Total No. of Printed Pages—16

X/18/CSc

2018

COMPUTER SCIENCE

(CANDIDATES WITH PRACTICAL/INTERNAL ASSESSMENT)

Full Marks : 80
Pass Marks : 24

(CANDIDATES WITHOUT PRACTICAL/INTERNAL ASSESSMENT)

Full Marks : 100
Pass Marks : 30

Time : 3 hours
(For Both Categories of Candidates)

The figures in the margin indicate full marks for the questions

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 one of the following letters represents the largest digit in hexadecimal?

   (a) D

   (b) E

   (c) F

   (d) G

2. In general for a number N of n digits with base p, the $(p \quad 1)$'s compliment is calculated as

(a) $p^n \quad N$ *(b)* $(p^n \quad 1) \quad N$

(c) $p^n \quad N$ *(d)* $(p^n \quad 1) \quad N$

3. Using BCD-4 bit coding scheme, the decimal number 369 is represented by

(a) 001101101101

(b) 001101001001

(c) 001101101001

(d) 011101101001

4. According to binary arithmetic, the result of the addition $(10110)_2 \quad (10101)_2$ is

(a) $(101111)_2$ *(b)* $(101011)_2$

(c) $(100011)_2$ *(d)* $(101001)_2$

5. In Boolean algebra, if $X \quad 0$ and $Y \quad 1$, then $\overline{X \quad Y}$ is equal to

(a) 0 *(b)* 1

(c) 10 *(d)* 11

6. Which of the following operations performs the last when a logical expression contains a combination of AND, OR and NOT operations?

(a) NOT

(b) OR

(c) AND

(d) None of the above

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

1. The division is actually implemented in a digital computer by repetitive subtraction.

2. The continuous data that we need to provide to the computer must be encoded into discrete.

3. The truth table deals only with the truth values and not the falsity of the compound proposition.

4. The number 110 belongs to only binary number system.

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

1. Clubbing of 4 bits into a unit is called the _____.

2. NOT operation is also known as _____.

3. If the subtrahend is $(100100)_2$, then its 2's compliment will be _____.

4. Octal Number System consists of _____ digits.

(Short Answer-type Questions)

IV. Answer the following : 1×3=3

1. Define the term 'bit'.

2. Give the full form of the abbreviation EBCDIC.

3. Convert $(0\ 25)_{10}$ $(?)_2$

(Descriptive-type Questions)

V. *Either*

(a) *(i)* Write down the maximum number of codes allowed in EBCDIC, ASCII and BCD. 1+1+1=3

(ii) Convert the following : 2

$(1234)_8 \quad (?)_{16}$

Or

(b) *(i)* Subtract $(11010)_2 \quad (10101)_2$ using 1's compliment method. 2

(ii) Give the truth table for the expression $Y \quad A \quad B \quad C$. 3

VI. *Either*

(a) *(i)* Give one example each of positional and non-positional number systems. 2

(ii) Draw the logic circuit for the Boolean expression

$Y \quad (A \quad B) \; (\overline{A} \quad B) \; (\overline{C \quad D})$ 3

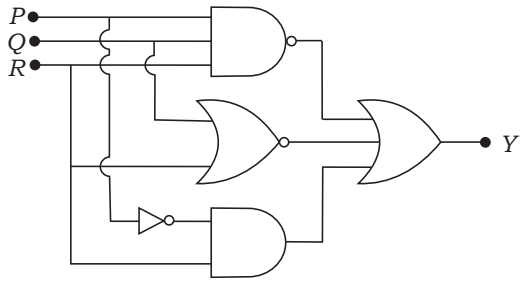
[For the Visually Handicapped (Blind) Students only in lieu of Question No. VI*(a)(ii)* above]

(ii) State three rules for subtraction using 2's compliment method. 1+1+1=3

Or

(b) *(i)* Explain briefly the NAND gate. Give its Boolean expression with two inputs. 1+1=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) What are Logic gates? Name the gate which has only one input signal going into it. Write its Boolean expression. 1+1+1=3

SECTION—B

(OPERATING SYSTEMS)

(*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 is an external DOS command?

   (a) VOL

   (b) COPY

   (c) DEL

   (d) EDIT

2. Which of the following files in DOS is called the *command processor*?

   (a) COMMAND.COM

   (b) IO.SYS

   (c) MSDOS.SYS

   (d) All of the above

3. The purpose of CHKDSK command is to check and display

   (a) the status of the selected disk

   (b) the status of the computer's memory

   (c) the specified file for fragmentation

   (d) All of the above

4. Which one of the following commands in Linux is used to copy one or more files?

   (a) chmod *(b)* cp

   (c) cal *(d)* mv

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

1. A switch allows some additional features to the command.
2. The process in which files are written on a disk in parts is known as 'defragmentation'.
3. MEM command displays important information about the disk.
4. Linux is an open source operating system released by Linus Torvalds in 1991.

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

1. _____ command is used to arrange the data of a file in a particular order (A–Z, 0–9) or reverse order.

2. _____ DOS command is used to change/modify the name of a file or files.

3. _____ command is used to view the list of directories and subdirectories present on the disk in graphical form.

4. To create directory in Linux, one must have _____ permission within the parent directory.

(Short Answer-type Questions)

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

1. Format the C drive and put the volume label TEST.
2. Copy all the files from A:\MYDIR to C: and its subdirectories having the same file name.
3. Redirect all the commands presently stored in the buffer to a file 'computer.txt'.
4. Delete the file *old.file* in Linux with a prompt for confirmation.

