2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–201 (OC)

(Introduction to Programming Language Through C)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What do you mean by identifiers? What are the different rules for identifiers? 5

(b) What are constants? Explain the different types of constant. 5

Or

(c) Define operator. Write three different types of operator with their meaning. 5

(d) Explain implicit-type conversion and explicit-type conversion by giving examples. 5

2. *(a)* Explain the different types of looping statement with their general format. 6

(b) Write a C program to find the sum of digits of the given number. 4

Or

(c) What is switch statement? Explain with appropriate example. 5

(d) Write a C program to display the following format on the screen : 5

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

3. *(a)* Differentiate between call by value and call by reference. Write a C program to swap two numbers using call by value and call by reference. 6

(b) Write a C program to find the factorial of a given number using recursive function. 4

Or

(c) Define array. Explain one-dimensional array and two-dimensional array. 5

(d) Write a C program to read 10 integers in an array. Find the largest and the smallest number. 5

4. *(a)* Define string. Why do we need a terminating null character '\0' in string? 4

(b) Write a C program to count the number of vowels in a given string. 6

Or

(c) What is pointer? Write and explain the declaration and initialization of a pointer variable. 5

(d) An array of 10 integer elements has its elements stored as {5, 10, 15, 40, 25, 30, 35, 20, 45, 50}. If the 4th and 8th elements are to be interchanged, then array will get sorted. Write a C program that makes use of pointers to interchange the element and print the sorted elements. 5

5. *(a)* Differentiate between structure and union by giving an appropriate example. 4

(b) Write a C porgram to print the details of 3 students like, R_no, name, address, city, phone using array of structure. 6

Or

(c) Explain the operation of the following file functions : 4

(i) getc()

(ii) putw()

(iii) fprintf()

(iv) fscanf()

(d) Write a C program to store some information inside a file and display the same information on terminal. 6

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Subject Code : **II/BCA/201 (OC)**

Booklet No. A

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DEGREE 2nd Semester
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Booklet No. B .....

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2 0 1 7

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–201 (OC)

(Introduction to Programming Language Through C)

(Old Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

Answer **all** questions

SECTION—I

(*Marks* : 15)

1. Choose the correct answer by putting a Tick (✓) mark in the brackets provided : 1×10=10

(a) #include is known as

(i) preprocessor directive ( )

(ii) postprocessor directive ( )

(iii) processor directive ( )

(iv) None of the above ( )

(b) The format indentifier '%f' is used for _____ data type.

(i) int ( )

(ii) char ( )

(iii) float ( )

(iv) double ( )

(c) How many times i value is checked in the code given below?

```
#include<stdio.h>
int main()
{
   int i=0;
   do
   {
        i++;
   }while(i<3);
}
```

(i) 2 ( )

(ii) 3 ( )

(iii) 4 ( )

(iv) 1 ( )

(d) The ____ statement transfers the control out of the loop.

(i) exit ( )

(ii) jump ( )

(iii) break ( )

(iv) skip ( )

(e) Which is the correct statement for declaring array variable?

(i) int array<5> ( )

(ii) int array[5] ( )

(iii) int array(5) ( )

(iv) int array{5} ( )

(f) Function header contains

(i) return type ( )

(ii) function name ( )

(iii) parameter list ( )

(iv) All of the above ( )

(g) Which one is an indirection operator among the following?

(i) * ( )

(ii) & ( )

(iii) % ( )

(iv) # ( )

(h) Which string function is used to join two strings?

(i) strjoin() ( )

(ii) stradd() ( )

(iii) stringjoin() ( )

(iv) strcat() ( )

(i) What type of value does sizeof return?

(i) unsigned int ( )

(ii) signed int ( )

(iii) char ( )

(iv) short ( )

(j) Which one is a write mode in a file?

(i) a ( )

(ii) w ( )

(iii) r ( )

(iv) r+ ( )

2. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

(a) Every line in a C program should end with a semicolon.

(T / F)

(b) do-while loop executes at least one time even if the condition is false at the beginning.

(T / F)

(c) C function returns a value of the type **int** as the default case when no other type is specified explicitly.

(T / F)

(d) Pointer variables are declared using the symbol **&** operator.

(T / F)

(e) All members of a **union** use the same location.

(T / F)

SECTION—II

(*Marks* : 10)

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

(a) What do you mean by variables? Write the declaration of variables by giving examples.

(b) Differentiate between while loop and do-while loop.

(c) Write the different types of function.

(d) What is the difference between reading a line of text using **scanf()** and using **gets()**?

(e) Defne file. Write the general format for declaring and opening a file.

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–201

(Personality and Soft Skills Development)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer any *two* of the following : 10×2=20

(a) "The man who has no control on himself can never control others." In the light of this statement, state the different qualities of a leader for building a team.

(b) In order to be organized in a more productive way in life, suggest suitable ways to manage time effectively.

(c) To avoid the potential problems in E-mail communication, explain the various techniques for writing effective E-mail.

(d) "People having good communication skills generally win the race as soon as it begins." Describe ways to sharpen communication skills for personal development.

