Total No. of Questions—**7**] [Total No. of Printed Pages—**5**

Seat No.	

[5219]-1001

F.Y. B.C.A. (Science) (First Semester) EXAMINATION, 2017

BCA-101 : FUNDAMENTALS OF COMPUTER

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** (A or B) are compulsory.

(*ii*) Attempt any *two* questions from group-I.

(*iii*) Attempt any *two* questions from group-II.

(*iv*) Figures to the right indicate full marks.

1. (A) Choose the appropriate option : [7]

(*i*) Java is an ..... level language.

(*a*) High

(*b*) Low

(*c*) Middle

(*d*) None of the above

P.T.O.

(*ii*) SSD is ..... .

(*a*) Standard-state drive

(*b*) Solid-state drive

(*c*) Solid-select drive

(*d*) Standard-state drive

(*iii*) The device used to convert analog information into digital form is ..... .

(*a*) Analyzer

(*b*) Printer

(*c*) Digitizer

(*d*) None of the above

(*iv*) CD-R is ..... .

(*a*) Compact disc-recording

(*b*) Compact disc-recordable

(*c*) Control disc-recorder

(*d*) Compact disc-reading

(*v*) Microsoft powerpoint is an ..... software.

(*a*) Presentation

(*b*) Enterprise

(*c*) Spreadsheet

(*d*) Database

(*vi*) ..... translates program one statement at a time.

(*a*) Interpreter

(*b*) Compiler

(*c*) Source program

(*d*) None of the above

(*vii*) ..... stores the result of arithmetic and logical operations.

(*a*) Status Register

(*b*) Accumulator Register

(*c*) Instruction Register

(*d*) Buffer Register

(B) Define the following terms : [7]

(*i*) Compiler

(*ii*) RAM

(*iii*) Operating system

(*iv*) High level language

(*v*) FAT

(*vi*) Database

(*vii*) BIOS.

Group-I

2. Answer the following :

(*a*) What is computer ? State its advantages and disadvantages. [5]

(*b*) Explain Bar Code Reader. [5]

(*c*) Explain Spreadsheet. Explain usage of it. [4]

3. Attempt the following :

(*a*) Write a short note on Real time operating system. [4]

(*b*) State the characteristics, advantages and disadvantags of impact printer. [4]

(*c*) Write a short note on storage unit. [3]

(*d*) Convert the following : [3]

(*i*) $(135)_{10} = (?)_2$

(*ii*) $(17841)_{10} = (?)_{16}$

(*iii*) $(100010100101)_2 = (?)_{16}$

4. Answer the following :

(*a*) Explain some common networking problems. [4]

(*b*) Solve the following : [4]

(*i*) $11101.01 \div 1100$

(*ii*) 1011.01×110.1

(*iii*) 11011×101

(*iv*) $1001010 \div 1000$.

(*c*) Explain any *four* features of a word processor. Give **4** examples of word processor program. [3]

(*d*) What is integrated circuits ? [3]

Group-II

5. Answer the following :

(*a*) What is hardware ? Explain types of hardware. [5]

(*b*) Explain steps for drawing Bar graphs for result analysis. [Ex : yearwise result of F.Y.B.C.A. (Science)]. [5]

(*c*) Explain the following terms : [4]

(*i*) Slide

(*ii*) Paint Brush

(*iii*) Notepad

(*iv*) Text Editor.

6. Answer the following :

(*a*) Explain features of Text Editors. [4]

(*b*) Enlist and explain any *four* presentation tools. [4]

(*c*) Write a short note on gedit official text editor. [3]

(*d*) Explain CPU-Z in detail. [3]

7. Answer the following :

(*a*) What is operating system ? Explain some functions of operating system. [4]

(*b*) Solve the following : [4]

(*i*) 1001101 + 0010010

(*ii*) 1001 – 101.

(*c*) Write any *three* internal and external MS-DOS commands. [3]

(*d*) Differentiate High level language and low level language. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-1002

F.Y. B.C.A. (Science) (First Semester) EXAMINATION, 2017

INTRODUCTION TO PROGRAMMING

AND PROGRAMMING IN 'C'

(BCA-102 : Basic Programming in 'C')

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** (A and B) are compulsory.

(*ii*) Attempt any *two* questions from Group-I.

(*iii*) Attempt any *two* questions from Group-II.

(*iv*) Figures to the right indicate full marks.

1. (A) Choose correct option : [7]

(*i*) Comment in 'C' language is to be enclosed in ..... .

(*a*) ##

(*b*) //

(*c*) <! !>

(*d*) /* */

P.T.O.

(*ii*) ..... is unary operator.

(*a*) <

(*b*) &&

(*c*) ,

(*d*) sizeof( )

(*iii*) Qualifiers are not applicable to ..... data type.

(*a*) int

(*b*) double

(*c*) char

(*d*) float

(*iv*) ..... format specifier displays real data in exponential format.

(*a*) %d

(*b*) %f

(*c*) %x

(*d*) %e

(*v*) ..... function causes immediate termination of entire program.

(*a*) return

(*b*) exit( )

(*c*) break

(*d*) continue

(*vi*) Default initial value of global variable is ..... .

(*a*) space

(*b*) garbage

(*c*) zero

(*d*) one

(*vii*) The maximum number of elements can be stored in array int a [5] [8] is ..... .

(*a*) 58

(*b*) 5

(*c*) 8

(*d*) 40

(B) Answer the following : [7]

(*i*) List the characteristics of an algorithm.

(*ii*) 'C' programs are protable. Justify.

(*iii*) Define keyword.

(*iv*) What does associativity specify ?

(*v*) What is the purpose '\n' character ?

(*vi*) Define formal parameter.

(*vii*) What is an array ?

Group-I

2. Attempt the following :

(*a*) Write an algorithm to check whether given number is Armstrong number or not. [5]

(*b*) Define flowchart. Explain the flowchart symbols. [5]

(*c*) Explain bitwise operators with example. [4]

3. Attempt the following :

(*a*) Draw a flowchart to display divisors of given number. [4]

(*b*) Define contant. Discuss the types of constant in 'C' Language. [4]

(*c*) Explain any *three* problem solving aspects. [3]

(*d*) Explain the steps in creating and executing a 'C' program. [3]

4. Attempt the following :

(*a*) Differentiate between while loop and do-while loop. [4]

(*b*) Write a 'C' program using function which will accept an integer number and display sum of digits of a number. [4]

(*c*) 'C' does not perform bound checking for an array. Justify with example. [3]

(*d*) Trace the output : [3]

```
Main( )
{
    int j = 1;
        while( )
            {
                printf("%d", j++);
                if (j>3)
                    break;
            }
}
```

Group-II

5. Attempt the following :

(*a*) Write a 'C' program to accept a matrix and display the largest number from matrix. [5]

(*b*) Explain the following functions with example : [5]

(*i*) getchar( )

(*ii*) putchar( )

(*iii*) getch( )

(*iv*) gets( )

(*v*) puts( ).

