Roll No. ..................

# 97664

## BCA 1st Semester (New)
## Examination – November, 2018

### LOGICAL ORGANIZATION OF COMPUTERS-I

Paper : BCA-104

*Time : Three Hours ]*      *[ Maximum Marks : 80*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *four* questions by selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) What is BCD adder ?      $2 \times 8 = 16$

   (b) What is meant by digital logic ? Explain.

   (c) What is the difference between Boolean Algebra and Real Algebra ?

   (d) Which number system is followed in digital computers and why ?

   (e) What are Demultiplexers ? State their importance.

   (f) What is Unicode ? State its relevance.

   (g) What is the smallest and largest integer number represented in a 32-bit computer ?

   (h) What are code converters ?

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## UNIT – I

**2.** (a) What are parity bits ? How are these relevant in error-detection and correction codes ? Illustrate through suitable examples.    7

     (b) Find out the values of X, Y and Z in the following :    9

$$(75.75)_{10} = (X)_2 = (Y)_8 = (Z)_{16}$$

**3.** Explain the following :

     (a) Floating-point Representation of numbers    8

     (b) Character codes    8

## UNIT – II

**4.** (a) What is principle of Duality ? Illustrate.    6

     (b) Simplify the following Boolean expression using K-map :    10

$$F(a,b,c) = \Sigma(1,4,5,6,7)$$

     and realize the same using NAND gates.

## UNIT – III

**5.** Explain the following :

     (a) SOPs and POSs    5

     (b) Venn diagrams    5

     (c) Boolean Algebra    6

**6.** (a) What are Universal Gates ? Why these are named so ? Justify.    6

     (b) Design a combinational circuit that receives 4-bit binary input and produces its 2's complement.    10

**7.** (a) What do you mean by multilevel NAND and NOR circuits ? Illustrate.    4

     (b) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain.    4

     (c) What is combinational circuit ? What are its characteristics ? Detail out the procedure for design of combinational circuit.    8

## UNIT – IV

**8.** (a) What is a multiplexer ? How does it work ? What are its applications ? Explain.    8

     (b) What is a full-adder ? Design a full-adder and implement the same using gates.    8

**9.** Explain the following :

     (a) BCD to seven-segment Decoder    8

     (b) Magnitude Comparators    8

9. Evaluate the following integral :

(i) $\int \dfrac{1}{x \log x}\, dx$ .

(ii) $\int \dfrac{x^2}{(x-1)^3 (x-1)}\, dx$

(iii) $\int \dfrac{dx}{2+3\cos x}$

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Roll No. ....................

## 97663

## BCA 1st Semester (New)
## Examination – November, 2018

### MATHEMATICS
Paper : BCA-103

*Time : Three Hours ]*   [ *Maximum Marks :* 80

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* question in all, selecting *one* question from each Section. Q. No. 1 is *compulsory.*

1. (a) Given A = {a, e, i, o, u}, B = {r, a, m}, find A ∩ B, A – B.

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

(c) Define many – one function.

(d) Evaluate $\lim\limits_{x \to 1/2} \dfrac{4x^2 - 1}{2x - 1}$.

(e) If $y = \cot 3x$, find $\dfrac{dy}{dx}$.

(f) If $y = \cot^{-1} x^3$, find $\dfrac{dy}{dx}$.

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(g) Evaluate :

$$\int \frac{x}{x-3}\,dx$$

(h) Evaluate :

$$\int \frac{1}{\sqrt{2+x}}\,dx$$

## SECTION – I

2. (a) To prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

   (b) In a class of 25 students, 12 students have taken Economics; 8 have taken Economics but not maths Find (i) the numbers of students who have taken Economics and Maths (ii) those who have taken Maths but not Economics.

3. (a) Prove that $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c)$

   (b) Solve :

   $$x - y - z = 1,\ 2x + y + z = 2,\ x - 2y + z = 4$$

## SECTION – II

4. (a) Let $\theta$ be the set of all rational numbers. Show that the function $f : \theta \to \theta : f(x) = 3x + 5 \ \forall \ x \in \theta$ is bijective. Also find $f^{-1}$.