2. Write short notes on the following : 5×4=20

(a) Personality development

(b) Motivation

(c) Goal setting

(d) E-mail etiquette

3. *(a)* Imagine yourself as the owner of Oriental Store, Chaltlang, Aizawl. Write a letter to T/S Company, Dawrpui, ordering stationery items. 10

Or

(b) Write an application to Public Works Department, Aizawl for the post of a Mechanical Engineer. Provide your resume. 10

4. *(a)* Draft a letter of quotation for the regular supply of uniforms to the purchase officer of Sunrise Garments, Khatla. 10

Or

(b) You are working in High End Printing Press. You are not satisfied with the photocopier machine that you have bought from a supplier. Write a letter of complaint to the manager inventing suitable complain on the machine. 10

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–202(OC)

[Mathematics—II (Numerical Analysis)]

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. *(a)* Using Newton-Raphson method, find the positive root of $x^4 \quad x \quad 10 \quad 0$ correct to three decimal places. 8

Or

(b) Find a root of the equation $x^3 \quad x \quad 11 \quad 0$, using the bisection method correct to three decimal places. 8

2. Solve the system of equations

$$x \quad y \quad z \quad 3$$
$$x \quad 2y \quad 3z \quad 4$$
$$x \quad 4y \quad 9z \quad 6$$

(a) using Gauss elimination method *or*
(b) Gauss-Jordan method. 8

3. *(a)* Using Newton's forward interpolation formula, find the value of y at x 2. Given that

x	:	1	1·4	1·8	2·2
y	:	3·49	4·82	5·96	6·5

8

Or

(b) Interpolate by means of Gauss' backward formula, the population of a town for the year 1974. Given that

Year	:	1939	1949	1959	1969	1979	1989
Population (in thousand)	:	12	15	20	27	39	52

8

4. *(a)* By the use of Lagrange's formula, find the polynomial of degree three which takes the values prescribed below : 7

x	:	0	1	2	4
$f(x)$	:	1	1	2	5

Or

(b) By using Newton's divided difference formula, find $f(3)$. Given that

x	:	1	2	4	7	12
$f(x)$	:	22	30	82	106	216

7

5. *(a)* Fit the curve $y \quad ae^{bx}$ to the following data : 9

x	:	0	2	4
y	:	5·1	10	31·1

Or

(b) By the method of least squares, find the straight line that best fits the following data : 9

x	:	1	2	3	4
y	:	14	27	40	55

6. Solve the differential equation

$$\frac{dy}{dx} \quad xy \quad 0, \quad y(0) \quad 1$$

from $x \quad 0$ to $x \quad 0\ 25$ where $h \quad 0\ 05$, *(a)* using Heun's method *or (b)* Euler's method. 8

7. From the table below

x	:	14·1	14·3	14·5	14·7	14·9
y	:	7·25	8·17	9·04	10·42	11·99

evaluate f (14 7) and f (14 7). 7

8. Find the approximate value of the integral

$$I \quad \int_0^4 e^x dx$$

using—

(a) Simpson's one-third rule;

(b) Simpson's three-eighths rule;

(c) Weddle's rule;

(d) Trapezoidal rule. 8

9. Solve $y \quad x \quad y$, $y(0) \quad 1$ by Taylor's series method. Hence find the values of y at $x \quad 0\ 1$ and $x \quad 0\ 2$. 7

10. Solve the following differential equations : 2+3=5

(i) $\dfrac{dy}{dx} \quad y \quad 1$

(ii) $\dfrac{dy}{dx} \quad \dfrac{x \quad y}{x \quad y}$

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–202

[Mathematics—II (Discrete Mathematics)]

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* In a survey, it is found that 20 people like product *A*, 30 people like product *B* and 28 like product *C*. If 15 people like products *A* and *B*; 16 people like products *B* and *C*; 12 people like products *C*

and *A* and 8 people like all the three products, find—

(i) how many people are surveyed in all;

(ii) how many like product *B* only. 5

(b) In a Boolean algebra *B*, prove that

$(x \quad y) \quad x \quad y$ for all $x, y \quad B$. 5

Or

(c) Let $\langle L, \quad \rangle$ be a lattice in which and denote the operation of meet and join respectively. For any $a, b \quad L$, show that

$a \quad b \quad a \quad b \quad a \quad a \quad b \quad b$ 5

(d) In Boolean algebra $B \quad x, y, z \quad B$, prove that

$x \quad x \quad (x \quad y) \quad y \quad z \quad x \quad y$ 5

2. *(a)* Without truth table, show that

$(P \quad Q) \quad (\neg P \quad (\neg P \quad Q)) \quad (\neg P \quad Q)$ 5

(d) The 2nd, 3rd and 4th terms in the expansion of $(x \quad y)^n$ are 240, 720 and 1080 respectively. Find the values of x, y and n. 5

4. *(a)* Show that the set $G \quad \{1, \quad , \quad ^2\}$, where is an imaginary cube root of unity, is a group with respect to multiplication. 5

(b) Prove that the set $G \quad \{0, 1, 2, 3, 4, 5\}$ is a finite Abelian group of order 6 with respect to addition modulo 6. 5

Or

(c) If H_1 and H_2 are two subgroups of a group G, then show that $H_1 \quad H_2$ is also a subgroup of G. 5

(d) State and prove Lagrange's theorem. 5

5. *(a)* Define bipartite graphs. Draw the graph of $k_{2,4}$; $k_{3,3}$ and $k_{3,5}$. 2+3=5

(b) Show that in any digraph, the sum of all in-degrees is equal to the sum of all out-degrees and each sum being equal to the number of edges. 5

(b) Obtain the principal conjunctive normal form of the formula

$$(\neg P \quad R) \quad (Q \rightleftarrows P).$$ 5

Or

(c) By using the truth table, prove that

$$(P \quad Q) \quad (Q \quad R) \quad P \quad R$$ 5

(d) Obtain the principal disjunctive normal form of

$$P \quad ((P \quad Q) \quad \neg(\neg Q \quad \neg P))$$ 5

3. *(a)* A committee of 5 is to be formed out of 6 men and 4 ladies. In how many ways can this be done, when—

(i) at least 2 ladies are included;

