Seat
No.

[5426]-101A

F.Y. B.C.A. (Science) (I Semester) EXAMINATION, 2018

BCA-101 : FUNDAMENTALS OF COMPUTER

(2016 PATTERN)

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

N.B. :— (*i*) Question No. 1 (A & 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.

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

(1) .... is a document that store data grid of rows and columns.

(*a*) Notepad

(*b*) Spreadsheet

(*c*) Word Processor

(*d*) None of the above

(2) Dot Matrix is a type of .... printer.

(*a*) Impact Printer

(*b*) Non-impact Printer

(*c*) Line Printer

(*d*) Page Printer

(3) The principle used to store data on magnetize device is :

(a) Polarization

(b) Hybridization

(c) Digitization

(d) None of the above

(4) COBOL is an example of .... level language.

(a) Low

(b) Middle

(c) High

(d) Both (a) and (b)

(5) .... is the program PC microprocessor uses to get the computer system started after it turned off.

(a) BIOS

(b) MOS

(c) LAN

(d) None of the above

(6) .... is the output device.

(a) Keyboard

(b) Mouse

(c) Pendrive

(d) Monitor

(7) A translator which scans the entire program and translates it as a whole onto machine code is called as :

(a) Compiler

(b) Interpreter

(c) Assembler

(d) None of the above

(B) Define the following terms : [7]

(1) Virus

(2) Directory

(3) Operating System

(4) Port

(5) Word Processor

(6) Driver

(7) EPROM.

Group I

2. Answer the following : [14]

(a) What is Input Devices ? Explain at least *two* input devices in detail. [5]

(b) What is Computer ? What are the advantages of Computer ? [5]

(c) Write notes on : [4]

(1) ROM

(2) Octal Number System.

3. Answer the following : [14]

(*a*) What is Hardware ? Explain types of Hardware. [4]

(*b*) Write notes on : [4]

   (1) MS-Word

   (2) Get it.

(*c*) Convert the following decimal number into binary number : [3]

   (1) $(99)_{10}$

   (2) $(2022)_{10}$.

(*d*) Explain any *three* presentation tools. [3]

4. Answer the following : [14]

(*a*) Explain various types of computer. [4]

(*b*) What are the elements of good presentation ? [4]

(*c*) Explain primary storage devices. [3]

(*d*) Explain the usages of spreadsheet. [3]

Group II

5. Answer the following : [14]

(*a*) What is system software ? Explain with example. [5]

(*b*) What do you mean by high level language ? What are the features of high level language ? [5]

(*c*) Write notes on : [4]

   (1) BIOS

   (2) Graphics Card.

6. Answer the following : [14]

(*a*) State and explain different types of Hardware devices. [4]

(*b*) What is text editor ? What are its features ? [4]

(*c*) Convert the following binary number into decimal number : [3]

    (1) $(1001)_2$

    (2) $(1101010)_2$

    (3) $(110110)_2$.

(*d*) Explain any *three* external DOS commands with example. [3]

7. Answer the following : [14]

(*a*) Explain application software with example. [4]

(*b*) Write notes on : [4]

    (1) Desktop

    (2) Icon.

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

    (1) $(6252)_{10} = (?)_8$

    (2) $(101101111)_2 = (?)_8$.

(*d*) Explain batch file. [3]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.

[5426]-102

F.Y. B.C.A. (SCIENCE) (I Sem.) EXAMINATION, 2018
BCA-102 : BASIC PROGRAMMING IN C
(Introduction to Programming and Programming in C)
(2016 PATTERN)

Time : 3 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.

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

(1)   .... is unary operator in C.

(*a*)   ~   (*b*) +

(*c*)   &   (*d*) <

(2)   .... keyword is used for storage class.

(*a*)   break   (*b*) double

(*c*)   exit   (*d*) auto

(3)   .... format specifier used to display octal number.

(*a*)   %c   (*b*) %d

(*c*)   %o   (*d*) %f

(4)   The "continue" statement cannot be used with ....

(*a*)   for statement   (*b*) switch statement

(*c*)   do statement   (*d*) while statement

(5)   By default, a static variable is initialized to ....

    (a)   space   (b) garbage value

    (c)   zero   (d) one

(6)   The size of long double data type on 16-bit machine is
       .... bytes.

    (a)   2   (b) 4

    (c)   8   (d) 10

(7)   By default, array subscript in 'C' language starts
       at ....

    (a)   space   (b) 0

    (c)   1   (d) –1

(B)   Attempt the following :   [7]

    (1)   Define a flowchart.

    (2)   'C' is a middle level language. Justify.

    (3)   What is the use of typedef keyword ?

    (4)   State the purpose of conditional operator.

    (5)   What is escape sequence for null character ?

    (6)   List the techniques for parameter passing to function.

    (7)   Given X = 0 and Y = 0. Find value of X, Y, Z for
           the following expression :

                Z = ++ X ¦¦ ++ Y

Group-I

2.   Attempt the following :

(a)   Draw a flowchart to check whether given number is perfect
       number or not.   [5]

(b)   Define algorithm. State the characteristics of an algorithm. [5]

(c)   What are the features of 'C' language ?   [4]

3. Attempt the following :

(*a*) Write an algorithm to display numbers from 100 to 1 in reverse
order. [4]

(*b*) Explain the basic datatypes in 'C' language. [4]

(*c*) Differentiate between character constant and string constant. [3]

(*d*) What are the requirements for problem solving by computer ? [3]

4. Attempt the following :

(*a*) Discuss the various forms of increment and decrement operator
with an example. [4]

(*b*) Explain switch statement with example. [4]

(*c*) Define Array. What are the limitations of an array ? [3]

