) Define coupling. What are the different types of coupling that exist between two models ?

(c) What is the difference between black box and white box testing ?

(d) Define unit testing. What are stubs and drivers ? Explain.

(e) What are the different types of software development projects according to the COCOMO estimation model ?

4. Define the following terms : $1 \times 5 = 5$

(a) Failure

(b) Verification and validation

(c) Cohesion

(d) Perfective maintenance

(e) Integration testing

5. (a) Define debugging. What are the different approaches for debugging ? Explain them briefly. 7

(b) Define statement and branch coverage. Explain. 3

6. (a) What problems are likely to arise if two modules have high coupling ? 3

(b) What do you mean by Delphi cost estimation techniques ? 2

(c) Define Context Diagram. Explain with one diagram. 3

(d) What are LOC and FP in context with project size estimation technique? 2

Total number of printed pages-4

44 (3) BCA-HC-3016

2022

(Held in 2023)

SOFTWARE ENGINEERING

Paper : BCA-HC-3016

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : 1×6=6

(a) DFD stands for _____.

(b) COCOMO stands for _____.

(c) A design solution is understandable, if it is _____ and the molecules are arranged in layers.

(d) Cohesion is measure of _____ of a module.

(e) A _____ is a mistake committed by the development team.

Total number of printed pages-7

44 (BCA-1) 1-2

2022

(Held in 2023)

COMMUNICATIVE ENGLISH

Paper : 1-2

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

UNIT-I

1. Answer **any five** of the following :

2×5=10

- (i) Write *two* advantages and *two* disadvantages of formal communication.
- (ii) What is cross-cultural communication? Write *two* advantages of cross-cultural communication.
- (iii) "Feedback is an essential part of the communication process." Discuss.

Contd.

- (iv) What are cultural barriers? Write with a suitable example.
- (v) Explain upward and downward communication.
- (vi) Define communication network. How does a communication network affect the performance of a group?
2. Define communication on the basis of way of expression. Give *three* advantages of oral communication over written communication.
2+3=5

UNIT-II

3. (i) Use the correct form of the verbs in brackets : **(any four)** 1×4=4
- (a) These days cricket (play) everywhere.
- (b) I will speak to him when he (come).
- (c) To hate man (be) the biggest sin.
- (d) The referee blew the whistle and the match (begin).
- (e) If I were you, I (not do) it.

- (ii) Assume yourself to be the librarian of Wisdom Public School, Guwahati. Write a letter to the Sales Manager of Bharat Publishers Limited, New Delhi, complaining about the supply of wrong books to you.
- (iii) Assume yourself to be the owner of a bookshop a Panbazaar, Guwahati, who ordered some books from the publishers of New Delhi. Write an enquiry letter by asking them whether your ordered books have been dispatched or not.

UNIT-III

4. Answer **any five** of the following : $3 \times 5 = 15$

- (i) Discuss the purpose of group discussion.
- (ii) Write the difference between hearing and listening.
- (iii) What are the effectiveness of listening skill?
- (iv) Distinguish between interview and group discussion.
- (v) Write *three* guidelines for speaking skills.
- (vi) Mention *three* demerits of oral communication skills.

5. Define business report. Write the principles of drafting a business report. $1 + 4 = 5$

UNIT-IV

6. Answer the following : **(any two)** $7 \times 2 = 14$

- (i) Assume yourself to be the distributor of electronics accessories of Samsung. One of your customers' television set is not functioning for which he made a complaint. Write a confirmation letter by stating that you have accepted the complaint.

(ii) Fill in the blanks with appropriate prepositions : **(any four)** $1 \times 4 = 4$

- (a) He is blind _____ the faults of his son.
- (b) The students are sitting _____ their desks.
- (c) I made _____ home as soon as the rain stopped.
- (d) The little girl was pleased _____ her new dress.
- (e) I congratulate you _____ your success.