(ii) at most 2 ladies are included? 5

(b) How many numbers are there between 100 and 1000, which have exactly one of their digits as 8? 5

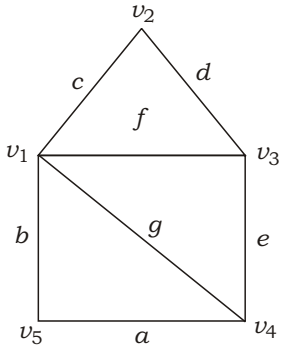
Or

(c) Find the 10th term in the expansion of

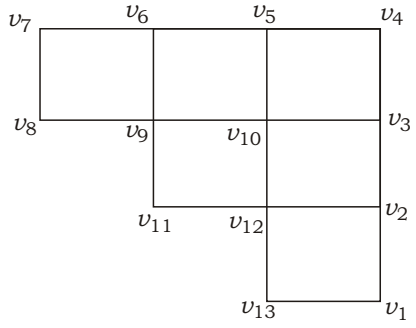
$$\frac{a}{b} \quad \frac{2b}{a^2}^{15}$$ 5

Or

(c) Write the adjacency and incidence matrices for the following graph : 5



(d) Define Hamiltonian circuits. Check whether the following graph has Hamiltonian circuit or not : 5



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Subject Code : II/BCA/202

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–202

[Mathematics—II (Discrete Mathematics)]

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

I. Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

1. Two sets P and Q are said to be disjoin, if

(a) $P \quad Q \quad P$ ( )

(b) $P \quad Q \quad U$ ( )

(c) $P \quad Q$ ( )

(d) $P \quad Q \quad \{0\}$ ( )

2. Both the join and meet operations are

(a) commutative ( )

(b) associative ( )

(c) distributive ( )

(d) All of the above ( )

3. Which of the following is not a statement?

(a) The earth is round. ( )

(b) Close the door. ( )

(c) 7 4 9 ( )

(d) India is a country. ( )

4. Which of the following implications is true?

(a) $P \quad Q \quad P$ ( )

(b) $P \quad P \quad Q$ ( )

(c) $P \quad Q \quad Q$ ( )

(d) $\neg P \quad P \quad Q$ ( )

5. If ${}^{n}P_4 \quad 20 \quad {}^{n}P_2$, then the value of n is

(a) 7 ( )

(b) 6 ( )

(c) 4 ( )

(d) 8 ( )

6. The term independent of x in the expansion of $x^2 \left(\frac{1}{x}\right)^9$ is

   (a) 76 ( )

   (b) 84 ( )

   (c) 96 ( )

   (d) 68 ( )

7. An algebraic structure (G,) is said to be a semi-group in the binary operation is

   (a) associative ( )

   (b) commutative ( )

   (c) distributive ( )

   (d) All of the above ( )

8. A necessary and sufficient condition for a non-empty subset H of a group G to be a subgroup is that HH^{1}

   (a) H^{1} ( )

   (b) 1 ( )

   (c) 0 ( )

   (d) H ( )

9. A vertex of degree zero is called

   (a) isolated vertex ( )

   (b) terminal vertex ( )

   (c) cut point ( )

   (d) cut vertex ( )

10. Let G be a connected graph with n vertices, then the number of edges in the spanning tree of G is

   (a) n ( )

   (b) $\frac{n}{2}$ ( )

   (c) $n \quad 1$ ( )

   (d) $\frac{n(n \quad 1)}{2}$ ( )

II. Tick (✓) either True or False : 1×5=5

1. In Boolean algebra B, $x, y \quad B$ such that $x \quad (x \quad y) \quad y$ ( )

   True ( ) / False ( )

2. Binomial expansion of $(a \quad b)^n$ has $(n \quad 1)$ terms.

True ( ) / False ( )

3. In mathematical logic, *P T P*

True ( ) / False ( )

4. In any group, the identity element *e* is always of order two.

True ( ) / False ( )

5. A graph is said to be regular, if every vertex has the same degree.

True ( ) / False ( )

SECTION—II

(*Marks* : 10)

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

1. If A and B are two sets such that $n(A)$ 40, $n(B)$ 25 and $n(A \quad B)$ 53, find $n(A \quad B)$.

2. How many 9-digit numbers of different digits can be formed?

3. Write the truth table for biconditional statement.

4. Define planar and non-planar graph.

5. Find the order of each element of the multiplicative group $\{1, \quad 1, i, \quad i\}$.

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2 0 1 7

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203(OC)

(Introduction to Computer Architecture and Organization)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Define De Morgan's theorem in Boolean algebra. Explain sum of product (SOP) and product of sum (POS). 5

(b) Draw the logic symbol and construct the truth table for each of the the following gates : 5

(i) Two-input NAND gate

(ii) Three-input OR gate

(iii) NOT gate

Or

(c) What is Karnaugh map? Reduce the following function using Karnaugh map technique : 5

$F(A, B, C, D)$ $m(5, 6, 7, 12, 13)$ $d(4, 9, 14, 15)$

(d) What is half adder? Write its truth table and logic diagram. 5

2. *(a)* Explain briefly Arithmetic Logic Unit (ALU) organization. 5

(b) What is register? Explain register transfer operation. 5

Or

(c) Explain the different phases of instruction cycle. 5

(d) Explain the types of interrupts. 5

3. *(a)* What is Direct Memory Access (DMA)? Explain briefly DMA transfer and DMA controller. 10

Or

(b) What do you understand by the terms I/O interfacing, memory-mapped I/O and synchronous data transfer? 10