(*d*) Trace the output [3]

```
main( )
{
        int a=5;
        do
        {
          printf("%d", a);
            a=-1;
        } while (a > 0);
}
```

Group-II

5. Attempt the following :

   (*a*) Write a 'C' program to print transpose of matrix. [5]

   (*b*) Define storage class. Explain different storage classes. [5]

   (*c*) Explain jump statements in 'C' language. [4]

6. Attempt the following :

   (*a*) Write a 'C' program to reverse the given number. [4]

   (*b*) What is recursion ? Explain with example. [4]

   (*c*) Explain the functions getchar( ), putchar( ), getch( ) with example. [3]

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

```
main( )
{
    typedef   int   X;
    X  a=0;
    printf ("%d", a);
}
```

7. Attempt the following :

   (*a*) Draw a flowchart to find minimum of three numbers. [4]

   (*b*) Discuss the bitwise operators with example. [4]

   (*c*) Explain the qualifiers applied to integer type. [3]

   (*d*) Explain the steps involved in C program development. [3]

Seat
No.

[5426]-103

F.Y. B.C.A. (Science) (Semester I) EXAMINATION, 2018

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

(*i*) De-Morgan's law is :

(*a*) (A ∩ B) = A ∪ B   (*b*) (A ∩ B)^c = A^c ∪ B^c

(*c*) (A ∪ B)^c = A^c ∩ B^c (*d*) (A ∪ B)^c = A^c ∪ B^c

(*ii*) For every positive integer *n* binomial theorem is :

(*a*) $(x + y)^n = \sum_{r=0}^{n} \binom{n}{r} x^r y^{n-r}$

(*b*) $(x + y)^n = \binom{n}{r} x \, y$

(*c*) $(x + y)^n = \sum_{r=0}^{n} x^r y^{n-r}$

(*d*) None of the above

(*iii*) A natural number 354 in binary representation is :

    (*a*) $101100010_{(2)}$ (*b*) $1111010_{(3)}$

    (*c*) $1011000_{(2)}$ (*d*) $01111010_{(2)}$

(*iv*) In logical connectives P∨Q means :

    (*a*)   P False

    (*b*)   Q true whenever P true

    (*c*)   At least one true

    (*d*)   Same truth value

(*v*) An equation of line is :

    (*a*) $L = \{(x, y) \in R^2 \mid ax + by \neq r$

    (*b*) $L = \{(x, y) \in R^2 \mid ax + by = r$

    (*c*) $\{ax + by = r\}$

    (*d*)   None of the above

(*vi*) If *a* and *b* are relatively prime, then there exist integers *m* and *n* such that :

    (*a*) $\dfrac{ma}{nb} = 1$

    (*b*) $ma - nb = 1$

    (*c*) $ma + nb = 1$

    (*d*) $ma + nb = -1$

(*vii*) Bounded function using quantifiers is :

    (*a*) $(\exists M \in R)\,(\forall x \in R)\,(|F(x)| \leq M)$

    (*b*) $(\forall M \in R)\,(\exists x \in R)\,(|F(x)| > M)$

    (*c*) $(\exists M \in R)\,\,(\exists x \in R)$

    (*d*)   None of the above

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

    (*a*) Define Harmonic Mean.

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

    (*c*) Prove that Z is countable, Z is integer set.

(d) What is meant by a Bijection Function.

(e) Convert the integer $3333_{(5)}$ into decimal representation.

(f) Define a term set giving an example.

(g) Define a term intersection of two sets.

Group I

2. Attempt the following questions :

    (a) Let $f, g : \mathrm{R} \to \mathrm{R}$ be two functions. Determine which of the following statements are true. Justify. [5]

    (i) If f and g are bounded, then $f + g$ is bounded.

    (ii) If f and g are bounded, then $f \cdot g$ is bounded.

    (b) Prove that, for $n \in \mathrm{N}$. $1 + 2 + 3 + \cdots + n = \dfrac{n(n+1)}{2}$. [5]

    (c) Give an indirect proof of the theorem "If $3n + 2$ is odd, then n is odd." [4]

3. (a) Prove that the statements :
        $\mathrm{P} \to \mathrm{Q}$ and $\mathrm{Q} \to \mathrm{R}$ imply $\mathrm{P} \to \mathrm{R}$ with usual notation. [4]

    (b) IF a, b, c are odd integers, then show that $ax^2 + bx + c = 0$ has no solution in the set of rational numbers. [4]

    (c) Suppose that r and s are distinct real solutions of the equation $ax^2 + bx + c = 0$. In terms a, b, c, obtain formulas for $r + s$ and rs. [3]

    (d) For $n \in \mathrm{N}$, when does $3^n > n^4$ hold ? [3]

4. (a) Let $\mathrm{A} = \mathrm{R} - \left\{ \dfrac{2}{3} \right\}$, $\mathrm{B} = \mathrm{R} - \{0\}$ [4]

        Show that the function $\mathrm{F} : \mathrm{A} \to \mathrm{B}$, defined by

        $f(x) = \dfrac{1}{3x - 2}$ is bijection.

(b) Prove that $\sum_{i=1}^{n} i^3 = \left(\dfrac{n(n+1)}{2}\right)^2$ without using induction. [4]

(c) If p is prime and a, b are integers such that $p|ab$, then show that either $p|a$ or $p|b$. [3]

(d) Prove that if A is finite, then for exactly one n there is a bijection from A to $[n]$. [3]

Group II

5. Attempt the following questions :

(a) Find gcd of P $= x^3 - 2x^2 + 6x - 5$ and $g = x^2 - 2x + 1$ [5]

(b) Prove that 6 divides $n^3 + 5n$, for every positive integer n. [5]

(c) Let $g = 132$ and $h = 213$ be permutation then find hog and goh. [4]

6. (a) Let $h : $ R $\to$ R be defined by $h(x) = mx + b$ where $m \neq o$, then :

(i) Show that h is bijection

(ii) Find formula for h^{-1} [4]

(b) Determine whether the following permutation are even or odd : [4]

(i) $f = 23514$

(ii) $h = 3217645$.

