

Total No. of Printed Pages—16

**X/20/CSc (O)**

**2 0 2 0**

**COMPUTER SCIENCE**

( Old Course )

**( FOR CANDIDATES WITH INTERNAL ASSESSMENT )**

*Full Marks : 80*

*Pass Marks : 24*

**( FOR CANDIDATES WITHOUT INTERNAL ASSESSMENT )**

*Full Marks : 100*

*Pass Marks : 30*

*Time : 3 hours*

**( FOR ALL CATEGORIES OF CANDIDATES )**

*General Instructions :*

- (i) The candidates are advised to attempt all questions accordingly.
- (ii) Marks allocated to every question are indicated against each.
- (iii) Sections A, B, C and D are to be answered by all Candidates.
- (iv) Section E is to be answered by Candidates without Internal Marks only.

( 2 )

SECTION—A

( **COMPUTER FUNDAMENTALS** )

( *Maximum Marks* : 20 )

( Objective-type Questions )

I. Choose and write the correct answer for the following  
(any *three*) : 1×3=3

1. Which of the following number systems has no base at all?

- (a) Binary
- (b) Octal
- (c) Decimal
- (d) Roman

2. What is the decimal equivalent of the binary number 11011?

- (a) 31
- (b) 27
- (c) 26
- (d) 30

3. What is the product of  $(10110)_2 \times (101)_2$ ?

- (a)  $(1101110)_2$
- (b)  $(11100)_2$
- (c)  $(101011)_2$
- (d)  $(110011)_2$

( 3 )

4. The OR operator is represented by the symbol

(a) “.”

(b) “+”

(c) “-”

(d) “\*”

5. Which of the following Boolean expressions represents the NOR gate?

(a)  $Y = \overline{A \cdot B}$

(b)  $Y = A + B$

(c)  $Y = \overline{A + B}$

(d)  $Y = \bar{A}$

6. The 2's complement of 1001001 is

(a) 0110111

(b) 0110110

(c) 1110110

(d) 1110111

II. State whether the following statements are *True* or *False*  
(any two) :

1×2=2

1. EBCDIC represents a total of 256 characters.
2. Hexadecimal number system has base 10.
3. The binary equivalent of decimal number  $(0.428)_{10}$  is  $(0.011)_2$ .
4. The computer logic circuits are based on Boolean expressions.

( 4 )

**III.** Fill in the blanks of the following sentences (any *two*) :

1×2=2

1. A combination of the AND gate and the NOT gate is known as the \_\_\_\_ gate.
2. The computer actually performs subtraction by the process of \_\_\_\_.
3. The ASCII uses 7 bits, thereby allowing a total of \_\_\_\_ different codes.
4. The computer recognizes only two states of current, that is \_\_\_\_.

( Short Answer-type Questions )

**IV.** Answer the following questions :

1×3=3

1. What is BCD?
2. Subtract  $(1110011)_2$  from  $(110011)_2$  using the 2's complement method.
3. Give the truth table for the expression

$$Y = \overline{A + B}$$

( Descriptive-type Questions )

**V.** *Either*

- (a) (i) Explain briefly the positional and non-positional number systems. 1+1=2
- (ii) Differentiate between the 1's complement and the 2's complement with examples.  $1\frac{1}{2}+1\frac{1}{2}=3$

*Or*

- (b) (i) Convert the following :  
 $(1101.101)_2 = (?)_{10}$  1
- (ii) Verify the following Boolean expression using truth table :  
 $X + Y \cdot Z = (X + Y) \cdot (X + Z)$  2
- (iii) Divide  $(11101011)_2$  by  $(101)_2$ . 2

( 5 )

VI.

*Either*

(a) (i) What is the difference between a bit and a byte? 1+1=2

(ii) Draw the Logic circuit for the following : 3

$$A = (\bar{x} + y) \cdot (x + z) \cdot (y + z)$$

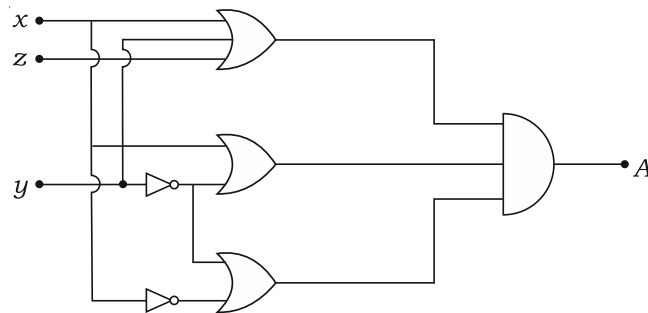
**[ For the Visually Handicapped (Blind) Students only  
in lieu of Question No. VI(a)(ii) above ]**