(*c*) Distinguish between automatic storage class and static storage class. [4]

6. Attempt the following :

(*a*) Write a 'C' program to calculate GCD and LCM of two numbers. [4]

(*b*) Differentiate between break and continue statement. [4]

(*c*) What is escape sequence ? List and explain them. [3]

(*d*) Write a recursive function to find factorial of given number. [3]

7. Attempt the following :

(*a*) Write an algorithm to display all numbers between two numbers. [4]

(*b*) Discuss the unary operators. [4]

(*c*) Explain user defined type with example. [3]

(*d*) Trace the output : [3]

```
main( )
    {
        int x, y, z;
        x = y = z = 1;
        2 = ++ x && ++ y ¦¦ ++ z;
        printf ("%d %d %d", x, y, z);
    }
```

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-1003

F.Y. B.C.A. (Science) (First Semester) EXAMINATION, 2017

BCA-103 : APPLIED MATHEMATICS—I

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group-I and *two* questions from Group-II.

(*iii*) Figures to the right indicate full marks.

1. Choose the *correct* alternative : [7]

(A) (*i*) If $|S| = m$ and $|T| = n$, then $|S \times T|$ is :

(*a*) $m + n$

(*b*) $m \times n$

(*c*) $m - n$

(*d*) $m \div n$

P.T.O.

(*ii*) Which of the following inequalities is *true* ?

(*a*) G.M $\leq$ A.M.

(*b*) A.M $\leq$ G.M.

(*c*) A.M $\leq$ H.M.

(*d*) G.M $\leq$ H.M.

(*iii*) The binary representation of 6 is :

(*a*) $(110)_2$

(*b*) $(101)_2$

(*c*) $(011)_2$

(*d*) $(100)_2$

(*iv*) Let S be any set such that $|S| = 4$.

Then $|P(s)|$ is :

(*a*) 8

(*b*) 4

(*c*) 16

(*d*) 2

(*v*) A function $f : \mathbf{R} \to \mathbf{R}$ is defined by $f(x) = x^2$. Then f is :

(*a*) injective function

(*b*) surjective function

(*c*) bijective function

(*d*) none of the above

(*vi*) Choose the *correct* alternative :

(*a*) $\sum_{r=0}^{n} \binom{n}{r} = 2^n$

(*b*) $\sum_{r=0}^{n} 2^r \binom{n}{r} = 2^n$

(*c*) $\sum_{r=0}^{n} \binom{n}{r} = 3^n$

(*d*) $\sum_{r=0}^{n} 2^r \binom{n}{r} = 0$

(*vii*) Let $g = 132$ and $h = 213$ be permutation. Then $h \cdot g$ is :

(*a*) 123

(*b*) 312

(*c*) 231

(*d*) 213

(B) Answer the following in one *or* two sentences : [7]

(*i*) Evaluate $\phi(75)$.

(*ii*) Determine whether the given permutation is even or odd, $f = 2351$.

(*iii*) Find the sum $1^3 + 2^3 + \ldots\ldots + n^3$.

(*iv*) Write given statement in symbolic form and express its negation.

'for all $x \in A$, there is a $b \in B$ such that $b > x$'.

(*v*) Determine the coefficient of x^4y^5 in expansion of $(x+y)^9$.

(*vi*) Show that the equation $3x + 6y = 5$ has no solution in integers.

(*vii*) Determine whether the rule $f : \mathbf{R} \to \mathbf{R}$ defined by :

$$f(x) = \begin{cases} |x-1| & \text{if} \quad x < 4 \\ |x| - 1 & \text{if} \quad x > 2 \end{cases}$$

is a function.

Group-I

2. (*i*) Let A and B be any two sets. By using Venn diagram, [5]

show that $(A \cap B)^c = A^c \cup B^c$

and $(A \cup B)^c = A^c \cap B^c$

(*ii*) If x any y are real numbers, then prove that :

$$|x + y| \leq |x| + |y|. \qquad [4]$$

(*iii*) If f and g are bounded. Prove that $f + g$ and $(f \cdot g)$ are bounded. [5]

3. (*i*) Verify for tautology or contradiction [4]

$$(p \wedge q) \wedge [\sim(p \vee q)].$$

(*ii*) Suppose that r and s are distinct real solutions of equation $ax^2 + bx + c = 0$. Obtain $(r.s)$. [4]

(*iii*) Prove that :

$$\{x \in \mathbf{R} \mid x^2 - 2x - 3 < 0\} = \{x \in \mathbf{R} \mid -1 < x < 3\}.$$ [3]

(*iv*) Prove that if x is odd, then x^2 is odd. [3]

4. (*i*) Which integer is smaller $(333)_{(5)}$ and $(110110)_{(2)}$? [4]

(*ii*) If there is a bijection $f : [m] \to [n]$, then show that $m = n$. [4]

(*iii*) When two standard dice are rolled, then find the probability that the sum on upper most faces be 7. [3]

(*iv*) Prove that $\sum_{r=0}^{n} (-1)^r \binom{n}{r} = 0$. [3]

Group-II

5. (*i*) Prove that $\sqrt{2}$ is an irrational number. [4]

(*ii*) Prove that :

$$1^2 + 2^2 + 3^2 + \ldots\ldots + n^2 = \frac{n(n+1)(2n+1)}{6}.$$ [5]

(*iii*) Determine whether the function $f : \mathbf{R} \to \mathbf{R}$ defined by $f(x) = ax + b$ is one-one and onto. If yes, find f^{-1}. (where $a \neq 0$). [5]

6. (*i*) A committee of 5 is to be selected among 6 boys and 5 girls. Determine the number of ways of selecting the committee, if it is to consist of at least one boy and one girl. [4]

(*ii*) Let f be permutation 41523 of [5]. Find $f \cdot \mathrm{F}$ and f^{-1}. [4]

(*iii*) Draw functional digraph of permutation

$$f = 23416785.$$ [3]

(*iv*) Prove that :

$$6\binom{m}{3} + 6\binom{m}{2} + m = m^3.$$ [3]

7. (*i*) Prove that, if a and b are relatively prime and a divides qb, then a divides q. [4]

(*ii*) Find gcd of $a = 595$ and $b = 252$. Write it in the combination of a and b. [4]

(*iii*) What are the integer solutions of

$$60x + 42y = 104.$$ [3]

(*iv*) Let :

$p = 1 - 2x + 4x^2$,

$q = 5 + 3x + 4x^2 - 7x^3 \in \mathbf{Z}[x]$

Then find $p + q$, deg $(p + q)$, deg $(p \cdot q)$. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**5**

Seat No.	

[5219]-1004

F.Y.B.C.A. (Science) (Semester I) EXAMINATION, 2017

BCA-104 : COMMUNICATION SKILLS

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** (A and B) is compulsory.

(*ii*) Attempt any *two* questions from Group I.

(*iii*) Attempt any *two* questions from Group II.

(*iv*) Figures to the right indicate full marks.

(*v*) Draw neat diagram whenever necessary.

1. (A) Choose *correct* answer from the options : [7]

(1) Prejudice is ..... barrier.

(*a*) Physical

(*b*) Psychological

(*c*) Semantic

(*d*) Social

P.T.O.

(2) Gestures are part of ..... communication.

(*a*) Written

(*b*) Non-verbal

(*c*) Channel

(*d*) Feedback

(3) Attitude is very important ..... aspect.