(c) Represent rotation by 90° in permutation form ? [3]

(d) Show that the set N×N is countable. [3]

7. (a) Prove that $4\, xyz$W $\leq x^4 + y^4 + z^4 + w^4$ for real numbers x, y, z, w. [4]

(*b*)   What are the negations of statement ?   [4]

(*i*) "There is an honest politician".

(*ii*) "All Americans eat cheese burgers" ?

(*c*)   Prove that if x and y are distinct real numbers, then $(x + 1)^2 = (y + 1)^2$ iff $(x + y) = -2$.   [3]

(*d*)   Using mathematical induction, prove that $n < 2^n$, $\forall \ n \in N$.   [3]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.

[5426]-104

F.Y. B.C.A. (SCIENCE) (I Sem.) EXAMINATION, 2018
BCA-104 : COMMUNICATION SKILLS
(2016 PATTERN)

Time : 3 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 wherever necessary.

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

(*i*)   Channel is............................

(*a*)   feedback

(*b*)   formality

(*c*)   mode of communication

(*d*)   e-communication

(*ii*) Function of memo is............................

(*a*)   To give quotation   (*b*) To offer rate

(*c*)   To issue suggestion   (*d*) To give information

(*iii*) Noise disturbance is :

(*a*)   Physical barrier   (*b*) Psychological barrier

(*c*)   Technical barrier   (*d*) Body language

(*iv*) Dress code is necessary for.................

(*a*)   Grapevine   (*b*) Informal meeting

(*c*)   Interview   (*d*) Oral communication

P.T.O.

(v)   Agenda of meeting is...............................

   (a)   Conclusion   (b) Beginning

   (c)   Purpose   (d) Information

(vi)   Graphs are...............................

   (a)   Formal communication

   (b)   Non-verbal communication

   (c)   Verbal communication

   (d)   Physical communication

(vii)   Listening is.................................

   (a)   Collecting information (b) Attentive involvement

   (c)   Casually hearing   (d) Passive activity

(B)   Answer briefly :   [7]

   (i)   Importance of tone

   (ii)   Significance of channel

   (iii)   Informal communication

   (iv)   Two etiquettes of telephonic talk

   (v)   Examples of formal communication

   (vi)   Two examples of oral communication

   (vii)   Objective of listening.

Group-I

2.   Answer the following :

   (a)   What factors make oral communication effective ?   [5]

   (b)   What are physical barriers ?   [5]

   (c)   What are the importance of graphs and pie-charts.   [4]

3. Attempt the following :

(a) What is communication ? What are the types of communication ? [4]

(b) Write a note on objectives of communication. [4]

(c) Write *four* functions of report. [3]

(d) Write *four* principles of effective oral communication. [3]

4. Answer the following :

(a) Enlist advantages of informal communication. [4]

(b) What is the scope of business communication. [4]

(c) What are limitations of non-verbal communication. [3]

(d) What is interpersonal skills. [3]

Group-II

5. Answer the following :

(a) How is "understanding others" key in communication ? [5]

(b) Write a formal letter to manager calling for a meeting.[5]

(c) Write a report on students industrial visit. [4]

6. Answer the following :

(a) Write an application letter for the post of Assistant Manager.[4]

(b) Draft proper resume for the post of Assistant Manager. [4]

(c) What is interview ? What is the objective of interview ? [3]

(d) What are the aspects of effective communication. [3]

7. Answer the following :

    (*a*)   What is empathy ? Why is it important in communication ? [4]

    (*b*)   What is reflective thinking ?   [4]

    (*c*)   What are ways of resolving conflict ?   [3]

    (*d*)   What is group discussion ?   [3]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.

[5426]-201

F.Y. B.C.A. (SCIENCE) (II Sem.) EXAMINATION, 2018
BCA-201 : COMPUTER ORGANIZATION
(2016 PATTERN)

Time : Three Hours   Maximum Marks : 70

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

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

(*iii*)   Draw neat diagram wherever necessary.

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

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

(*i*)   EBCDIC is.............................

(*a*)   Extended Bitwise Coded Decimal Interchange Code

(*b*)   Extended Binary Coded Decimal Interchange Code

(*c*)   External Binary Coded Decimal Interchange Code

(*d*)   Extended Binary Coded Decimal Internal Code

(*ii*)   The........................gate has only one i/p.

(*a*)   AND   (*b*)   OR

(*c*)   NOT   (*d*)   EX-OR

(*iii*)   Half adder is an example of.............................

(*a*)   Combinational Circuit   (*b*)   Logic Circuit

(*c*)   Microprocessor   (*d*)   None of these

(*iv*)   A circuit which has two states and can be rised to store state information is.............................

(*a*)   Latch   (*b*)   Flip-Flop

(*c*)   Circuit   (*d*)   (*a*) and (*b*) both

P.T.O.

(v)   GPR is...

     (a)   General Program Register

     (b)   General Purpose Register

     (c)   General Parallel Register

     (d)   None of the above

(vi)   ....is the minimum time for which data must be present after a valid write pulse ends.

     (a)   Data half time   (b) Data setup time

     (c)   Data hold time   (d) Data sample time

(vii) The math coprocessor is also called as...........................

     (a)   Numeric processor extension

     (b)   Numeric data processor

     (c)   Floating point unit

     (d)   All (a), (b) and (c)

(B)   Attempt the following :   [7]

     (i)   Draw the symbol for AND gate and OR gate.