(ii) Differentiate between the NOR gate and the NAND gate. 3

*Or*

(b) (i) Why is the ASCII code important for computer operation? 2

(ii) Give the Boolean expression of the following logic circuit : 3



**[ For the Visually Handicapped (Blind) Students only  
in lieu of Question No. VI(b)(ii) above ]**

(ii) Explain the AND operation with its truth table. 1½+1½=3

( 6 )

SECTION—B

( **ADVANCED DOS AND LINUX** )

( *Maximum Marks : 20* )

( Objective-type Questions )

I. Choose and write the correct answer for the following  
(any *two*) : 1×2=2

1. Which of the following commands is used to view the list of directories and subdirectories present in the disk in graphical form?

- (a) DIR
- (b) LIST
- (c) TREE
- (d) VOL

2. Which of the following is not a valid LINUX command?

- (a) data
- (b) pwd
- (c) cat
- (d) touch

3. Which of the following commands is a filter?

- (a) DOSKEY
- (b) FIND
- (c) FORMAT
- (d) MOVE

( 7 )

4. Which of the following is not permission associated with the chmod command in Linux?

- (a) r
- (b) w
- (c) x
- (d) y

**II.** State whether the following statements are *True* or *False* (any two) : 1×2=2

1. In Linux, every user is assigned an individual home directory.
2. FORMAT is an internal command in DOS.
3. The DOS command XCopy is used to selectively copy files from one disk to another.
4. In Linux, a user can remove a directory by using 'rmdir' command without having write and execute permission.

**III.** Fill in the blanks of the following sentences (any two) : 1×2=2

1. \_\_\_\_\_ DOS command is used to change/modify the name(s) of a file or files.
2. The \_\_\_\_\_ DOS command is used to display one screen of output at a time.
3. \_\_\_\_\_ is the process by which a file is written on a disk in parts.
4. The \_\_\_\_\_ directory contains executable files for most of the commands in Linux.

( 8 )

( Short Answer-type Questions )

**IV.** Write the commands and their switches (or options) for the following (any *two*) : 2×2=4

1. List the contents of your home directory in Linux with file types.
2. Delete all the files with extension .BAK in the current directory with the option to confirm before each one is deleted (in DOS).
3. Remove the fragmentation of files in D : drive (in DOS).
4. Format the floppy in drive A : with the label set to BOARD (in DOS).

( Descriptive-type Questions )

**V.** *Either*

- (a) (i) What is the purpose of the REPLACE command? 1  
(ii) How is proprietary software different from open-source software? 2+2=4

*Or*

- (b) (i) What does the 'media' directory contain in Linux? 1  
(ii) How is DELTREE different from DEL? 2+2=4

**VI.** *Either*

- (a) Name and explain five different types of directories in Linux. 1+1+1+1+1=5

*Or*

- (b) Explain in detail the EDIT command with syntax and its various switches. 2+1+2=5



( 9 )

SECTION—C

( QBASIC )

( Maximum Marks : 28 )

( Objective-type Questions )

I. Choose and write the correct answer for the following  
(any two) : 1×2=2

1. Which of the following cannot be used as a valid data type for a numeric type of data?
  - (a) INTEGER
  - (b) LONG
  - (c) DOUBLE
  - (d) STRING
2. Which of the following is not a relational operator?
  - (a) =
  - (b) <>
  - (c) >
  - (d) ^
3. Which one of the following is known as a user-defined function?
  - (a) SUB-END SUB
  - (b) LIBRARY FUNCTION
  - (c) DEF-FN
  - (d) ON-GOSUB

( 10 )

4. The library function which is used to find the position of one string in another string is

- (a) INSTR
- (b) MID\$
- (c) CHR\$
- (d) RIGHT\$

**II.** State whether the following statements are *True* or *False* (any two) : 1×2=2

- 1. The format string used in PRINT USING statement consists of one or more character(s) having pre-defined meaning.
- 2. A variable in QBasic may contain any number of characters and special characters.
- 3. We cannot pass an entire array of cells to a subprogram or a function.
- 4. A subprogram always begins with a SUB statement and ends with the END SUB statement.