(*a*) Writing

(*b*) Reading

(*c*) Listening

(*d*) Non-verbal

(4) Feedback is ..... of communication.

(*a*) Conclusion

(*b*) Initial

(*c*) Non-verbal

(*d*) Written

(5) Presentation in seminar is ..... communication.

(*a*) Non-verbal

(*b*) Verbal

(*c*) Grapevine

(*d*) Personal

(6) Pie charts are ..... communication.

(*a*) Verbal

(*b*) Oral

(*c*) Non-verbal

(*d*) Formal

(7) Agenda is ..... of meeting.

(*a*) Purpose

(*b*) Contents

(*c*) Conclusion

(*d*) Initiative

(B) Answer briefly : [7]

(*i*) Two physical barriers

(*ii*) Body language

(*iii*) Objectives of communication

(*iv*) Principles of effective communication

(*v*) SMS

(*vi*) Tone in communication

(*vii*) Listening skill.

Group I

2. (*a*) Write advantages of oral communication. [5]

(*b*) How do cultural barriers affect communication ? [5]

(*c*) Write importance of written message. [4]

3. (*a*) What is communication ? State the principles of effective communication. [4]

(*b*) Enlist *four* telephonic manners. [4]

(*c*) What are ways to overcome psychological barriers ? [3]

(*d*) Write a note on Body-Language. [3]

4. (*a*) Write a note on telephone manners and barriers of telephone manners. [4]

(*b*) What is group discussion ? [4]

(*c*) What is cultural barriers ? [3]

(*d*) What is informal communication ? [3]

Group II

5. (*a*) Write a business letter to the manager for arranging an international tour. [5]

(*b*) Draft a report on "Annual Gathering". [5]

(*c*) Prepare an agenda for the meeting to discuss examination schedule. [4]

6. (*a*) Write an application letter for the post of Technical Adviser. [4]

(*b*) Write a resume. [4]

(*c*) What is negotiation skills ? [3]

(*d*) What are minutes of meeting ? [3]

7. (*a*) What is meant by 'empath' ? [4]

(*b*) What is interpersonal skills ? [4]

(*c*) How lack of negotiation skill hamper one's business ? [3]

(*d*) How can critical thinking resolve problem ? [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-2001

F.Y. B.C.A. (Science) (II Semester) EXAMINATION, 2017

BCA-201 : COMPUTER ORGANISATION

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* from Group I and any *two* from Group II respectively.

(*iii*) Draw neat diagram wherever necessary.

(*iv*) Figures to the right indicate full marks.

1. (A) Attempt the following : [7]

(1) The decimal equivalent of $(821)_8$ is ..... .

(*a*) 592

(*b*) 529

(*c*) 630

(*d*) 295

P.T.O.

(2) $A.(\overline{A} + B) =$ ..... .

(*a*) AB

(*b*) A + B

(*c*) B

(*d*) A

(3) Multiplexer is an example of ..... .

(*a*) Sequential circuit

(*b*) Logic circuit

(*c*) Combinational circuit

(*d*) Both (*a*) and (*b*)

(4) The flip-flop in which the output changes at the falling edge of the clock, it is ..... .

(*a*) Negative flip-flop

(*b*) Negative edge triggered flip-flop

(*c*) Positive edge triggered flip-flop

(*d*) None of the above

(5) ..... is responsible for performing various arithmetic and logical or shift operations.

(*a*) CPU

(*b*) ALU

(*c*) Monitor

(*d*) None of the above

(6) Secondary storage is also known as ..... .

(*a*) External memory

(*b*) Auxiliary storage

(*c*) Cache memory

(*d*) Both (*a*) and (*b*)

(7) NPX is ..... .

(*a*) Number Processor Extension

(*b*) Numeric Processor Extension

(*c*) Numeric Point Extension

(*d*) Numeric Point Execution

(B) Attempt the following : [7]

(1) What is positive and negative logic ?

(2) What is combinational circuit ?

(3) Define latch.

(4) What is address bus ?

(5) Explain the term—phosphorescene.

(6) State the uses of control register.

(7) What is burst mode of DMA transfer ?

Group I

2. Attempt the following :

(*a*) Explain AND gate. Also draw the diode diagram of an AND gate. [5]

(*b*) Write a short note on Half Adder. [5]

(*c*) Convert the following : [4]

(*i*) $(AF9.BOD)_{16} = (?)_2$

(*ii*) $(23.85)_{10} = (?)_2$

(*iii*) $(1101101)_2 = (?)_{10}$

(*iv*) $(457.65)_8 = (?)_{10}$

3. Attempt the following :

(*a*) State the applications of shift registers. [4]

(*b*) Explain BCD encoder with its diagram. [4]

(*c*) What are character codes ? Explain ASCII code with example. [3]

(*d*) Draw the logic gate to implement : [3]

(*i*) $AB + AC + A\bar{B}C$

(*ii*) $\overline{(A + B) \cdot (C + D)}$

(*iii*) $(A + BD) \cdot (\bar{C} + B)$

4. Attempt the following :

(*a*) What is a stack ? What are the different operations on a stack ? [4]

(*b*) Write a short note on parallelism. [4]

(*c*) What is an interrupt ? What are its types ? [3]

(*d*) What is the use of cache ? Explain the terms hit and miss. [3]

Group II

5. Attempt the following :

(*a*) Write a short note on general registers in CPU. [5]

(*b*) With neat block diagram explain the signals in a DMA controller. [5]

(*c*) Write a short note on memory hierarchy. [4]

6. Attempt the following :

(*a*) Explain the working of arithmetic pipeline in brief. [4]

(*b*) What is a flag register ? Give its structure with explanation. [4]

(*c*) Distinguish between serial and parallel data transfer. [3]

(*d*) What is internal memory ? Explain processor registers and processor cache. [3]

7. Attempt the following :

(*a*) Explain ring counter. [4]

(*b*) Draw the logic gate, state Boolean function and truth table for NAND gate. [4]

(*c*) Distinguish between edge and level triggered flip-flops. [3]

(*d*) Solve the following : [3]

(*i*) 11011.101 + 1010.111

(*ii*) Perform 11110 – 1010 using 2's complement.

Total No. of Questions—**7**] [Total No. of Printed Pages—**7**

Seat No.	

[5219]-2002

F.Y. B.C.A. (Science) (II Semester) EXAMINATION, 2017

BCA-202 : ADVANCED PROGRAMMING IN C

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and Group II respectively.

(*iii*) Figures to the right indicate full marks.

1. (A) Attempt all of the following : [7×1=7]

(1) What is the similarity between a structure, union and enumeration ?

(*a*) All of them let you define new values.

(*b*) All of them let you define new data type.

(*c*) All of them let you define new pointers.

(*d*) All of them let you define new structures.

P.T.O.