     (ii)   List the types of encoders.

     (iii) Define edge-triggered flip-flop.

     (iv) What is a data bus ?

     (v)   What is a line printer and character printer ?

     (vi) State the different architectural configuration of parallel computers.

     (vii) What is cycle stealing method ?

Group-I

2. Attempt the following :
   (*a*) State and prove De Morgan's Theorem. [5]
   (*b*) What is a multiplexer ? Give its application. [5]
   (*c*) What is binary number system ? Explain with example binary to gray code conversion. [4]

3. Attempt the following :
   (*a*) Differentiate between asynchronous and synchronous counters with example. [4]
   (*b*) Write a short note on IC 74148. [4]
   (*c*) Simplify using Boolean algebra and draw simplification diagram for $(A + BC)\ (\overline{B}+\overline{C})$. [3]
   (*d*) What do you mean by parity bit ? State the purpose of adding it. [3]

4. Attempt the following :
   (*a*) With neat block diagram explain the working of CPU. [4]
   (*b*) Write a short note on pipeline. [4]
   (*c*) Distinguish between serial and parallel data transfer. [3]
   (*d*) What is virtual memory ? What are the ways of managing virtual memory ? [3]

Group-II

5. Attempt the following :
   (*a*) Draw block diagram of 8086 and explain flag register. [5]
   (*b*) What is an IVT ? Draw the structure. [5]
   (*c*) Explain memory parameters in brief. [4]

6. Attempt the following :

   (*a*)   Explain the working of register stack with block diagram. [4]

   (*b*)   Differentiate between RISC and CISC. [4]

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

   (*d*)   What is cache memory ? Give the *three* types of mapping processes implemented with cache. [3]

7. Attempt the following :

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

   (*b*)   Draw logic gate and state Boolean function and truth table for EX-OR gate. [4]

   (*c*)   Give the difference between D and T flip-flops. [3]

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

       (*i*) $(AB1.12)_{16} = (?)_8$

       (*ii*) $(1110101)_{gray} = (?)_{binary\ code}$

       (*iii*) $(457.77)_8 = (?)_{16}$.

Seat
No.

[5426]-202

B.C.A. (First Year) (Second Semester) EXAMINATION, 2018

SCIENCE

(BCA-202 : Advanced Programming in C)

(2016 PATTERN)

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

N.B. :— (*i*) Q. 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]

   (*i*) How will you free the allocated memory ?

   (*a*) remove(varname)

   (*b*) free(varname)

   (*c*) delete(varname)

   (*d*) dalloc(varname)

   (*ii*) Size of a union is determined by size of the :

   (*a*) first member in the union

   (*b*) last member in the union

   (*c*) biggest member in the union

   (*d*) sum of the sizes of all members

(*iii*) Which is an indirection operator among the following ?

(*a*) &

(*b*) *

(*c*) →

(*d*) •

(*iv*) String literal constant are terminated by :

(*a*) Newline character

(*b*) Carriage return character

(*c*) Null character

(*d*) None of the above

(*v*) Which of the following functions can be used to close the standard stream ?

(*a*) fclose( )

(*b*) fcloseall( )

(*c*) feof( )

(*d*) none of the above

(*vi*) Pointer arithmetic cannot be performed on :

(*a*) Void pointer

(*b*) Uninitialized pointer

(*c*) Dangling pointer

(*d*) None of the above

(*vii*) Which of the following are C preprocessor ?

(*a*) #ifdef

(*b*) #define

(*c*) #endif

(*d*) all of the above

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

(i) What is the use of gets( ) and puts( ) function ?

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

(iii) Explain the use of file opening modes "*a*" and "*a+*".

(iv) What is Dangling pointer ?

(v) What is use of • operator ?

(vi) Trace the output :

```
#define square (x)(x)*(x)
main( )
{
    printf("%d", square(4+2));
}
```

(vii) "A float pointer always contains integer value." State true *or* false.

Group I

2. Answer the following :

(A) What are the advantages and disadvantages of macro over functions ?   [5]

(B) What is pointer ? Explain various pointer operation.   [5]

(C) Explain any *four* string handling functions.   [4]

3. Answer the following :

(A) Explain conditional directives in C.   [4]

(B) What is meant by array of pointers ? Explain with suitable example.   [4]

(C) Write a C program using string library functions for :   [3]
(1) Length of string
(2) Comparing two strings.

(D) What is void pointer ? What kind of information is represented by a pointer variable ?   [3]

4. Answer the following :

(A) Write a program to accept student information using structure (rollno, name, percentage) for *n* students. Display student details having highest percentage. [4]

(B) What is the difference between structure and union ? [4]

(C) Differentiate between text and binary file. [3]

(D) Explain the following function along with their syntax : [3]
   (1) ftell( )
   (2) rewind( )
   (3) fread( ).