**III.** Fill in the blanks of the following sentences (any two) : 1×2=2

- 1. Every expression contains \_\_\_\_\_ and operators.
- 2. In the PRINT USING statement, the digit position is denoted by the \_\_\_\_\_ symbol.
- 3. \_\_\_\_\_ functions are also called library functions.
- 4. In \_\_\_\_\_ type of array, you can easily change its size.

**IV.** Answer the following questions : 1×3=3

1. What is global variable?
2. Explain briefly the MID\$ statement.
3. Write the QBasic expression of

$$\left(\frac{abc}{a}\right)^2 + b$$

( Short Answer-type Questions )

**V.** Answer the following questions within 2 or 3 sentences or steps each (any *two*) : 2×2=4

1. How is a user-defined function different from subroutines?
2. What is the use of the ERASE statement?
3. Why do we use the READ-DATA-RESTORE statement? Explain with suitable example.
4. Differentiate between ASC and CHR\$ functions.

( Descriptive-type Questions )

**VI.** Answer the following questions : 5×3=15

1. *Either*  
(a) Explain the SELECT-CASE-END SELECT structure. Discuss its various syntaxes with examples. 5  
*Or*  
(b) Discuss the different versions of the DO...LOOP statement. 5

( 12 )

2. *Either*

- (a) Write the output generated by the following QBasic program : 5

```
DIM I AS INTEGER, J AS INTEGER
FOR I = 5 TO 9
  FOR J = 1 TO 5
    PRINT I*J;
  NEXT J
  PRINT
NEXT I
END
```

*Or*

- (b) Develop QBasic codes to generate all the Armstrong numbers in the range 1 to 999. 5

3. *Either*

- (a) Write a program to accept a sentence from the user and count the number of words present in the sentence. 5

*Or*

- (b) Write a program to store the names of all your classmates in a one-dimensional array and display them in ascending order. 5

( 13 )

SECTION—D

( **JAVA CONCEPT** )

( *Maximum Marks : 12* )

( Objective-type Questions )

**I.** Choose and write the correct answer for the following  
(any two) : 1×2=2

1. Which of the following operators is not in the numeric category?

(a) %

(b) ++

(c) --

(d) ||

2. Which of the following tools compiles a Java source code?

(a) java

(b) javac

(c) java.io

(d) java.util

3. Which of the following is not a data type in Java?

(a) byte

(b) short

(c) single

(d) float

( 14 )

4. A collection of objects of same type is called a/an

- (a) method
- (b) class
- (c) data member
- (d) object

**II.** State whether the following statements are *True* or *False* (any two) :

1×2=2

1. A constant in Java is declared by using the keyword 'final'.
2. The scanner class is defined in the package 'java.util'.
3. The process of creating an object from a class is called instantiation.
4. Java is case-insensitive.

**III.** Fill in the blanks of the following sentences (any two) :

1×2=2

1. By default the starting index of an array is \_\_\_\_.
2. Boolean operator && represents \_\_\_\_ operator.
3. 'float' data type is stored in \_\_\_\_ bytes.
4. The \_\_\_\_ visibility modifier makes the data members and methods invisible or inaccessible to the outside classes.

( 15 )

IV. Answer the following questions : 1×3=3

1. Expand JSL.
2. Name the two categories of data types in Java.
3. Define encapsulation.

V. *Either*

- (a) What is a class and how is it different from an object?  $1\frac{1}{2}+1\frac{1}{2}=3$

*Or*

- (b) What is a method? What do we understand by overloading of methods?  $1\frac{1}{2}+1\frac{1}{2}=3$

### SECTION—E

( Maximum Marks : 20 )

**( For Candidates without Internal Assessment )**

I. Answer the following questions within 2 or 3 sentences each (any *five*) :  $2\times 5=10$

1. What is the difference between the TAB function and the SPC function?  $1+1=2$
2. What are the different data types available in QBasic? 2
3. Differentiate between the INPUT statement and the LINE INPUT statement.  $1+1=2$
4. How can PRINT USING be used for string types of data? Give examples.  $1+1=2$
5. How is an argument passed to a subprogram or a function? Explain.  $1+1=2$
6. How is the FIX function different from the INT function? Give examples.  $1+1=2$

( 16 )

II. Answer the following questions :

5×2=10

1. *Either*

(a) Write a QBasic program to display a given integer by reversing its digits. 5

*Or*

(b) Write a program to display the largest and the smallest elements in an array containing  $n$  number of elements. 5

2. *Either*

(a) What are the rules for naming a variable in QBasic? 5

*Or*

(b) Enumerate the rules for READ-DATA statement. 5

★ ★ ★