(2) What will be the output of the program ?

```
# include <stdio.h>
# define square (x) x * x
void main( )
{
    int i;
    i = 64/square (4);
    printf ("%d," i);
}
```

(*a*) 4

(*b*) 64

(*c*) 16

(*d*) None of the above

(3) What does fp point to in the program ?

```
# include <stdio.h>
int main( )
{
    File * fp;
    fp = fopen ("trial", "r");
    return o;
}
```

(*a*) The first character in the file

(*b*) The structure which contains a char pointer which points to the first character of a file

(*c*) The name of the file

(*d*) The last character in the file

(4) What will be the output of the program ?

```
# include <stdio.h>
int main( )
{
        char str1[ ] = "Hello";
        char str2[ ] = "Hello";
        if (str1 = = str2)
        printf ("equal\n");
else
        printf ("unequal \n");
return o;
}
```

(*a*) equal

(*b*) unequal

(*c*) error

(*d*) None of the above

(5) Which of the following comments about union is *false* ?

(*a*) Union is a structure whose members share same memory area

(*b*) The compiler will keep track of what type of information is currently stored

(*c*) Only one of the members of union can be assigned a value at particular time

(*d*) Size allocated for union is the size of its member needing the maximum storage

(6) A pointer is :

(*a*) A keyword used to create variables

(*b*) A variable that stores address of an instruction

(*c*) A variable that stores address of other variable

(*d*) All of the above

(7) Which of the following operations is illegal in structure ?

(*a*) Typecasting of structure

(*b*) Pointer to a variable of same structure

(*c*) Dynamic allocation of memory for structure

(*d*) All of the mentioned

(B) Attempt all of the following : [7×1=7]

(1) What is the use of the fseek function ?

(2) What is the significance of argv[0] ?

(3) Define Union.

(4) Give the use of # if-def with example.

(5) "A union cannot be nested in a structure." State true/ false.

(6) What is the use of void pointer ?

(7) Write the prototype and usage of function strcat( ).

Group I

2. (*a*) Define Pointer. Explain how to declare, initialize and use a pointer (de-referencing pointer). [5]

(*b*) Write a program to accept and display name of customer and search for a specific name using array of string. [5]

(*c*) What is command line argument ? Give advantages of command line argument. [4]

3. (*a*) Explain different types of preprocessor directives in C with example. [4]

(*b*) Write a program to count number of word space and lines for a given file. [4]

(*c*) Write a short note on pointer to function. [3]

(*d*) Write a user defined function to copy one string to another and return the copied string. [3]

4. (*a*) What are the different modes in which file can be opened ? [4]

(*b*) How the declaration of array of structure is done ? Can it be initialized ? Give an example. [4]

(*c*) Write a program to cheek whether the number is odd or even pass through command line argument. [3]

(*d*) Explain self-referential structure. [3]

Group II

5. (*a*) Explain the function used to allocate and deallocate memory dynamically. [5]

(*b*) Write a program to accept student data (rollno, name, marks) of 3 subjects. Calculate total percentage and average of each student and display class as per the percentage. [5]

(*c*) Differentiate between printf and fprintf, scanf and fscanf. [4]

6. (*a*) Define union and explain how union is used within a structure. [4]

(*b*) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( ) function. [4]

(*c*) Write the prototype and syntax of the following : [3]

(*i*) fflush( )

(*ii*) remove( )

(*iii*) ftell( )

(*d*) Write user defined function to convert a string to uppercase and return converted string. [3]

7. (*a*) Explain macro substitution in brief with example. [4]

(*b*) Write the prototype and syntax of the following : [4]

(*i*) strlwr( )

(*ii*) strchr( )

(*iii*) strrev( )

(*iv*) strlen( )

(*c*) Write a C program for accepting 2 number as command line argument and find sum and difference of there number. [3]

(*d*) Explain pointer-to-pointer concept with suitable example. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**7**

Seat No.	

[5219]-2003

F.Y. B.C.A. (Science) (Semester II) EXAMINATION, 2017

BCA-203 : APPLIED MATHEMATICS–II

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and any *two* questions from Group II.

(*iii*) Figures to the right indicate full marks.

1. (A) Choose the *correct* alternative. [7]

(1) Chromatic polynomial of null graph on n-vertices is :

(a) k^n

(b) $(k - 1)^{n-1}$

(c) $k(k - 1)^{n-1}$

(d) None of the above

(2) Walk is a :

(a) no vertex is repeated

(b) containing no cycle

(c) finite alternating sequency of vertices and edges

(d) None of the above

P.T.O.

(3) If p is prime, then Wilson's Theorem is :

(*a*) $(p-1) \equiv 1 \pmod{p}$

(*b*) $(p-1)\,! \equiv 1 \pmod{p}$

(*c*) $(p-1)\,! \equiv -1 \pmod{p}$

(*d*) $(p-1) \equiv \pmod{p}$

(4) A vertex of degree q in a tree is a :

(*a*) Cyclic

(*b*) Leaf

(*c*) Acyclic

(*d*) None of the above

(5) A relation R on set S is said to be equivalence relation if :

(*a*) Reflexive, Symmetric and Transitive

(*b*) Reflexive, Antisymmetric and Transitive

(*c*) Reflexive, Inverse and Symmetric

(*d*) None of the above

(6) x and y be any *two* integer and $n \in \mathrm{N}$, then congruence is :

(*a*) $x \equiv y(\mathrm{mod} - n)$

(*b*) $x \equiv -y(\mathrm{mod}\, n)$

(*c*) $x \equiv y(\mathrm{mod}\, n)$

(*d*) $x \equiv 1(\mathrm{mod}\, n)$

(7) A graph with 10 vertices each of degree 6, then number of edges are :

(*a*) 15

(*b*) 30

(*c*) 20

(*d*) 12

(B) Answer the following questions in one or two lines : [7]

(1) State Chinese Remainder Theorem.

(2) What is meant by degree of vertex ?

(3) If given recurrence relation is $a_n - a_{n-2} = 0$, then find characteristic equation and root ?

(4) Define the term Bipartite Graph.

(5) Can a simple graph with 7 vertices each of degree 3 exist ? Justify.

(6) Let $a_n = 2^n + 5.3^n$ for n = 0, 1. Find a_0 and a_1.

(7) State generalized pigeonhole principle.

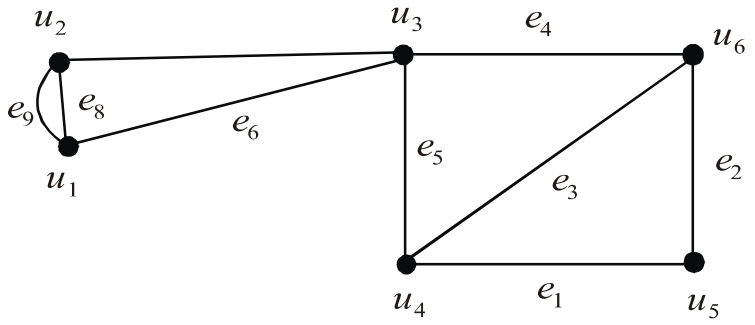
Group I

Attempt the following questions :

2. (*a*) Find all integers that are congruent to $1 \pmod 7$, $3 \pmod 8$ and $5 \pmod 9$. Which solution has the smallest absolute value ? [5]

(*b*) How many integers between 1 and 1000 are divisible by 2 and 3 but not by 5 ? [5]

(*c*) Let G be a graph. [4]



Find :

(*i*) G – U where U = $\{u_1, u_3, u_5\}$

(*ii*) G – F where F = $\{e_7, e_3, e_2\}$

3. (*a*) Let R be a relation on Z, the set of integers, defined XRY iff $5x + 8y$ is divisible by 13. Show that R is an equivalence relation. [4]