4. *(a)* Explain three-state buffer registers. 5

(b) Explain asynchronous counter and synchronous counter. 5

Or

(c) Write short notes on the following : 2×5=10

(i) RAM

(ii) ROM

(iii) Paging

(iv) Swapping technique

(v) Cache memory

5. *(a)* Explain briefly assembly instructions. 7

(b) Explain interfacing assembly language routines to high-level language program. 3

Or

(c) Explain the following : 2×5=10

(i) Assembler

(ii) Linker

(iii) Loader

(iv) Debugger

(v) Editor

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Subject Code : **II/BCA/203 (OC)**

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203(OC)

(Introduction to Computer Architecture and Organization)

(Old Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

I. Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

1. Which of the following is not a universal building block?

   (a) 2-input NAND gate ( )

   (b) 3-input NAND gate ( )

   (c) 2 to 1 multiplexer ( )

   (d) 2-input XOR gate ( )

2. A CPU instruction normally contains

(a) no address ( )

(b) one address reference ( )

(c) maximum of three address references ( )

(d) None of the above ( )

3. Data is carried along with the instruction in

(a) immediate addressing ( )

(b) indexed addressing ( )

(c) direct addressing ( )

(d) None of the above ( )

4. The *T* flip-flop can be constructed using a *J-K* flip-flop by connecting

   (a) toggle input to *J* and the inverted form of toggle input to *K* ( )

   (b) the toggle input to *J* ( )

   (c) inverted form of toggle input to *K* ( )

   (d) None of the above ( )

5. To transfer the contents of a register R1 to register R2, one needs to enable

   (a) input of register R1 and input of register R2 ( )

   (b) input of register R1 and output of register R2 ( )

   (c) output of register R1 and input of register R2 ( )

   (d) None of the above ( )

6. Operand is fetched from memory during

(a) fetch phase ( )

(b) decode phase ( )

(c) execute phase ( )

(d) read phase ( )

7. Cache memory is implemented using

(a) dynamic RAM ( )

(b) EEPROM ( )

(c) EPROM ( )

(d) ROM ( )

8. CPU can perform read or write operation at any point of time in

(a) EEPROM ( )

(b) EPROM ( )

(c) ROM ( )

(d) None of the above ( )

9. LOOP instruction

(a) loops to a location ( )

(b) decrements the value in CX register and loops to a location ( )

(c) There is no such instruction ( )

(d) None of the above ( )

10. Assembler directives

(a) allocate storage for constants and program variables ( )

(b) are converted into machine instructions to be included into object code ( )

(c) are instructions to assembler to tell how assembly of source program is to be performed ( )

(d) None of the above ( )

II. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark : 1×5=5

1. Logic gates and flip-flops are examples of linear ICs.

(T / F)

2. ALU controls the input-output operations.

(T / F)

3. Handshaking is simple timing mechanism.

(T / F)

4. Constant declared in assembly language program cannot be changed during execution.

(T / F)

5. Queue is a first-in first-out structure.

(T / F)

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

1. What is logic gate?

2. What is pipelining?

3. What is baud rate?

4. What is shift register?

5. Define parameter passing.

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203

(Data Structure Using C)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. Answer the following questions :

(a) What is dynamic memory allocation? How does it differ from static memory allocation? 1+4=5

(b) Explain the concept of pointer and function with an example. 5

Or

(c) Explain linear and non-linear data structure. 5

(d) Explain the concept of pointer and array with an example. 5

2. *(a)* Write a C program code for implementing a binary search technique. 5

(b) Write a C program code for sorting from a list of numbers using bubble sort. 5

Or

(c) Write a C program for implementation of linear search. 5

(d) Write a C program code for sorting from a list of numbers using insertion sort. 5

3. *(a)* What is stack? Write the C function code for push() and pop() operation using linked list. 1+4=5

(b) Convert the infix expression A B C (D E F) G to postfix form using stack. 5

Or

(c) Evaluate the given postfix expression

6 2 3 3 8 2 / 2 3

using stack. 5

(d) What is queue? Write the C functions code for insert() and delete() operation using array. 1+4=5

4. *(a)* Write the C function of inserting a node at intermediate position of circular linked list. 4

(b) Write the C functions code for inserting and deleting a node at last of single linked list. 3+3=6

Or

(c) Write the applications of stacks. 4

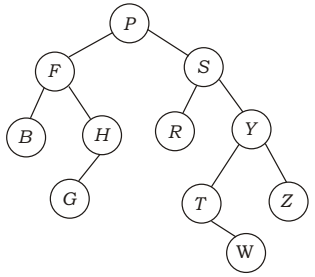
(d) Write the C functions code for insert and delete operations of circular queue. 3+3=6

5. *(a)* Construct a binary tree from the given pre-order and in-order sequence : 4

Pre-order : ABDGCEHIF

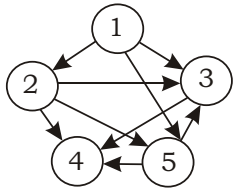
In-order : DGBAHEICF

(b) Traverse the following binary tree in pre-order, in-order, and post-order : 6

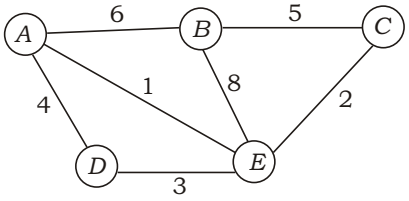


Or

(c) Find the adjacency matrix and adjacency list for the graph shown below : 4



(d) Find a minimal spanning tree (MST) for the graph shown below starting with the vertex A : 6



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2 0 1 7

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203

(Data Structure Using C)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 10)

1. Tick (✓) the correct answer in the brackets provided : 1×10=10

(a) Every algorithm must satisfy which of the following criteria?