Group II

5. Answer the following :

(A) What do we mean by nested structures ? How do we access a member of inner structure declaration ? Explain with example. [5]

(B) Write a C program to count the number of occurrences of the given character in a file. [5]

(C) Find and justify the error of the following program : [4]

```
#include<stdio.h>
union variables
{
    char a;
    int b;
    float c;
};
    main( )
{
union variables var={'A', 2, 2.5};
printf("The values are % C % f % d", var . a, var . b, var c.);
}
```

6. Answer the following :

(A) How to pass whole structure to a function ? Explain with an example. [4]

(B) What are command line arguments ? How are they declared ? Give example. [4]

(C) Write a C program to copy contents of one file into another file. [3]

(D) What are different operations performed on unions. [3]

7. Answer the following :

(A) Write a C program for finding largest of 2 numbers using a macro. [4]

(B) Explain pointer to pointer concept with suitable example. [4]

(C) Write a C program to find the number of vowels present in the string. [3]

(D) Trace the output : [3]

```
    main( )
{
    char *str;
    str=("Hello", "Readers!");
    puts . (str);
}
```

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

Seat
No.   **[5426]-203**

F.Y. B.C.A. (Science) (Second Semester) EXAMINATION, 2018
BCA-203 : APPLIED MATHEMATICS-II
(2016 PATTERN)

Time : Three Hours   Maximum Marks : 70

N.B. :— (*i*) Q. 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. (A) Choose the *correct* alternative :   [7]

(*i*)   If k is an odd number then $k^2 - 1$ is divisible by :

(*a*) 8

(*b*) 4

(*c*) 2

(*d*) 1

(*ii*) An order relation on a set S is relation R on S is :

(*a*) R is transitive, symmetric, transitive

(*b*) R is symmetric, antisymmetric

(*c*) R is transitive, inverse, symmetric

(*d*) R is reflexive, antisymmetric, transitive

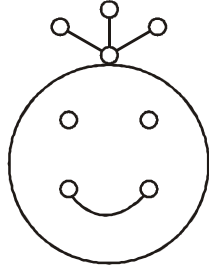(*iii*) Number of elements in $\phi(15)$ is :

(*a*) 4

(*b*) 5

(*c*) 8

(*d*) None of the above

P.T.O.

(*iv*) Let A and B are two sets then $|A \cup B|$ is :

(*a*) $|A| + |B| + |A \cap B|$

(*b*) $|A| + |B| - |A \cap B|$

(*c*) $|A|^C + |B|^C + |A \cap B|$

(*d*) $|A|^C + |B| - |A \cup B|$

(*v*) Number of components in the following graph is :

(*a*) 2

(*b*) 4

(*c*) 3

(*d*) 0

(*vi*) If every vertex of graph G is of the same degree K then G is :

(*a*) Complete graph

(*b*) Regular graph

(*c*) Bipartite graph

(*d*) None of the above

(*vii*) Number of edges in k_n is :

(*a*) $\dfrac{n(n - 1)}{2}$

(*b*) $n(n + 1)$

(*c*) $\dfrac{n(n + 1)}{2}$

(*d*) $n(n - 1)$

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

    (*i*) Give an equation of a relation on the set A = {1, 2, 3} which is symmetric.

    (*ii*) State pigeonhole principle.

    (*iii*) $a_n = a_{n-1} + 2a_{n-2}$ with $a_9 = 3$ and $a_{10} = 5$. Find a_8.

    (*iv*) Draw the complete bipartite graph $k_{2, 4}$.

    (*v*) What is meant by coloring graph ?

    (*vi*) Give a formula for the number of elements in the union of 3-sets.

    (*vii*) If $a_n = a_n - 7a_{n-1} + 10a_{n-2} = 0$, find the characteristics equation and root of the above recurrence relation.

Group I

2. Attempt the following :

(A) Prove that, there are precisely n distinct remainder classes modulo n. [5]

(B) Let k_n be complete graph on n-vertices then prove that : [5]

    (*i*) The degree of each vertex in k_n is $(n - 1)$.

    (*ii*) The number of edges in k_n is $\dfrac{n(n - 1)}{2}$.

(C) How many integers between 1 and 1,000 are divisible by 2 or 3 or 5 ? [4]

3. (A) Find the remainder when 4^{37+82} is divided by 7. [4]

(B) For the graph G given below, draw the following subgraphs : [4]

(i) <H>; H = {V_2, V_3, V_5}

(ii) G − {V_3, V_7}
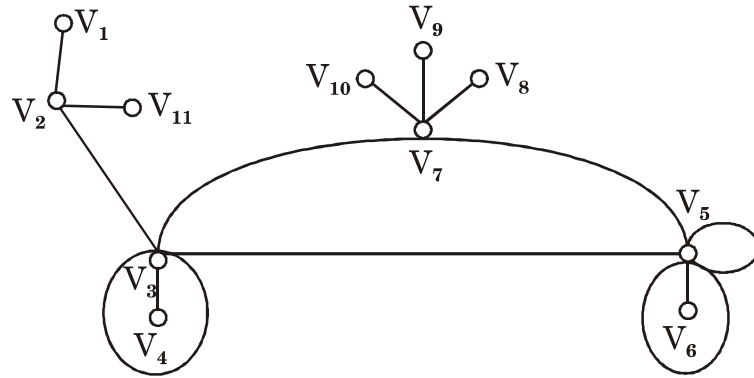
(C) Determine whether the relation : [3]

R = {$(x, y) \in$ S × S | gcd(x, y) > 1}

is an equivalence relation on set S = N − {1}.

(D) Solve the recurrence relation $a_r = 2a_{r-1} - a_{r-2}$ with initial conditions $a_0 = a_1 = 2$. [3]

4. (A) If G is self complementary graph on n vertices, then show that n is of the type $4k$ or $4k + 1$ for some integer k. [4]

(B) Find particular solution of difference equation : [4]

$$a_r + 5a_{r-1} + 6a_{r-2} = 42.4^r.$$

(C) The isomorphism relation is an equivalence relation on the set of simple graphs. [3]

(D) Given that $a_0 = 0$, $a_1 = 1$, $a_2 = 4$ and $a_3 = 12$ satisfy the recurrence relation $a_r + c_1 a_{r-1} + c_2 a_{r-2} = 0$. Determine a_r. [3]

Group II

Attempt the following questions :

5. (A) If G is a connected plane graph with V vertices, edges and F faces, then show that $V - e + F = 2$. [5]