(iii) Fill up the blanks with appropriate conjunction : **(any four)** $1 \times 4 = 4$

- (a) _____ he works hard, he will not pass.
- (b) She cares for _____ gold nor silver.
- (c) _____ had the tiger seen the man, when it jumped over him.
- (d) She has lost _____ her handbag and purse.

(e) No sooner had he left _____ his brother came.

(iv) Correct the following sentences : **(any four)**
1×4=4

(a) He does not know to drive.

(b) What is the time in your watch ?

(c) Neither he comes nor he writes.

(d) I wish I was the king.

(e) May you please lend me one thousand rupees ?

(v) Make sentences to illustrate the use of the following phrasal verbs : **(any four)**
1×4=4

(a) Call on

(b) Get over

(c) Take for

(d) Bring out

(e) Hold on

(vi) Identify nouns and adjectives from the following passage : $\frac{1}{2} \times 6 = 3$

A little boy once stole a book and brought it to his mother. The mother sold the book for ten rupees and gave him two rupees as a reward. The boy was happy. But for this conduct of his mother, the boy became a thief when he grew up.

(vii) Punctuate the following : **(any two)**
1×2=2

(a) The king is dead he announced

(b) i made some money yesterday he explained now you will be paid regularly

(c) have you been to Bombay he asked yes i replied

(viii) Write a paragraph on *any one* of the following topics : 6

(a) Social media and the youth

(b) YouTube

(c) Conference call

Total number of printed pages-7

44 (1) BCA-ENG-AE-1014

2022

(Held in 2023)

ENGLISH COMMUNICATION

Paper : BCA-ENG-AE-1014

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

UNIT-I

1. Answer **any five** of the following : $2 \times 5 = 10$
 - (i) Write *two* advantages and *two* disadvantages of informal communication.
 - (ii) What is cross-cultural communication ? Write *two* importances of cross-cultural communication.
 - (iii) Do you think feedback is an essential part of the communication process ? Discuss.
 - (iv) What is semantic barrier ? Give examples.

Contd.

- (v) Explain upward and downward communication.
- (vi) Define communication network. How does a communication network affect the performance of a group ?
2. Define communication on the basis of way of expression. Give *three* advantages of oral communication over written communication.
- 2+3=5

UNIT-II

3. (i) Use the correct form of the verbs in brackets : **(any five)** 1×5=5
- (a) To hate man (be) the biggest sin.
- (b) The referee blew the whistle and the match (begin).
- (c) The First World War (last) for four years and ended in 1918.
- (d) I will speak to him when he (come).
- (e) If I were you, I (not do) it.
- (f) These days cricket (play) everywhere.

- (iii) Assume yourself to be the Librarian of Wisdom Public School, Guwahati. Write a letter to the Sales Manager of Bharat Publishers limited, New Delhi, complaining about the supply of wrong books to you.
-

(iv) Distinguish between an interview and a group discussion.

(v) Write three guidelines for speaking skills.

(vi) Mention *three* demerits of oral communication skills.

5. Define business report. Write the principles of drafting a business report. 1+4=5

UNIT-IV

6. Answer the following : **(any two)** 7×2=14

(i) Assume yourself to be the distributor of electronics accessories of Samsung. One of your customers' television set is not functioning for which he made a complaint. Write a confirmation letter by stating that you have accepted the complaint.

(ii) Assume yourself to be the owner of a bookstall at Panbazaar, Guwahati, who ordered some books from the publishing house. Write an enquiry letter by asking them whether your ordered books have been dispatched or not.

(ii) Fill in the blanks with appropriate articles : **(any five)** 1×5=5

(a) He will come back in ____ hour.

(b) I will give you ____ useful hint.

(c) My brother is ____ NCC cadet.

(d) Don't hate ____ poor.

(e) Switzerland is ____ European country.

(f) She has read ____ best book in the library.

(iii) Fill in the blanks with appropriate prepositions : **(any five)** 1×5=5

(a) He is blind ____ the faults of his son.

(b) The students are sitting ____ their desks.