(i) Effectiveness ( )

(ii) Definiteness ( )

(iii) Finiteness ( )

(iv) All of the above ( )

(b) Which of the following functions can be used to resize the allocated memory space?

(i) Malloc ( )

(ii) Calloc ( )

(iii) Realloc ( )

(iv) Free ( )

(c) In which searching technique, elements are eliminated by half in each pass?

(i) Linear search ( )

(ii) Binary search ( )

(iii) Both *(i)* and *(ii)* ( )

(iv) None of the above ( )

(d) The postfix expression to infix form A B / (C D) is

(i) AB CD / ( )

(ii) ABCDE / ( )

(iii) / DC BA ( )

(iv) / ABCD ( )

(e) What is the worst-case time for quick sort to sort an array of n elements?

(i) $O(n^2)$ ( )

(ii) $O(n \log_2 n)$ ( )

(iii) $O(n)$ ( )

(iv) $O(\log n)$ ( )

(f) In a linked list, the link field in a node contains

(i) data of next node ( )

(ii) address of next node ( )

(iii) data of previous node ( )

(iv) data of current node ( )

(g) An adjacency matrix representation of a graph cannot contain

(i) nodes ( )

(ii) direction of edges ( )

(iii) edges ( )

(iv) parallel edges ( )

(h) Heap is a good data structure to implement

(i) priority queue ( )

(ii) normal queue ( )

(iii) dequeue ( )

(iv) circular queue ( )

(i) The maximum number of nodes at any level in a binary tree is

(i) n ( )

(ii) $2n$ ( )

(iii) n 1 ( )

(iv) 2^n ( )

(j) The depth-first search traversal in a graph is analogous to tree traversal

(i) in-order ( )

(ii) post-order ( )

(iii) pre-order ( )

(iv) level-order ( )

2. State whether the following statements are *True (T)* or *False (F)* by a Tick (✓) mark : 1×5=5

(a) A pointer with a NULL address is an empty pointer that points to nowhere in the memory.

(T / F)

(b) In a linked list, searching a particular element is easy and save time.

(T / F)

(c) While evaluating the postfix expression the priority of the operator is no longer relevant.

(T / F)

(d) Breadth-first search uses a stack data structure to find an element from a graph.

(T / F)

(e) A tree traversal is a method of visiting particular node in the tree.

(T / F)

SECTION—II

(*Marks* : 10)

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

(a) What do you mean by space and time complexity of the algorithm?

(b) Differentiate internal sorting and external sorting.

(c) Write a short note on depth-first search (DFS).

(d) What is input restricted in a dequeue?

(e) Differentiate spanning tree and binary tree.

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–203 P

(Data Structure using C)

(Practical)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer *any* **two** questions from Section—A and *any* **one** question from Section—B

SECTION—A

(*Marks* : 30)

1. Write a C program code for sorting from a list of numbers using selection sort. 15

2. Write the C program code for stack using array and perform the following operations : 15

(a) Push an item into a stack

(b) Pop an item from a stack

(c) Display the contents of a stack

3. Write a C program code to search any given number in an array using binary search. 15

SECTION—B

(*Marks* : 20)

4. Write a C program code for singly linked list and perform the following operations : 20

(a) Create nodes of a list

(b) Insert a node at intermediate position

(c) Delete a node at intermediate position

(d) Display the contents of a list

5. Write a C program code for binary tree and perform the following operations : 20

(a) In-order traversal

(b) Pre-order traversal

(c) Post-order traversal

SECTION—C

(*Marks* : 25)

6. Viva voce. 15

7. Record book. 10

★★★

2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–204 (OC)

(Management Information System)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What do you mean by MIS? What are the different roles played by MIS? 5

(b) Explain in brief how MIS is used as technique for making decision. 5

Or

(c) What are the essential requirements for decision making? 5

(d) What do you understand by system? What are the different types of system? 5

2. *(a)* Explain various steps involved in the conceptual design of a system. 5

(b) Mention the different components required for documentation design. 5

Or

(c) What is report? Create a simple report for a system. Your report should include system definition, system objectives and an overall view of the system. 5

(d) Discuss the different steps of the detailed system design. 5

3. *(a)* What are pitfalls in MIS development? Mention the various pitfalls in the MIS development. 5

(b) What is System Constraints? Explain with suitable example internal constraints and external constraints. 5

Or

(c) Mention the various characteristics of good documentation. 5

(d) Explain the conceptual design of MIS. Explain how to create the conceptual design documentation. 5

4. Write short notes on general business planning and MIS planning. 10

Or

(a) Discuss the essential steps in the process of decision making. 5

(b) Explain the different types of information in terms of their applications. 5

5. Explain the different steps in system implementation. 10

Or

(a) Discuss the strategic planning and project planning for MIS. 5

(b) Describe the MIS organization in company. 5

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–204 (OC)

(Management Information System)

(Old Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

I. Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

1. Information systems generally are classified into

   (a) two categories ( )

   (b) three categories ( )

   (c) four categories ( )

   (d) five categories ( )

2. The word decision is derived from the Latin '*root decido*', meaning

   (a) to cut off ( )

   (b) to process ( )

   (c) to collect ( )

   (d) to create ( )

3. The decision support systems provide a generalized model of

   (a) information ( )

   (b) decision making ( )

   (c) planning ( )

   (d) implementation ( )

4. In MIS, a process for accomplishing purposes is

   (a) planning ( )

   (b) documentation ( )

   (c) data collection ( )

   (d) system design ( )

5. A decision is the choice out of several options made by

   (a) decision maker ( )

   (b) manager ( )

   (c) user ( )

   (d) organization ( )