(B) Determine whether the following pair of graphs is isomorphic ? [5]
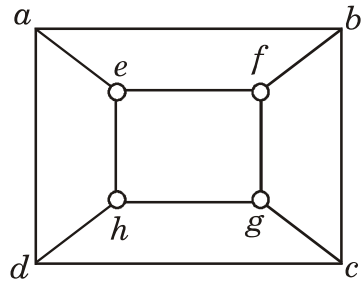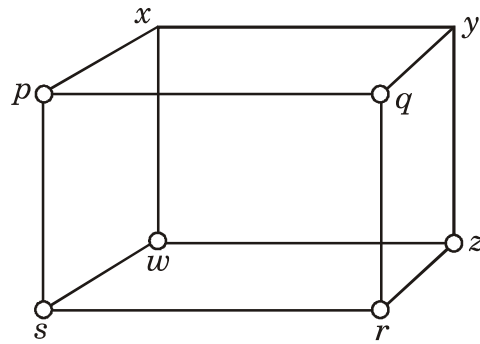
$$G_1 \qquad\qquad G_2$$

(C) Solve the recurrence $a_n = \left(1 - \dfrac{1}{n+1}\right)a_{n-1}$ for $n \geq 1$ with $a_0 = 1$. [4]

6. (A) Let $a, r, x \in Z$ if $a \equiv r(\text{mod } n)$, then show that : [4]

(i) $ax \equiv rx(\text{mod } n)$

(ii) $a + x \equiv r + x(\text{mod } n)$.

(B) If T is a tree on n vertices, then prove that T has $(n - 1)$ edges. [4]

(C) Show that the formal power series expansion of the generating function $(1 - x)^{-r}$ is $\displaystyle\sum_{n=0}^{\infty}\binom{n+r-1}{r-1}x^n$, for $r \in N$. [3]

(D)   In a graph G, find :   [3]

   (*i*)   a trail of length 5

   (*ii*) a path of length 9

   (*iii*) cycles of length 5
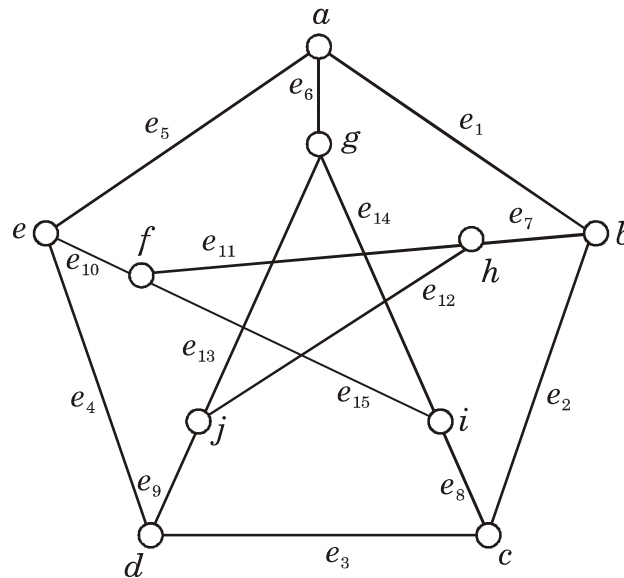
7.   (A)   Let (G, *) be 9 group. Define F_y : G → G by $F_y(x) = y * x$.
             Prove that F_y is a bijection.   [4]

      (B)   Suppose that 100 people surveyed and it's found that 78 like
             oranges, 47 like mangoes and 10 like neither. How many like
             both ? How many like oranges but not mangoes ?   [4]

      (C)   Prove that $n^5 - n$ is divisible by 30.   [3]

      (D)   Show that for every set S, the equality relation R = {(x, y)
             ∈ S × S|x = y} is an equivalence relation.   [3]

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

Seat
No.

[5426]-204

F.Y. B.C.A. (SCIENCE) (II-Sem.) EXAMINATION, 2018
BCA-204 : RELATIONAL DATABASE MANAGEMENT SYSTEM
(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.

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

(*i*)   'A collection of related record' is called :

(*a*)   File   (*b*) Record

(*c*)   Byte   (*d*) Field

(*ii*)   The capacity to change logical schema without having to
change the view schema is known as :

(*a*)   Logical data Independence

(*b*)   Physical data Independence

(*c*)   Data Independence

(*d*)   All of the above

(*iii*) In an E-R diagram, double rectangle represents.

(*a*)   Entity   (*b*) Strong entity

(*c*)   Weak entity   (*d*) None of these

(*iv*)   The key which uniquely represents the relation is called
as :

(*a*)   Primary key   (*b*) Unique key

(*c*)   Key   (*d*) All of these

P.T.O.

(v) Select the appropriate option for aggregate functions in SQL :

(a) Average   (b) Minimum

(c) Maximum   (d) All of these

(vi) The repetition of information in a database is known as :

(a) Redundancy   (b) Dependency

(c) Anomaly   (d) None of these

(vii) Breaking up relation schema into smaller relation schema is called :

(a) Decomposition   (b) Join

(c) Aggregation   (d) Generalization

(B) Attempt the following :   [7]

(i) Define index.

(ii) List any *two* disadvantages of DBMS.

(iii) What is weak entity ?

(iv) Define constraint.

(v) List the desirable properties of decomposition.

(vi) Define Normalization.

(vii) What is closure of functional dependencies ?

Group-I

2. Answer the following :

(a) Write a note on Architecture of DBMS.   [5]

(b) List the notations used in E-R diagram with their purpose.[5]

(c) Write in detail about sorted file organization with insert, update and delete operations.   [4]

3. Attempt the following :

(*a*) What is a record ? Explain its types with example. [4]

(*b*) Write a note on users of DBMS. [4]

(*c*) Explain the concept of generalization with example. [3]

(*d*) Consider the following relations : [3]

Doctor (Doctor_id, d_name, specialization)

Hospital (Hosp_no, H_name, address)

Doctor and Hospital are related with many to many relation

Draw the E-R diagram.