(c) I made ____ home as soon as the rain stopped.

(d) The little girl was pleased ____ her new dress.

(e) I congratulate you ____ your success.

(f) A true friend will always stand
_____ you in difficult times.

(iv) Make sentences to illustrate the use
of the following phrases : **(any five)**
1×5=5

(a) Call on

(b) Get over

(c) Take for

(d) Hold on

(e) Bring out

(f) Set out

(v) Identify nouns and adjectives in the
following passage : $\frac{1}{2} \times 6 = 3$

A little boy once stole a book and brought it to his mother. The mother sold the book for ten rupees and gave him two rupees as a reward. The boy was happy. But for this conduct of his mother, the boy became a thief when he grew up.

(vi) Punctuate the following : **(any two)**
1×2=2

(a) the king is dead he announced

(b) i made some money yesterday he explained now you will be paid regularly

(c) have you been to bombay he asked yes i replied

(vii) Write a paragraph on **any one** of the following topics : 6

(a) Social media and the youth

(b) WhatsApp

(c) E-mail

UNIT-III

4. Answer **any five** of the following : $3 \times 5 = 15$

(i) Discuss the purpose of group discussion.

(ii) Write the differences between hearing and listening.

(iii) What are the effectives of listening skills?

- (b) Define busy waiting. What are the requirements of first reader writer problem? 5
5. (a) Define deadlock with example. What are the four necessary conditions for a deadlock? Explain. 6
- (b) Differentiate between external and internal fragmentations. 4
6. (a) Explain the concept of virtual memory. What is demand paging? 5
- (b) What is device controller. Describe the goals of I/O software. 5
7. (a) What do you mean by file system mounting? How is it performed? 5
- (b) What is the basic idea behind the linked list allocation using index method? What does FAT contain? 5
8. Write short notes on: **(any two)** $5 \times 2 = 10$
- (a) Functions or responsibilities of operating system
- (b) Semaphore
- (c) Banker's algorithm
- (d) Scheduling criteria

Total number of printed pages-4

44 (5) BCA-HC-5026

2022

(Held in 2023)

OPERATING SYSTEM

Paper : BCA-HC-5026

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any six** questions.

1. (a) Fill in the blanks : $1 \times 5 = 5$
- (i) The two main objectives of operating systems are _____ and _____.
- (ii) A process that no longer exists but whose PCB has still not been removed from the process table is known as a _____.
- (iii) The round robin scheduling is efficient for _____ systems.

(iv) The division of logical memory into fixed size blocks is called as _____.

(v) Process execution comprised alternate cycles of _____ and _____.

(b) State True and False : $1 \times 5 = 5$

(i) FCFS is well suited for batch systems but not suitable for time sharing system.

(ii) A number of mechanisms have been developed to solve the critical section problem.

(iii) A deadlock can occur on a single system only.

(iv) Only processes are represented in a wait-for graph.

(v) A directory is a flat file that stores information about files and subdirectories.

2. Answer **any five** : $2 \times 5 = 10$

(a) Define safe and unsafe states.

(b) Distinguish between CPU bound and I/O bound processes.

(c) What is the function of a dispatcher?

(d) Distinguish between physical and logical addresses.

(e) Define the term 'caching'.

(f) What are the *two* types of real time systems?

3. (a) Distinguish between preemptive and non-preemptive algorithms. 4

(b) Consider four processes p_1, p_2, p_3 and p_4 with arrival times and required CPU burst (in *ms*) as shown in table :

Process	p_1	p_2	p_3	p_4
Arrival time	0	1	3	4
CPU burst (<i>ms</i>)	10	5	2	3

Assuming that the time slice is 3 *ms*, how will these processes be scheduled according to round-robin scheduling algorithm? Compute average waiting time and average turn around time.