6. Which one serves as a data resource for the MIS of an organization?

   (a) Data ( )

   (b) Interview ( )

   (c) Database ( )

   (d) Documentation ( )

7. Decomposition of the system to operational activities is called

   (a) subsystem ( )

   (b) subprocedure ( )

   (c) subroutine ( )

   (d) suboperation ( )

8. Orderly arrangement of all the records related to each other is called

   (a) file ( )

   (b) entity ( )

   (c) record set ( )

   (d) database ( )

9. System development schedule is to be weighed against

   (a) quality ( )

   (b) timescale ( )

   (c) manpower ( )

   (d) user ( )

10. The main purpose of information systems is to manage

    (a) data ( )

    (b) employee ( )

    (c) information ( )

    (d) time ( )

II. Tick (✓) whether *True (T)* or *False (F)* : 1×5=5

1. An information system is a collection of hardware, software, data, people and procedures.

(T / F)

2. In MIS, planning is a blueprint of business growth.

(T / F)

3. Conceptual design in itself is the end of the design process.

(T / F)

4. The documentation involves system inputs, output and overall system flow.

(T / F)

5. The plan for development and its implementation is not basic necessity for MIS.

(T / F)

SECTION—II

(*Marks* : 10)

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

1. What do you mean by subsystem in MIS?

2. What are the roles of MIS in an organization?

3. What is the difference between open systems and closed systems?

4. What are the main purposes of planning in MIS?

5. What are data and information?

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–204

(System Analysis and Design)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What are the characteristics of a system? 5

(b) Differentiate between real-time and distributed systems. 5

Or

(c) Explain briefly the types of systems. 5

(d) Explain system boundary and environment with examples. 5

2. *(a)* What is SDLC? Explain the various phases of SDLC. 10

Or

(b) What is documentation? Explain the uses of documentation. 5

(c) Explain different types of documentation. 5

3. *(a)* Write short notes on the following : 10

(i) Technical feasibility

(ii) Economic feasibility

(iii) Interviews

(iv) Group communication

Or

(b) Define open-ended and closed-ended questionnaire. Explain how to develop a questionnaire. 10

4. *(a)* What is Entity Relationship Diagram? Explain the types of relationship exist among entities and construct an *E-R* diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. 10

Or

(b) Illustrate the role of CASE tools in system analysis and design. What are its advantages and disadvantages? 10

5. *(a)* What is planning for system implementation? Explain the four methods of handling the system conversion. 5

(b) List and discuss the desirable qualities of the system acceptance criteria. 5

Or

(c) Explain the various stages in the testing process. 5

(d) Discuss, in detail, about the quality assurance activity. 5

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–204

(System Analysis and Design)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

A. Choose the correct answer by putting a Tick (✓) mark in the brackets provided : 1×10=10

1. SDLC stands for

(a) Systems Development Life Cycle ( )

(b) Structure Design Life Cycle ( )

(c) System Design Life Cycle ( )

(d) Structure Development Life Cycle ( )

2. _____ can be defined as an organized grouping of interdependent functioning units or components, linked together according to plan, to achieve a specific objective.

   (a) System ( )

   (b) Information ( )

   (c) Technology ( )

   (d) Service ( )

3. The detailed study of existing system is referred to as

   (a) system planning ( )

   (b) system analysis ( )

   (c) feasibility study ( )

   (d) None of the above ( )

4. The first step in the Systems Development Life Cycle is

   (a) system analysis ( )

   (b) system design ( )

   (c) problem/preliminary investigation ( )

   (d) development and documentation ( )

5. A feasibility study is carried out

   (a) after final requirement specifications are drawn up ( )

   (b) during the period when requirement specifications are drawn up ( )

   (c) before the final requirement specifications are drawn up ( )

   (d) at any time ( )

6. How many feasibility studies are conducted in Requirement Analysis?

   (a) 2 ( )

   (b) 4 ( )

   (c) 5 ( )

   (d) 3 ( )

7. A logical or mathematical representation of a system is called

   (a) process modelling ( )

   (b) system modelling ( )

   (c) logical design ( )

   (d) None of the above ( )

8. The data flow diagram is the basic component of _____ system.

   (a) conceptual ( )

   (b) physical ( )

   (c) logical ( )

   (d) All of the above ( )

9. White-box testing is also known as

   (a) glass-box testing ( )

   (b) functional testing ( )

   (c) structural testing ( )

   (d) Both *(a)* and *(c)* ( )

10. Which maintenance is performed to correct any errors in the newly implemented system?

   (a) Corrective maintenance ( )

   (b) Adaptive maintenance ( )

   (c) Perfective maintenance ( )

   (d) System maintenance ( )

B. State whether the following are *True (T)* or *False (F)* by putting a Tick (✓) mark : 1×5=5

1. An analyst is required to find solutions to problems.

(T / F)

2. The next major step before system design and after feasibility study is programming.

(T / F)

3. An information system is a closed system.

(T / F)

4. Entity relationship diagrams are used to design tables.

(T / F)

5. Planning is an iterative process.

(T / F)

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

1. Define manual and automated systems.

2. Differentiate between system analysis and system design.

3. Why is feasibility study important?

4. Write a short note on data dictionary.

5. What is user interface?

★★★

2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205 (OC)

(Programming Language through 'C')

(Practical)

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **two** questions

(*Marks* : 30)

1. Write a C program code to display Fibonacci series up to *n*th term using function. 15

2. Write a C program code to find the largest and smallest from list of numbers in an array. 15

3. Write a C program code to convert any decimal number to its equivalent binary number. 15

SECTION—B

Answer *any* **one** question

(*Marks* : 20)