(Descriptive-type Questions)

V. *Either*

(a) *(i)* Differentiate between DEL and DELTREE commands with their syntaxes. 2+2=4

(ii) What is the purpose of MKDIR command? 1

Or

(b) *(i)* Explain the purpose of *ls* command in Linux. Explain the options *r* and *c* used with *ls* command. 2+1+1=4

(ii) What is the purpose of *pwd* command? 1

VI. *Either*

(a) Explain the purpose of FIND command with its syntax. Briefly explain all the switches available with this command. 1+1+3=5

Or

(b) *(i)* Differentiate between a proprietary software and an open source software. 2+2=4

(ii) Name any two common distributions of Linux. ½+½=1

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. The string length falls within the range of

(a) 32,768 to 32,767

(b) 0 to 32,767

(c) 1 to 32,767

(d) 1 to 40

2. Which one of the following is not a relational operator?

   (a) > *(b)* <

   (c) ^ *(d)* =

3. Which one of the following statements is correct in case of FOR-NEXT loop?

   (a) The arguments counter, start, end and increment are all string.

   (b) It is indeterminate loop.

   (c) It is determinate loop.

   (d) None of the above

4. PRINT LEN (num%) will give the output as

   (a) 1 *(b)* 0

   (c) 1 *(d)* 2

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

1. The INPUT$(✗) function displays the number of keys pressed from the keyboard.

2. The WHILE...WEND loop is used for backward compatibility.

3. In a TAB (*column*) function, the least value of *column* can be 0.

4. Argument variables in a subroutine are always passed by reference by default.

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

1. _____ are used as place holders that can change its value during the program execution.
2. If a 10 45 and b 2 61, the result of $a \setminus b$ is _____.
3. Writing of _____ is an intermediary step between your flowchart and the actual source code.
4. A _____ is used to identify a particular line/statement in the program. It can be a string or a number.

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

1. Write QBasic expression for

$$\frac{P \quad \frac{Q}{2}}{\frac{P}{2} \quad Q}$$

2. When is LINE INPUT statement valuable in a program?
3. Write the output of the following QBasic statement :

PRINT USING " $####.##"; 123·4567

(Short Answer-type Questions)

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

1. What are the different forms the expression lists can have in SELECT-CASE structure? 2
2. Give the summary of XOR operator and write its truth table. 1+1=2

3. Distinguish between INT and CINT functions with examples. 1+1=2

4. Explain the difference between a comma and a semicolon as separators in PRINT statement. 1+1=2

(Descriptive-type Questions)

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

1. *Either*

(a) Explain the hierarchy of QBasic operators. 5

Or

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

2. *Either*

(a) Develop QBasic code to generate the following output : 5

6 5 4 3 2 1
5 4 3 2 1
4 3 2 1
3 2 1
2 1
1

Or

(b) Write a QBasic program to calculate the sum and average of a set of numbers given by the user. The user should be allowed to input numbers as long as he/she wants. 5

3. *Either*

(a) *(i)* Distinguish between the scope and lifetime of a variable. 2+2=4

(ii) How can you extend the lifetime of a local variable declared within a subprogram or function? 1

Or

(b) Write a QBasic program to store 10 integer numbers in a one-dimensional array, sort and display them in descending order of their values. 5

SECTION—D

(JAVA CONCEPTS)

(*Maximum Marks* : 12)

(Objective-type Questions)

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

1. A class declaration is enclosed within

(a) (and)

(b) [and]

(c) { and }

(d) < and >

2. Which of the following operators is used to access data member through an object of the class?

   (a) . (dot)

   (b) ; (semicolon)

   (c) : (colon)

   (d) = (assignment)

3. A 'short' data type variable occupies

   (a) 1 byte

   (b) 2 bytes

   (c) 4 bytes

   (d) 8 bytes

4. Which of the following visibility modifiers make the data members and methods of a class visible and accessible to every other classes?

   (a) Private

   (b) Protected

   (c) Public

   (d) None of the above

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

1. The process of creating an object from a class is called instantiation.
2. A method in Java defines the operations that an object of a class can execute.
3. The package 'java.awt' contains classes for designing GUI applications.
4. A constant in Java is declared by the keyword *final*.

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

1. The _____ method reads a string as input terminated by white space.
2. A _____ is a special purpose method in a class which initializes the data members of an object on instantiation.
3. In Java, to declare a 10 element array of integers named score, we have to write _____.
4. Comparison operator 'equality' is represented by the symbol _____.

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

1. List two tools in Java Development Toolkit which are used to compile and execute programs. ½+½=1
2. In declaring objects, what is the purpose of 'new' keyword? 1
3. What are the two main data type categories in Java? ½+½=1

V. *Either*

(a) *(i)* What is a class and how is it different from an object? 1+1=2

(ii) What is the main difference between the while loop and the do-while loop? 1

Or

(b) *(i)* What do you understand by method overloading? 2

(ii) Define encapsulation. 1

[For Private Candidates only (without Practical)]

(*Maximum Marks* : 20)

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

1. What do you understand by the character set of a language? 2

2. What are reserved words? 2

3. What do you mean by relational operators? How do they differ from arithmetic operators? 1+1=2

4. Explain LOCATE statement with its syntax. 1+1=2

5. Differentiate between a subprogram and a function. 1+1=2

6. What are the full forms of JSL and JDK? 2

7. In Java what are attributes and operations known as? 2

II. Answer the following questions : 5×2=10

1. *Either*

(a) Write a program to enter the radius of a circle and calculate its area. 5

Or

(b) Enumerate the points to be remembered while writing expressions in QBasic. 5

2. *Either*

(a) Write a program to calculate the factorial of any given positive integer : 5

Example : Factorial of 5 is calculated as

5! 5 4 3 2 1 120

Or

(b) What do you mean by branching statement? Distinguish between conditional branching and unconditional branching with examples. 1+2+2=5

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