6

4. (a) Define critical section problem. Also explain all the requirements that a solution to critical section problem must meet. 5

- (iv) Branch coverage
- (v) Condition coverage

(b) Fill in the blanks : $1 \times 5 = 5$

- (i) COCOMO stands for _____.
- (ii) The _____ is an idealistic model for developing any software.
- (iii) DFD stands for _____.
- (iv) The context diagram is defined as _____.
- (v) The _____ phase of waterfall model takes maximum time in SDLC process.

(c) Define unit and integration testing. 5

Section - B

7. Write short notes on : **(any two)** $10 \times 2 = 20$

- (a) Software reverse engineering and reengineering
- (b) Risk management
- (c) Debugging activities and software maintenance
- (d) Cohesiveness and coupling
- (e) COCOMO model

Total number of printed pages-4

44 (BCA-3) 3-1

2022

(Held in 2023)

SOFTWARE ENGINEERING

Paper : 3-1

(Old Syllabus)

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer any four from Section - A.

Section - A

1. (a) What is the principal aim of software engineering discipline? What does the discipline of software engineering discuss? $2+4=6$
- (b) Distinguish between program and a software product. 4
- (c) What do you understand by the build and fix style of software development? What are its shortcomings? $2+3=5$

2. (a) Give an example of a software product development project for which the iterative waterfall model is suitable. 5
- (b) List five desirable characteristics of a good software requirement specification (SRS) document. 5
- (c) List the characteristics of bad SRS documents. Explain briefly. 5
3. (a) What is meant by the size of a software project? Why does a project manager need to estimate the size of the project? How is the size estimated? 2+2+4=8
- (b) Explain Delphi cost estimation technique briefly. 3
- (c) List the important shortcomings of LOC for use as a software size metric for carrying out project estimations. 4
4. (a) State *True* and *False*: 1×5=5
- (i) The primary-purpose of phase containment of error is to develop an error-free product.
- (ii) The SRS document is the legal document between the customer and the developer.

- (iii) Size of a project, as used in COCOMO is the size of the final executable code in bytes.
- (iv) A DFD model of a system usually comprises many DFDs.
- (v) Error and failure are synonyms in software testing terminology.
- (b) Define the following terms: 1×5=5
- (i) Stubs and drivers
- (ii) LOC
- (iii) Software crises
- (iv) Backtracking
- (v) Code Review
- (c) Distinguish between data flow diagram and a flowchart. 5
5. (a) Explain how DFD model of a software can be created from source code. 5
- (b) What is the difference between black box testing and white box testing? 5
- (c) What do you mean by coding guidelines? List some of the important coding guidelines. 5
6. (a) Define the following terms: 1×5=5
- (i) Code walkthrough
- (ii) Code inspection
- (iii) Statement coverage

Total number of printed pages-3

44 (BCA-5) 5-1

2022

(Held in 2023)

**SYSTEM ADMINISTRATION
USING LINUX**

Paper : 5-1

Full Marks : 80

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Write the Linux command to perform the following : 1×7=7
 - (a) To print the list of files and directories contained within a file
 - (b) To change the access permission of a user
 - (c) To create a user account
 - (d) To compare the contents of two files
 - (e) To partition the hard disk
 - (f) To change ownership of a file
 - (g) To delete a group

Contd.

2. Differentiate the following : $2 \times 4 = 8$

- (a) Absolute and relative path
- (b) Program and process
- (c) Foreground and background process
- (d) Mounting and unmounting of file system

3. Answer the following questions : **(any five)**

$7 \times 5 = 35$

- (a) Briefly describe the roles of a system administrator.
- (b) Write the basic features of Linux file system.
- (c) Describe the significance of /etc/ services and well-known port number.
- (d) Write the steps to set up NFS file system.
- (e) Write the purpose of six shell environment variables.
- (f) What is device driver ? Write the functions of various driver commands.