4. Write a C program code to input two matrices A and B and perform the multiplication. 20

5. Write a C program code to display the following format on screen : 20

C
C P
C P R
C P R O
C P R O G
C P R O G R
C P R O G R A
C P R O G R A M
C P R O G R A
C P R O G R
C P R O G
C P R O
C P R
C P
C

SECTION—C

(*Marks* : 25)

6. Viva voce. 15

7. Record book. 10

★ ★ ★

2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205

(Accounting and Financial Management)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

Answer Question No. **1** and *any* **three** from the rest

1. *(a)* The following is the Trial Balance of Mr. David as on 31st March, 2016 :

Trial Balance
as on 31st March, 2016

Particulars	*Dr. Balance* ₹	*Cr. Balance* ₹
Sales	—	1,31,000
Bank Credit Balance	—	20,000

Particulars	*Dr. Balance* ₹	*Cr. Balance* ₹
Commission	—	2,000
Bills Payable	—	7,000
Pre-received Commission	—	2,000
Sundry Creditors	—	39,000
Loan from Bank	—	55,000
Purchases Returns	—	1,000
Capital	—	1,30,000
Sales Returns	1,000	—
Carriage Inward	6,000	—
Salary	25,000	—
Import Duty	6,000	—
Property Tax	4,000	—
Stock on 1st April, 2015	40,000	—
Prepaid Salary	1,000	—
Purchases	82,600	—
Wages	4,800	—
Cash in Hand	12,000	—
Live Stock	20,000	—
Miscellaneous Expenses	7,100	—
Advertising	7,600	—
Discount Allowed	300	—
Net Interest on Bank Loan	2,800	—
Sundry Debtors	41,000	—
Buildings	80,000	—
Vehicles	40,000	—
Bad Debts	1,800	—
Carriage Outwards	4,000	—
	3,87,000	3,87,000

You are required to prepare Trading and Profit & Loss A/c for the year ended on 31st March, 2016 and Balance Sheet as on that date after taking the following adjustments into account : 15

(i) Unsold stock of goods on hand on 31st March, 2016 amounted to ₹ 30,000

(ii) Goods of ₹ 3,400 were purchased and issued on 30th March, 2016 and are included in the closing stock but the entry is not recorded in bought book

(iii) Outstanding wages amounted to ₹ 1,200

(iv) Provide 5% on Sundry Debtors for Bad and Doubtful Debts

(v) Goods of ₹ 1,400 are distributed as free samples

(vi) Depreciate building at 10% p.a.

(vii) ₹ 1,000 is to be written off as Bad Debts

(b) Explain the term 'contra entry' by using a suitable example. 5

2. Enter the following transactions in the books of Mr. Archie's Cashbook with Cash Discount and Bank Columns : 10

2016 December	1	Mr. Archie started business with cash of ₹ 90,000
»	3	Opened Bank Account with Bank of India and deposited ₹ 80,000
»	5	Purchased goods from Jughead Brothers and paid by cheque ₹ 12,000
»	11	Received cash from sales—₹ 3,000
»	14	Withdrawn cash ₹ 1,500 from bank
»	17	Purchased stationery for cash ₹ 600
»	20	Received cheque from M/s Betty and Company for ₹ 1,800 and deposited in the Bank on the same date
»	21	Received cash from Reggie Enterprises of ₹ 1,750 net after allowing ₹ 50 as discount
»	22	Paid to M/s Rosie and Co. by cheque for ₹ 3,500
»	24	Drawn from bank for office use—₹ 3,800
»	26	Drawn for personal use—₹ 1,500
»	30	Paid salary for the month of December 2011 ₹ 15,000 by cheque

3. The following are summarized Profit & Loss A/c for the year ended 31st March, 2016 and Balance Sheet as on that date of *XYZ* Ltd. :

Profit & Loss A/c
for the year ended on 31st March, 2016

Particulars	₹	*Particulars*	₹
To Opening Stock	10,000	By Sales	1,00,000
» Purchases	55,000	» Closing Stock	15,000
» Gross Profit	50,000		
	1,15,000		1,15,000
To Selling and Distribution Expenses	12,000	By Gross Profit	50,000
» Administration Expenses	15,000		
» Interest	3,000		
» Net Profit	20,000		
	50,000		50,000

Balance Sheet
as on 31st March, 2012

Liabilities	₹	*Assets*	₹
Equity Capital		Plant and Machinery	30,000
of ₹ 10	1,00,000	Land and Building	50,000
Profit & Loss A/c	20,000	Furniture	20,000
Bills Payable	15,000	Inventories	15,000
Sundry Creditors	25,000	Bills Receivable	12,500
		Sundry Debtors	15,000
		Bank	17,500
	1,60,000		1,60,000

Calculate the following : 10

(a) Gross Profit Ratio

(b) Net Profit Ratio

(c) Operating Ratio

(d) Working Capital Turnover Ratio

(e) Proprietary Ratio

4. Explain the term Management Accounting. Distinguish between Management Accounting and Financial Accounting. 10

5. A factory produces 20000 units. The budgeted expenses are given below :

	Per Unit
Raw Materials	75
Direct Labour	20
Direct Expenses	25
Overheads	15
Fixed Overheads (₹ 2,00,000)	20
Administrative Expenses (fixed)	10
Selling Expenses (10% fixed)	15
Distribution Expenses (25% fixed)	20
Total cost	200

You are required to prepare a budget for 15000 and 10000 units. 10

6. What do you mean by budgetary control? Explain the objectives of budgetary control. Discuss the advantages and disadvantages of budgetary control. 10

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205

(Accounting and Financial Management)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

1. Choose the correct answer by putting a Tick (✓) mark in the brackets provided : 1×10=10

(a) Debit what comes in and credit what goes out is a principle of which account?