4. Answer the following :

(*a*) Consider the following relation schema

R (A, B, C, D, G, H, I) and functional dependencies

F = {A → B, A → C, CG → H, CG → I, B → H}.

Compute the closure of F i.e. F⁺. [4]

(*b*) Consider the following relations : [4]

Item (i_code, i_name, price)

Order (o_code, o_date, cust_hnm)

Item-order (i_code, o_code, quantity)

Solve the following queries :

(1) List all the items ordered by customer.

(2) List most costly item.

(*c*) Write a note on aggregate functions in SQL. [3]

(*d*) Consider the following E-R diagram and convert it into relation model : [3]
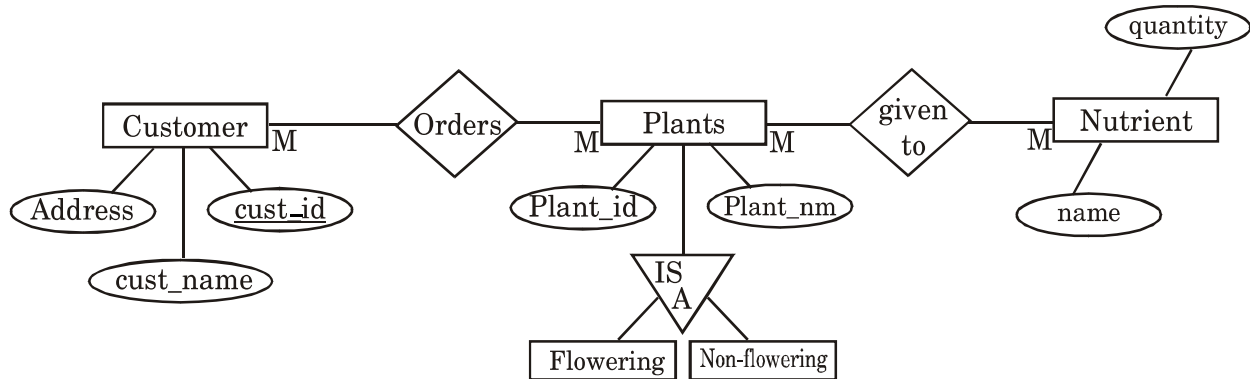
Group-II

5. Answer the following :

(*a*) Explain the following DML commands with example : [5]

(*i*) Insert

(*ii*) Delete

(*iii*) Update.

(*b*) Differentiate between 3NF and BCNF. [5]

(*c*) Write a note on integrity constraints. [4]

6. Attempt the following :

(*a*) What is SQL ? Explain the generalized structure of SQL query with appropriate example. [4]

(*b*) Write a note on problems caused by redundency. [4]

(*c*) Consider the following relations :

Musician (m_no, m_name, age, m_city)

Instrument (i_no, i_name)

Plays (m_no, i_no)

Solve the following queries :

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

(*ii*) List all musicians who play at least *one* instrument that 'Mr. Ravi' plays. [3]

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

(*i*) 1 NF

(*ii*) 2 NF

(*iii*) 3 NF

7. Answer the following :

(*a*) Explain the concept of overflow pages in ISAM. [4]

(*b*) Explain mapping cardinalities with example. [4]

(*c*) Write a note on data abstraction. [3]

(*d*) Construct an E-R for a car insurance company that has a set of customer. Each customer owns one or more cars. Each car is associated with zero or any number of accidents. [3]

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

Seat
No.

[5426]-301

S.Y. B.C.A. (Science) (III Semester) EXAMINATION, 2018

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 the *correct* option :   [7×1=7]

(*a*) A mathematical-model with a collection of operations defined on that model is called :

(*i*) Data Structure

(*ii*) Abstract Data Type

(*iii*) Primitive Data Type

(*iv*) Algorithm

(*b*) The postfix form of the expression (A + B) * (C * D – E)*F / G is :

(*i*) AB + CD * E – FG /**

(*ii*) AB + CD * E – F ** G /

(*iii*) AB + CD * E – * F * G /

(*iv*) AB + CDE * – * F * G /

(*c*) A full binary tree with 2*n* + 1 nodes contain :

   (*i*)   *n* leaf nodes

   (*ii*) *n* non-leaf nodes

   (*iii*) *n* − 1 leaf nodes

   (*iv*) *n* − 1 non-leaf nodes

(*d*) In a circular linked list :

   (*i*)   Components are all linked together in some sequential manner.

   (*ii*) There is no beginning and no end.

   (*iii*) Components are arranged hierarchically.

   (*iv*) Forward and backward traversal within the list is permitted.

(*e*) The maximum degree of any vertex in a simple graph with *n* vertices is :

   (*i*)   *n* − 1

   (*ii*) 2*n* − 1

   (*iii*) *n* + 1

   (*iv*) *n*

(*f*) The quick sort algorithm exploit .... design technique.

   (*i*)   Greedy

   (*ii*) Divide and conquer

   (*iii*) Dynamic programming

   (*iv*) Backtracking

(g) The data structure required to check whether an expression contains balanced parenthesis is :

(i) Stack

(ii) Tree

(iii) Queue

(iv) Array

(B) Answer the following : [7×1=7]

(a) What is Space Complexity ?

(b) What is Polish Notation ?

(c) Define Circular Queue.

(d) List types of Linked List.

(e) What is Self-Referential structure ?

(f) Define Leaf Nodes.

(g) Define Complete Graph.