   (b) If R is a relation in $N \times N$, defined by $(a, b)\, R(c, d)$ if and only if $a + d = b + c$, show that R is an equivalence relation.

5. (a) Find $\lim\limits_{x \to 0} \dfrac{\tan x - \sin x}{\sin^3 x}$.

   (b) Find $\lim\limits_{x \to 3} \dfrac{3 - x}{\sqrt{4 + x} - \sqrt{1 + 2x}}$.

## SECTION – III

6. (a) Find the Differential coefficient of $\tan x$ by first principle.

   (b) Differentiate w.r.t. $x$

   (i) $\dfrac{x}{\sin 3x}$          (ii) $\dfrac{x^2 + 1}{x + 1}$

7. Differentiate w.r.t. $x$

   (i) $\sqrt{\dfrac{1 - \sin x}{1 + \sin x}}$   (ii) $\tan^{-1}\left(\dfrac{\sqrt{1 + x^2} - 1}{x}\right)$

   (iii) $x^{\log x}$   (iv) $\dfrac{x\sqrt{x^2 + 1}}{(x + 1)^{2/3}}$

## SECTION – IV

8. Evaluate the following integrals :

   (i) $\int e^x \cos x\,dx$

   (ii) $\int \dfrac{1 + x}{(2 + x)^2} e^x\,dx$

   (iii) $\int \dfrac{dx}{\sqrt{x^2 + 2x + 2}}$

# 97661

## BCA 1st Semester (New)

## Examination – November, 2018

### COMPUTER & PROGRAMMING FUNDAMENTALS

#### Paper : BCA-101

*Time : Three Hours* ]                    [ *Maximum Marks : 80*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

***Note :*** Examiner will be required to set *nine* questions in all. Question No. 1 will consist of total 8 parts (short answer type questions) covering the entire syllabus and will carry **16** marks. In addition to the compulsory question there will be *four* Units i.e. Unit-I to unit-IV. Examiner will set *two* questions from each unit of the syllabus and each question compulsory. In addition to *compulsory* question, student will have to attempt *four* more questions selecting *one* question from each Unit.

1. (a) What are the limitations of human of processing ? How these can be removed ?                    $8 \times 2 = 16$

    (b) What are the major secondary storage devices ?

    (c) Explain the various types of transmission media.

    (d) Differentiate between a bit, byte and a word.

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(e) What are the advantages and disadvantages of semi-conductor memories ?

(f) Name *four* computers belonging to each generation.

(g) Compare desktop, Laptop and Palmtop.

(h) What is CPU and explain how it works ?

## UNIT – I

2. Explain the classification of computers according with :                                    16

   (a) data representation

   (b) purpose

   (c) use

   (d) size, cost and speed

   (e) generation of computers

3. (a) What are high level languages ? Why are they known as problem oriented languages ? Name some high level languages.                                    8

   (b) What is meant by Memory Hierarchy ? State it's important.                                    8

## UNIT – II

4. (a) Define multiprogramming. Explain how multiprogramming ensures effective utilization of main memory and CPU.                                    8

   (b) What is the difference between a source program and an object program ?                                    8

5. (a) What is an operating system ? Why is it necessary for a computer system ?                                    8

   (b) List out the various functions normally performed by an operating system.                                    8

## UNIT – III

6. (a) Explain the concept of structured programming. How does it differ from the conventional programming techniques ?                                    8

   (b) What is meant by programming language ?                                    8

7. (a) State the basic control structures which serve as building blocks for structured programming.                                    8

   (b) Explain the difference between compiler and Interpreter.                                    8

## UNIT – IV

8. (a) What do you meant by computer technology ? Explain any *three* topologies ?                                    8

   (b) Describe client-server concept. What are its benefits ?                                    8

9. (a) Describe various internet applications.                                    8

   (b) Explain the minimal hardware and software required for internet connection.                                    8

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