(i) Real ( )

(ii) Personal ( )

(iii) Nominal ( )

(iv) Current ( )

(b) Which financial statement displays the revenues and expenses of a company for a period of time?

(i) Income statement ( )

(ii) Balance Sheet ( )

(iii) Cash flow statement ( )

(iv) Statement of equity ( )

(c) What is the main purpose of financial accounting?

(i) Organize financial statement ( )

(ii) Provide useful financial information to outsiders ( )

(iii) Keep track of company expenses ( )

(iv) Minimize company taxes ( )

(d) Which of the following is not included in the basic accounting equation?

(i) Assets ( )

(ii) Revenues ( )

(iii) Liabilities ( )

(iv) Shareholder's equity ( )

(e) Which financial statement uses the expanded accounting equation?

(i) Income statement ( )

(ii) Balance Sheet ( )

(iii) Cash flow statement ( )

(iv) Statement of shareholder's equity ( )

(f) The accrual basis of accounting records revenue when they are

(i) collected ( )

(ii) earned ( )

(iii) contracted ( )

(iv) readily available for use ( )

(g) Asset accounts have what type of balance?

(i) Debit ( )

(ii) Credit ( )

(iii) Contra ( )

(iv) All of the above ( )

(h) Which account is not a liability account?

(i) Accounts payable ( )

(ii) Accrued expenses ( )

(iii) Cash ( )

(iv) Notes payable ( )

(i) Which account increases equity?

(i) Expenses ( )

(ii) Withdrawals ( )

(iii) Treasury stock ( )

(iv) Revenues ( )

(j) All of the following are characteristics of managerial accounting, except

(i) reports are used primarily by insiders rather than by persons outside of the business entity ( )

(ii) its purpose is to assist managers in planning and controlling business operations ( )

(iii) information must be developed in conformity with generally accepted accounting principles or with income-tax regulations ( )

(iv) information may be tailored to assist in specific managerial decisions ( )

2. Point out whether the following statements are *True* or *False* by putting a Tick (✓) mark : 1×5=5

(a) Book-keeping and Accounting are the same terms.

(True / False)

(b) Accounting is not the language of business.

(True / False)

(c) Accounting Standard I deals with disclosure of accounting policies.

(True / False)

(d) Depreciation is charged on current assets.

(True / False)

(e) The basic function of accounting is to interpret financial data.

(True / False)

SECTION—II

(*Marks* : 10)

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

(a) Explain the terms bad debts and provision for bad debts.

(b) What do you understand by zero-base budgeting?

(c) What are the responsibilities of a management accountant?

(d) What is the use of gross profit ratio?

(e) What are the objectives of Accountancy?

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205 P

(Tally ERP 9·0)

(Practical)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **one** question

1. Using Tally, Journalize the following transactions and post them in the Ledger A/c : 20

2017

January	1	Started business with cash—₹ 5,00,000
»	5	Deposited in bank—₹ 30,000
»	7	Paid wages—₹ 1,000
»	10	Sales goods worth—₹ 5,000 to Kima Ltd.
»	13	Deposited in bank—₹ 3,000
»	17	Purchase machine worth—₹ 7,000 from Joel

»	20	Withdraw from bank—₹ 10,000
»	27	Purchase table and chairs worth—₹ 800
»	30	Paid rent—₹ 4,000

2. Using Tally, journalize the following transactions and post them in the Ledger A/c : 20

2017

March	1	Zika commence business with cash—₹ 10,00,000
»	3	Purchase goods from Chris on credit—₹ 70,000
»	8	Paid salaries—₹ 7,000
»	12	Sales goods worth—₹ 65,000 to Bobby Enterprise
»	19	Deposited in bank—₹ 99,000
»	24	Purchase land worth—₹ 85,000 from Ricky
»	25	He paid to Chris—₹ 45,000
»	27	He sold goods worth—₹ 15,000 to Ethan on cheque
»	30	Rent paid—₹ 4,000

SECTION—B

3. From the following Trial Balance extracted from the books of Mary Enterprise as on 31st December, 2016, prepare Final A/c : 30

Particulars	₹
Cash at bank	8,200
Capital	1,08,090
Freight inward	18,600

Particulars	₹
Rent paid	5,700
Office expenses	3,000
Sundry Debtors	24,000
Purchases returns	5,800
Sales returns	8,600
Investment	5,000
Discount	7,340
Commission	900
Sales	2,89,600
Furniture	1,800
Opening stock	46,000
Bad debts	1,110
Sundry Creditors	13,200
Purchases	2,42,300
Insurance	3,800
Bank Overdraft	20,000
Drawings	10,000
Bills payable	30,000
Depreciation	9,300
Discount (Cr)	250
Cash-in-hand	380
Commission received	3,690
Land and Building	14,600

The closing stock was valued at ₹ 78,600.

SECTION—C

4. Viva voce. 15

5. Record book. 10

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2017

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–206 (OC)

(Assembly Language)

(Practical)

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **one** question

1. Write an Assembly Language Program to find the smaller and the larger between two numbers. 20

2. Write an Assembly Language Program to convert a 4-digit BCD number into its binary equivalent. 20

SECTION—B

Answer *any* **one** question

3. Write an Assembly Language Program to accept two character input from the keyboard and convert to their binary equivalent. The program should allow only numeric digits as input, and should not accept alphabetical key strokes. 30

4. Write an Assembly Language Program to get the number from the user, and calculate factorial for it. 30

SECTION—C

5. Viva voce. 15

6. Practical record book. 10

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