(*b*) Solve the recurrence relation :

$$2a_r = 7a_{r-1} - 3a_{r-2}$$

with initial conditions $a_0 = 1$, $a_1 = 1$. [4]

(*c*) State and prove Handshaking Lemma. [3]

(*d*) Find the remainder when 11903 is divided by 31. [3]

4. (*a*) Solve the particular solution of difference equation : [4]

$$a_r - 2a_{r-1} = 3.2^r .$$

(*b*) If G is simple planar graph with $n \geq 3$ vertices and e edges, then prove that $e \leq 3n - 6$. [4]

(*c*) Show that the sequence $\{a_n\}$ is solution of recurrence relation :

$$a_n = a_{n-1} + 2a_{n-2} + 2n - 9$$

0 if $a_n = 7.2^n - n + 2$. [3]

(*d*) Draw the graphs :

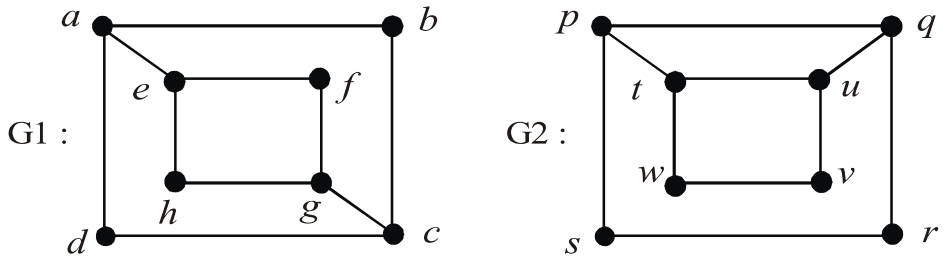
(*i*) Regular graph with degree 4.

(*ii*) Complete bipartite graph with $k_{3,3}$. [3]

Group II

Attempt the following questions :

5. (*a*) Determine whether the following two graphs are isomorphic. Justify. [5]



(*b*) Solve recurrence relation :

$$b_n = 3b_{n-1} - 2b_{n-2}$$

with initial condition $b_1 = 5$, $b_2 = 3$. [5]

(*c*) Define the term Wheel. Determine the chromatic number of the wheel with n-vertices. [4]

6. (*a*) If G is a connected plane graph with V vertices, e edges, and F faces, then show that :

$$V - e + F = 2.$$ [4]

(*b*) Consider the recurrence relation :

$$a_n = a_{n-1} + 2a_{n-2}$$

with $a_{9=3}$ and $a_{10=5}$. Find a_7 and a_{12}. [4]

(*c*) Show that k_5 is not planar graph. [3]

(*d*) Show that the formal power series expansion of the generating function $(1 - x)^{-r}$ is : [3]

$$\sum_{n=0}^{\infty} \binom{n+r-1}{r-1} x^n, \; r \in \mathrm{N}.$$

7. (*a*) If p is prime and $a \in \mathrm{N}$, then $a^2 \equiv 1 \pmod{p}$ iff $a \equiv 1$ or $a \equiv -1 \pmod{p}$. [4]

(*b*) Apply Wilson's Theorem to show that : [4]

(*i*) $18! + 1 \equiv 0 \pmod{19}$

(*ii*) $18! + 1 \equiv 0 \pmod{23}$.

(*c*) How many integers between 1 to 200 are divisible by 7 or 11 ? [3]

(*d*) Let k be an odd number. Prove that $k^2 - 1$ is divisible by 8, $k \in z$ be an integer. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**8**

Seat No.	

[5219]-2004

F.Y. B.C.A. (Science) (Second Semester) EXAMINATION, 2017

BCA-204 : RELATIONAL DATABASE MANAGEMENT SYSTEM

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group-I and Group-II respectively.

(*iii*) Figures to the right indicate full marks.

1. (A) Attempt all of the following : [7×1=7]

(1) A set of logically related record forms a ..... .

(*a*) database

(*b*) file

(*c*) record

(*d*) none of the above

P.T.O.

(2) ..... is the capacity to change the schema at one level of database system without having to change schema at next higher level.

(*a*) Logical data independence

(*b*) Physical data independence

(*c*) Data independence

(*d*) None of the above

(3) Which of the following is *not* an aggregate function ?

(*a*) min

(*b*) max

(*c*) avg

(*d*) order by

(4) The meaning of the notation X → Y is ..... .

(*a*) X functionally determines Y

(*b*) Y functionally depend on X

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(5) Relational data model stores the data in the form of ..... .

(*a*) row

(*b*) column

(*c*) relation

(*d*) table

(6) In entity-relationship diagram double ellipse represents ..... .

(*a*) multivalued attribute

(*b*) derived attribute

(*c*) weak entity

(*d*) primary key

(7) Process of breaking a large relation R into a set of small relations r_1, r_2, ... r_n is called as ..... .

(*a*) association

(*b*) generalization

(*c*) decomposition

(*d*) none of the above

(B) Attempt all of the following : [7×1=7]

(*a*) Define record type.

(*b*) State the users of DBMS.

(*c*) State the purpose of normalization.

(*d*) Define the term 'tuple'.

(*e*) What do you mean by strong and weak entity sets ?

(*f*) Give an example of nested subquery.

(*g*) What is ISAM ?

Group-I

2. Attempt all of the following : [5+5+4=14]

(*a*) Differentiate between File system and Database management system.

(*b*) Define Key. Explain the following terms :

(*i*) Primary key

(*ii*) Foreign key

(*iii*) Super key

(*iv*) Candidate key

(*c*) What do you mean by index organization ? How is it implemented using dense index and sparce index ?

3. Attempt all of the following : [4+4+3+3=14]

(*a*) What do you mean by fixed and variable length record ? Explain with example.

(*b*) What is data model ? Write a short note on relational data model.

(*c*) Explain any *three* types of attributes of entity relationship model in detail.

(*d*) Consider the following relations :

Book (bno, bname, publication, price)

Author (ano, aname, address)

Book and Author are related with many to many relationship. Draw an ER diagram for above scenario.

4. Attempt all of the following : [4+4+3+3=14]

(*a*) Let

$$R = \{A, B, C, D, E, F\}$$

and a set of FD's :

$$A \rightarrow BC,\ E \rightarrow CF,\ B \rightarrow E,\ CD \rightarrow EF,\ F \rightarrow D$$

Compute the closure of a set of attribute {A, B} under the given set of FDs.