4. State the use of the following commands :

$2 \times 5 = 10$

- (i) ipconfig
- (ii) traceroute
- (iii) telnet
- (iv) grep
- (v) maunt

5. Write short notes on : **(any four)** $5 \times 4 = 20$

- (a) Crontab file format
- (b) Backup and restore
- (c) DNS
- (d) DHCP server
- (e) Proxy server

Total number of printed pages-3

44 (5) BCA-HC-5016

2022

(Held in 2023)

JAVA PROGRAMMING

Paper : BCA-HC-5016

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : **(any five)**
4×5=20

- (a) Write the basic features of Java.
- (b) What is event handling? Discuss *two* event handling mechanisms used in Java.
- (c) Discuss the dynamic dispatch method with an example.
- (d) What is thread? Describe the complete life cycle of thread.

Contd.

- (e) Describe the uses of final and super keywords with respect to inheritance.
- (f) Explain the applet architecture with proper diagram.
2. Write Java program of the following : **(any four)** 5×4=20
- (a) Design three classes person, employee and student using the concepts of inheritance. Each class should have a constructor of its own properties such as name, age, gender and also have common method showdata () to display the data of the persons.
- (b) Write a program to find the square roots of a quadratic equation.
- (c) Create an applet program to draw different geometric shapes such as—a polygon, a rectangle, a straight line.
- (d) To determine length of a string and convert the string from lowercase to uppercase. It also finds a substring which starts from index '0' and ends at a fixed position.

- (e) To check whether a given number is an Armstrong or not.

3. Distinguish between the following : $2 \times 5 = 10$

- (a) Input stream and reader class
- (b) Output stream and writer class
- (c) Thread and multithreading
- (d) Character and byte stream
- (e) Try and catch block

4. (a) Briefly discuss the exception handling mechanism in Java. 5

(b) What is Java package? Write the advantages of Java packages. 5

2022

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Paper : 5.3

Full Marks : 80

Time : Time : 3 Hours

*The figures in the margin indicate
full marks for the questions.*

1. Answer the following questions : 1×10=10
- a) What functions do you use for the visualization of 3D data in Scilab?
 - b) Which command is to be used once in LaTeX?
 - c) What is the correct extension of a Python file?
 - d) What is The default variable to store the answer in scilab is?
 - e) Is Python code compiled or interpreted?
 - f) How do you create an identity matrix of 3 by 3 in scilab?
 - g) LaTeX usually avoid breaking a word in _____
 - h) How do you find the square root of 49 on Scilab console?
 - i) Which type of Programming does Python support?
 - j) Which command is used to achieve right alignment in LaTeX?

(2)

2. Answer the following questions :

2×5=10

a) If $E = [5 \ 19 \ 15; 8 \ 22 \ 36]$. What is the output of $E(1,2)$

b) What is the output of below program?

```
for i = 1:5
    disp(i)
    if (i==2),
        break
    end
end
```

c) List the standard data types in python.

d) Write the syntax to provide checkboxes in Scilab.

e) If $A = [a \ b \ c]$ and $B = [d \ e \ f]$ are two vectors, then their scalar or dot product is defined by,

$$[a \ b \ c] \cdot [d \ e \ f] = a*d + b*e + c*f$$

Write a Scilab function to determine the scalar product of the two vectors.

3. Answer the following questions (any five)

3×5=15

a) What is Scilab? Why it is necessary?

b) Define the various types of graphs that are used to represent information in LaTeX?

c) Write the syntax for - 'for' and 'while' loop in Scilab.

d) Write any four advantages of using LaTeX.

e) What are the applications of LaTeX software?

f) What are the uses of these LaTeX Commands- "`\begin`", "`\section`" & "`\label`" ?

(3)

4. Answer the following questions :

5×4=20

a) What's the difference between SCILAB and MATLAB?

b) Write a python program to find the largest among three numbers.

c) What is LaTeX? State 4 features of LaTeX.

d) What are the features of python programming?

5. Write short notes on (*any five*) :

5×5=25

a) LaTeX list

b) LaTeX colors

c) Applications of Scilab

d) Basic plotting commands

e) Python and its installation.

f) Matrix Operations in Scilab.

□□□□