(*b*) Consider the following relations :

Musician (m_no, m_name, age, m_city)

Instrument (i_no, i_name)

Play (m_no, i_no)

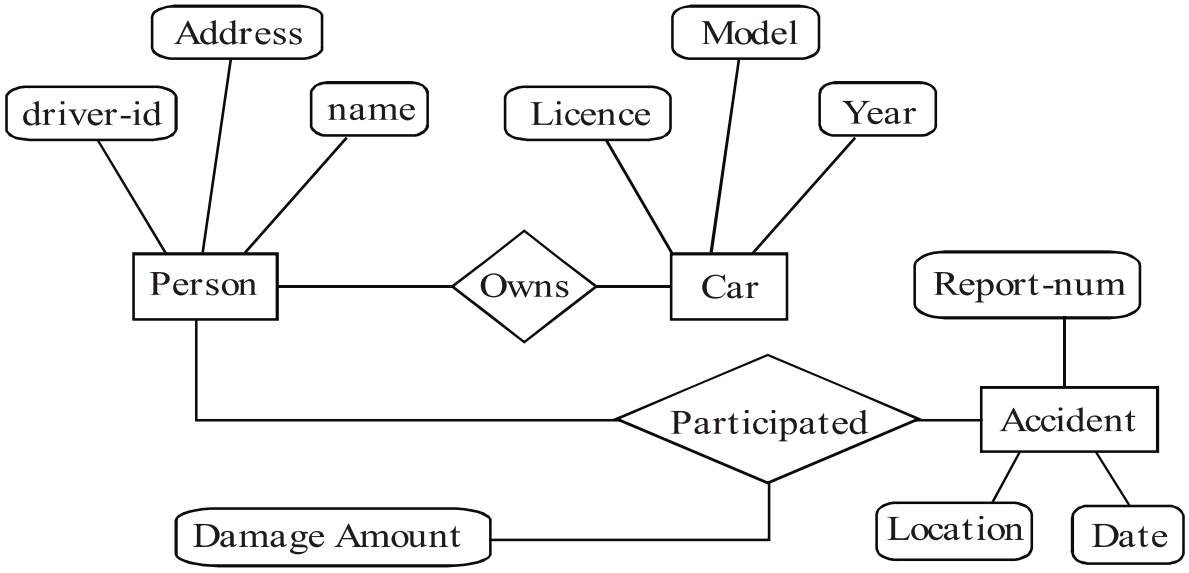
Solve the following queries :

(*i*) List all the musicians having age between 30 and 40 years.

(*ii*) List all 'violin' players who live in 'Mumbai' and their age is below 30.

(*c*) Explain 'Group by' and 'Order by' clauses in SQL with example.

(*d*) Design a relational database corresponding to the following ER diagram.



Group-II

5. Attempt all of the following : [5+5+4=14]

(*a*) Explain any *five* aggregate functions in detail.

(*b*) What are pitfalls in relational database design ?

(*c*) Write a short note on integrity constraints on database design.

6. Attempt all of the following : [4+4+3+3=14]

(*a*) What are different data types available in SQL ? Explain in detail.

(*b*) What is normalization ? Define the terms :

(*i*) 1NF

(*ii*) 2NF

(*iii*) 3NF

(*c*) Consider the following relations and solve the queries :

Item (i_code, i_name, price)

Order (o_code, date, cust_name)

Item-order (i_code, o_code, qty)

(*i*) List all order numbers along with different items.

(*ii*) List all orders before 4th October, 2010.

(*iii*) List all items along with their price.

(*d*) Write a short note on desirable properties of decomposition.

7. Attempt all of the following : [4+4+3+3=14]

(*a*) Explain pattern matching operators in SQL.

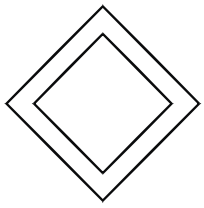
(*b*) Consider the following Relational Database 'Star' is an agency for flat booking and it has number of builders and agents who are jointly working. A customer can get a flat for residential or commercial purpose. If customer is approached through an agent, the agency and builders are giving some commission to the agent. Agent shows various flats and sites within various locations. Study above case and :

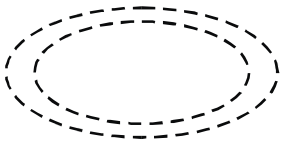
(*i*) Design an ER diagram

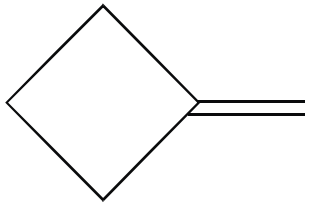
(*ii*) Identify all entities.

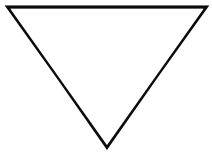
(*c*) Explain how insertion and deletion are done in B^+ tree index.

(*d*) Explain any *three* ER notations with example :

(*i*) 

(*ii*) 

(*iii*) 

(*iv*) 

Total No. of Questions—**7**] [Total No. of Printed Pages—**8**

Seat No.	

[5219]-3001

S.Y.B.C.A. (Science) (III Semester) EXAMINATION, 2017

BCA-301 : DATA STRUCTURE

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and any *two* questions from Group II.

(*iii*) *All* questions carry equal marks.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data if necessary.

1. (A) Choose *correct* option : [7×1=7]

(1) Time complexity of a program refer to :

(*a*) Complexity involved with the input time of a program

(*b*) Complexity involved in space mission and control

(*c*) Amount of time a program needs to run for completion

(*d*) None of the above

P.T.O.

(2) The memory address of the first element of an array is called :

(*a*) floor address

(*b*) foundation address

(*c*) first address

(*d*) base address

(3) Elements are added at which position of the stack ?

(*a*) Bottom

(*b*) Middle

(*c*) Top

(*d*) None of the above

(4) In the last node of the circular linked list the link field contains ?

(*a*) Null

(*b*) Pointer data item

(*c*) Pointer to next node

(*d*) Pointer to first node

(5) Which is the property of dequeue ?

(*a*) LIFO

(*b*) LILO

(*c*) FIFO

(*d*) None of the above

(6) Binary tree can be represented as :

(*a*) Linked list only

(*b*) Array only

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(7) In a graph Breadth First Search can be implemented with :

(*a*) Stack

(*b*) Queue

(*c*) Tree

(*d*) Forest

(B) Answer the following : 7×1=7

(*a*) "A data structure may be implemented by other data structure." State true/false.

(*b*) What is the Best Case and Worst Case time complexity of merge sort ?

(*c*) Give *one* advantage of using header node in linked list.

(*d*) What is the result of evaluating the postfix expression AB – CD * / given A = 2 B = 10 C = 4 D = 1.

(*e*) Define Dequeue.

(*f*) What is Right Skewed binary tree ?

(*g*) Define complete graph.

Group I

2. Attempt the following :

(*a*) Write a C function to delete node from a circular link list at any position. [5]

(*b*) Sort the following data using merge sort : [5]

24, 11, 9, 2, 6, 5, 4, 3

(*c*) Calculate the time complexity for the following code in table method : [4]

```
float sum (float a[ ], int n)
{
    float s = 0.0;
    for (int i = 1; i< = n; i++)
        s + = a[i];
    return s;
}
```

3. Answer the following :

(*a*) Write a C function for sequential search in a sorted array. [4]

(*b*) What are different types of linked list ? Give node structure of each type. [4]

(*c*) Give the best case and worst case efficiency of the following algorithm : [3]

(*i*) Bubble sort

(*ii*) Quick sort

(*iii*) Insertion sort.

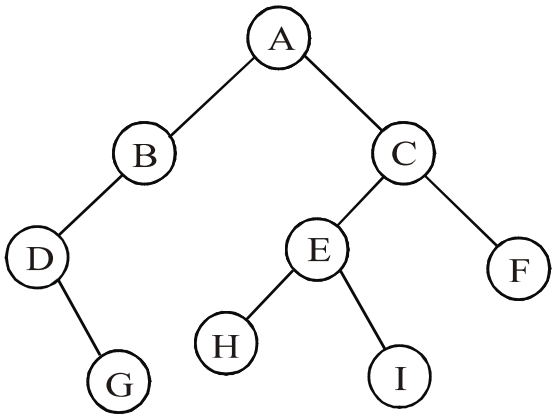
(*d*) What are different applications of Double linked list ? [3]

4. Attempt the following :

(*a*) What are the applications of stack ? [4]

(*b*) Differentiate between stack and queue ? [4]

(*c*) To find Preorder, Inorder, Postorder of the following tree : [3]



(*d*) Define the following terms : [3]

(*i*) Acyclic graph

(*ii*) Multigraph

(*iii*) Sink.

Group II

5. Answer the following :

(*a*) Write a C function to count depth of tree. [5]

(*b*) Give the output of the following code with contents of the stack. : [5]

```
initstack (5);
push (5, 10);
push (5, 6);
i = pop (5);
while (i > 0)
{
    push (5, i * 10);
    i – – ;
}
push (5, i * 10);
while (! stackempty (5))
{
    printf ("%d", pop (5));
}
```

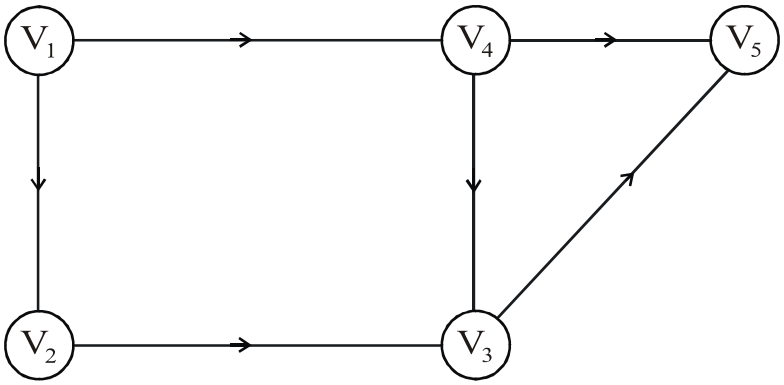
(*c*) What are different operations performed on queue ? Explain each. [4]

6. Answer the following :

(*a*) Define expression tree. Construct expression tree for the following given expression : [4]

(a + b * c) * e + f

(*b*) Construct the adjacency matrix and adjacency list for the following graph. [4]



(*c*) Write a C function to print queue data. [3]

(*d*) Construct the binary search tree for the following : [3]

11, 7, 15, 25, 18, 5, 12, 20

7. Answer the following :

(*a*) Write 'C' function to delete last node of a linked list. [4]

(*b*) Write a 'C' function to push an element to a stack (dynamic representation). [4]

(*c*) Represent generalized linked list for the following expression diagrammatically : [3]

$$A = (a, (b, c, d) e, f)$$

$$G = ((d, e) (e, f), c, d)$$

(*d*) Define linear and non-linear data structure. List any *three* linear and non-linear data structure. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-3002

S.Y. B.C.A. (Science) (Semester III) EXAMINATION, 2017

BCA-302 : ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and any *two* questions from Group II.

(*iii*) *All* questions carry equal marks.

(*iv*) Figures to the right indicate full marks.

1. (A) Attempt the following : [7×1=7]

(1) Single line comment in PL/PgSQL denoted as ..... .

(*a*) * *

(*b*) * /

(*c*) / /

(*d*) – –

P.T.O.

(2) Which of the following makes the transaction permanent in database ?

(*a*) View

(*b*) Commit

(*c*) Rollback

(*d*) Flashback

(3) Prevention of access to the database by unauthorized user is referred to as ..... .

(*a*) Integrity

(*b*) Productivity

(*c*) Security

(*d*) Reliability

(4) The typical technique of discretionary access control in database system is based on the ..... of privilege.

(*a*) Commit and rollback

(*b*) Granting and revoking

(*c*) Serial and non-serial

(*d*) All of the above

(5) Database modification written by active transaction are called ..... modification.

(*a*) Committed

(*b*) Rolled back

(*c*) Serial

(*d*) Uncommitted

(6) ..... statement is used to terminate the while loop.

(*a*) Loop

(*b*) End while

(*c*) Exit

(*d*) Exit loop

(7) Isolation is also called as ..... .

(*a*) Independence

(*b*) Intradependence

(*c*) Interdependence

(*d*) None of the above

(B) Answer the following : [7×1=7]

(1) Give the syntax for declaring a stored procedure.

(2) Define the terms :

(*i*) Schedule

(*ii*) Deadlock.

(3) What is a log ?

(4) State any *two* uses of grant privilege.

(5) List the server components.

(6) What is time stamp ?

(7) Give the advantages of shadow paging.

Group I

2. Attempt the following :

(1) How to create a view ? Explain with an example. [5]

(2) Explain states of transaction with diagram. [5]

(3) Explain the use of RAISE statement with an example. [4]

3. Attempt the following :

(1) State and explain various types of triggers. [4]

(2) Explain phantom phenomenon that occurs in dynamic databases. [4]

(3) Explain with an example how trigger ensures referential integrity. [3]

(4) What is deadlock detection ? Explain *one* method for deadlock detection. [3]

4. Attempt the following :

(1) Write a short note on Aries Algorithm. [4]

(2) What are different methods used for database security ? [4]

(3) Explain client-server architecture of database with diagram. [3]

(4) What are different types of failures ? [3]

Group II

5. Attempt the following :

(*a*) Describe storage structure in detail. [5]

(*b*) Write a short note on Discretionary Access Control. [5]

(*c*) Describe the various client components. [4]

6. Attempt the following :

(*a*) Write a short note on shadow paging. [4]

(*b*) Explain principles of client-server architecture. [4]

(*c*) Explain deffered database modification. [3]

(*d*) What do you mean by granting and revoking privilege ? [3]

7. (*a*)

T_1	T_2	T_3
R(X)		
	R(Y)	
		R(X)
	W(Y)	
R(Y)		
		W(X)
W(X)		
Commit		
	Commit	
		Commit

Check whether schedule is conflict serializable using precedence graph. [4]

(*b*) Consider the following entities and the relationship :

Company (cname, address, ccity, phone, share-val)

Person (pname, pcity),

Comp-person (cname, pname, no-share)

Write a stored function to transfer shares owned by "Mr. Pawar" to "Mr. Kale". [4]

(*c*) State different modes of locks that can be applied to a database item. [3]

(*d*) Explain different data types in PL/PgSQL. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-3003

S.Y.B.C.A. (Science) (Semester III) EXAMINATION, 2017

BCA-303 : SOFTWARE ENGINEERING

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and any *two* questions from Group II.

(*iii*) *All* questions carry equal marks.

(*iv*) Figures to the right indicate full marks.

1. (A) Attempt the following : [7×1=7]

(1) ..... means interconnection and interaction between subsystem.

(*a*) Interface

(*b*) Feedback

(*c*) Environment

(*d*) Boundaries

P.T.O.

(2) Which of the following is not considered in software engineering layers ?

(*a*) Quality

(*b*) Tools

(*c*) Methods

(*d*) Cost

(3) 'Level O' DFD is also known as ..... .

(*a*) Logical

(*b*) Functional

(*c*) Context level

(*d*) Physical level

(4) Which of the following is not a fact finding technique ?

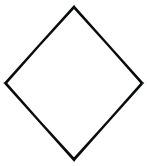
(*a*) Observation

(*b*) Questionnaire

(*c*) Interview

(*d*) Presentation

(5) The symbol used for computer processing in data flow diagram is ..... .

(*a*) 

(*b*) 

(*c*) 

(*d*) 

(6) Checking the individual program for correctness means ..... .

(*a*) System testing

(*b*) Unit testing

(*c*) Integration testing

(*d*) Alpha testing

(7) Which of the following is not an activity in extreme programming ?

(*a*) Planning

(*b*) Designing

(*c*) Coding

(*d*) Learning

(B) Attempt all of the following : [7×1=7]

(1) Define the term : Software Engineering.

(2) List any *two* advantages of spiral model.

(3) State any *two* records in Data Dictionary.

(4) State different types of software maintenance methods.

(5) Define integration testing.

(6) What is reverse engineering ?

(7) What do you mean by a Agile process ?

Group I

2. Attempt all of the following :

(a) Write a short note on Software Engineering Layers. [5]

(*b*) Differentiate between waterfall model and incremental model. [5]

(*c*) Explain inseption in detail. [4]

3. Attempt all of the following :

(*a*) What are different activities of software development life cycle ? Explain any *two* in detail. [4]

(*b*) What is Elicitation ? Discuss problem faced during elicitation. [4]

(*c*) What are benefits of prototyping model ? [3]

(*d*) What are different types of system ? [3]

4. Attempt all of the following :

(*a*) Draw a contex level DFD and Level 1 DFD for "online examination system for internal evaluation of students". [4]

(*b*) Write a short note on stress testing. [4]

(*c*) Explain components of data dictionary. [3]

(*d*) What are human factors involved in agile process ? [3]

Group II

5. Attempt all of the following :

(*a*) Draw decision tree and decision table for the following case study : [5]

An organization decides to give Diwali Bonus to all the employees. For this the management has divided the employees into three categories namely Administrative Staff (AS), Office Staff (OS), Workers (W) and considered the rules given below.

(*i*) If employee is permanent and in the 'AS' category the bonus amount is three months salary.

(*ii*) If employee is permanent and in 'OS' category, bonus amount is two months salary.

(*iii*) If employee is permanent and in 'W' category, the bonus amount is one months salary.

(*iv*) If employee is temporary then half of the amount is given to them as per the permanent employee's bonus amount.

(*b*) What is adaptive software development ? [5]

(*c*) Explain system testing with its types. [4]

6. Attempt the following :

(*a*) Write short note on Black Box Testing. [4]

(*b*) What is use of Data Dictionary ? Explain with example. [4]

(*c*) Explain the term Software Reengineering in detail. [3]

(*d*) What are issues related with the politics of Agile Development ? [3]

7. Attempt the following :

(*a*) Write a short note on preliminary investigation. [4]

(*b*) What are fact finding techniques ? Explain any *two* in detail. [4]

(*c*) Give the characteristics of system. [3]

(*d*) Explain benefits of incremental model. [3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**6**

Seat No.	

[5219]-3004

S.Y. B.C.A. (Science) (III Semester) EXAMINATION, 2017

BCA-304 : INTRODUCTION TO COMPUTER NETWORK

(2016 PATTERN)

Time : Three Hours **Maximum Marks : 70**

N.B. **:—** (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *two* questions from Group I and any *two* questions from Group II.

(*iii*) *All* questions carry equal marks.

(*iv*) Figures to the right indicate full marks.

(*v*) Use of scientific calculator is allowed.

1. (A) Attempt the following : [7]

(1) In which of the following topologies hub is required ?

(*a*) Star

(*b*) Ring

(*c*) Bus

(*d*) Mesh

P.T.O.

(2) Which of the following device operates at the network layer of OSI model ?

(*a*) Repeater

(*b*) Router

(*c*) Bridge

(*d*) Hub

(3) Transmission media is closer to the following layer :

(*a*) Application

(*b*) Physical

(*c*) Transport

(*d*) Network

(4) If the bandwidth of a channel is 5 Kbps, how long does it take to transmit a frame of 100000 bits ?

(*a*) 20s

(*b*) 10s

(*c*) 30s

(*d*) 2s

(5) In which error detection method polynomials are involved ?

(*a*) Simple parity check

(*b*) 2-D parity check

(*c*) CRC

(*d*) Checksum

(6) The length of 1P address is ..... .

(*a*) 46 bits

(*b*) 32 bits

(*c*) 16 bits

(*d*) 64 bits

(7) In the ..... method, each station has a predecessor and a successor.

(*a*) Reservation

(*b*) Polling

(*c*) Token passing

(*d*) None of the above

(B) Attempt the following : [7]

(*i*) Define Computer Network.

(*ii*) List any *four* application layer protocols.

(*iii*) What are the types of twisted pair cables ?

(*iv*) What is an analog signal ?

(*v*) What is channelization ?

(*vi*) Define netid and hostid.

(*vii*) Define topology.

Group I

2. Attempt the following :

(*a*) Explain broadcast and point to point transmission. [5]

(*b*) Differentiate between OSI and TCP/IP reference model. [5]

(*c*) Write a note on co-axial cable. [4]

3. Attempt the following :

(*a*) What do you understand by unguided media ? Give an account of infrared waves. [4]

(*b*) Describe home applications of Computer Network. [4]

(*c*) Draw Graph for NRZ – L coding for the following data : [3]

(1) 00000000

(2) 11111111

(3) 01010101

(*d*) Write in detail about goals of Computer Network. [3]

4. Attempt the following :

(*a*) Given the dataword to be sent is 100100 and the divisor is 1101 : [4]

(*i*) Show the generation of the code word at sender side.

(*ii*) Show checking of code word at receiver side.

(*b*) Write a note on Ethernet. [4]

(*c*) Write a note on classful addressing. [3]

(*d*) Compare circuit switching and packet switching. [3]

Group II

5. Attempt the following :

(*a*) Write in detail about pure and slotted ALOHA. [5]

(*b*) Compare FDM and TDM. [5]

(*c*) Explain the tasks performed by Network Layer. [4]

6. Attempt the following :

(*a*) Given a channel with an intended capacity of 20 Mbps. The bandwidth of the channel is 3 MHz. What signal to noise ratio is required in order to achieve this capacity ? [4]

(*b*) Write a note on serial transmission. [4]

(*c*) State the difference between IPV4 and IPV6. [3]

(*d*) Explain the concept of framing in detail in data link layer. [3]

7. Attempt the following :

(*a*) Write a note on LAN with its advantages and disadvantages. [4]

(*b*) Define the following terms : [4]

(*i*) Bandwidth

(*ii*) Throughput

(*iii*) Latency

(*iv*) Jitter.

(*c*) Write a note on modes of transmission over a network. [3]

(*d*) Discuss in detail straight through cable and cross over cable. [3]