Group I

2. Attempt the following :

(a) What is Data Structure ? Explain the different operations performed on Data Structure. [5]

(b) Write a C function for the following :

(i) To insert a node at Beginning in the doubly linked list.

(ii) Display the data in backward direction. [5]

(c) Write Binary Search Algorithm to search a given value called val in a list of N numbers called Series. [4]

3.   Attempt the following :

(*a*)   With the output for the following program segment, show content of the stack after every push and pop operation. Make necessary assumptions.   [4]

```
        initStack(S)
        push(S, 10)
        push(S, 6)
        I = pop(S)
        while(I > 0)
        {
            push(S, I* 10);
            I - - ;
        }
    push(S, I * 10);
    while(! StackEmpty(S))
        printf("%d", pop(S));
```

(*b*)   Write an algorithm to count the number of nodes in Binary tree.   [4]

(*c*)   What is Time Complexity ? Compute time complexity for the following algorithm :   [3]

```
        If(x > y)
        {
            x = x + 1;
        }
        Else
        {
            For(I = 1; I <= N; I++)
            {
                x = x + 1;
            }
        }
```

(*d*)   Explain the merits and demerits of static and dynamic memory allocation techniques.   [3]

4.   Attempt the following :

(*a*)   Write a C Function to create and display Circular Linked list.   [4]

(*b*)   What is Graph ? Give various methods of representing graphs.   [4]

(*c*)   What is Expression Tree ? Construct expression tree for the following :   [3]

(A + B) * (C – D)

(*d*)   Sort the following data using Bubble Sort :   [3]

55, 22, 66, 33, 44, 11

Group II

5.   Attempt the following :

(*a*)   Write a C Function to reverse a singly linked List.   [5]

(*b*)   What is BST ? Construct BST for the following data :
MON, SUN, TUE, FRI, SAT, WED, THUS.   [5]

(*c*)   Write a C function for adding and deleting an element from Queue (use Dynamic representation).   [4]

6.   Attempt the following :

(*a*)   Explain different types of Binary tree with suitable example.   [4]

(*b*)   Explain DFS algorithm with a suitable example.   [4]

(*c*)   Show the Stack contents and output while converting the following infix string to postfix :   [3]

A/B$C+D*E-A*C

(*d*)   Explain Big – oh Notation with the help of an example. [3]

7.   Attempt the following :

(*a*)   Write any *four* applications of Stack. Explain.   [4]

(*b*)   Differentiate between Stack and Queue.   [4]

(*c*)   Explain Insertion Sort Algorithm with Time Complexity. [3]

(*d*)   Write an algorithm to search an element from a given singly linked list.   [3]

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

Seat
No.   **[5426]-302**

S.Y. B.C.A. (SCIENCE) (III Sem.) EXAMINATION, 2018
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) A schedule in which transactions are executed one after another is called..............................

(*a*) Linear schedule   (*b*) Serial Schedule

(*c*) Unrecoverable schedule (*d*) None of these

(2) The.........................is an unconditional loop that will execute until an exit statement is met.

(*a*) While loop   (*b*) For loop

(*c*) Basic loop   (*d*) If statement

(3) The........................lists are constructed when the recovery procedure starts.

(*a*) Redo   (*b*) Undo

(*c*) Both (*a*) and (*b*)   (*d*) None of these

(4) The.......................attribute is used to declare a variable to have the same structure as a row in the table.

(*a*) % record type   (*b*) % tuple type

(*c*) % type   (*d*) % row type

P.T.O.

(5)   The...................lock can be held by more than one transaction on an object at the same time.
       (a) Shared   (b) Binary
       (c) Exclusive   (d) All of these

(6)   In the........................protocol, the locks held by a transaction are released only when the transaction commits.
       (a) 2PL   (b) Conservative 2PL
       (c) Rigorous 2PL   (d) Strict 2PL

(7)   The....................client is one which does minimum amount of processing at the client side.
       (a) Fat   (b) Thin
       (c) Slow   (d) Low

(B) Answer the following :   [7×1=7]

(1)   Give the syntax for creating a bounded and unbounded cursor

(2)   What is a complete schedule ?

(3)   State the atomicity properties of a transaction.

(4)   What is a log record ?

(5)   State the Thomas write rule.

(6)   Give any *four* datatypes used in PL/pgsql.

(7)   What is encryption technique used for ?

Group-I

2. Attempt the following :

(1)   Consider the relation :

Employee (eno, ename, designation, salary, dept_no)

Write a stored function with cursor, which accepts dept_no as input and prints the names of all employees working in that department.   [5]

(2) With the help of a state transition diagram, explain the states in which a transaction can be during its execution. [5]

(*3*) Explain conflict serializability with suitable example. [4]

3. Attempt the following :

(1) Explain with examples how triggers can be used to enforce referential integrity. [4]

(2) Consider the following schedule of interleaved execution of transactions. Check if there is a deadlock in the system : [4]

T₁	T₂	T₃
		R(X)
		W(X)
	R(Y)	
R(Z)		
W(Z)		
	W(Y)	
R(X)		
W(X)		
		R(Y)
		W(Y)
	R(Z)	
	W(Z)	

(3) What is a view ? Explain with example how views can be used. [3]

(4)   Explain the Basic Timestamp ordering method for concurrency control.   [3]

4.   Attempt the following :

(1)   What are checkpoints ? How are they useful in crash recovery ?   [4]

(2)   Explain how DBA is responsible for managing database security ? What are the privileged commands used by DBA ?   [4]

(3)   What are the different services provided by server component ?   [3]

(4)   What is the relationship between Recovery manager and Buffer management ?   [3]

Group-II

5.   Attempt the following :

(1)   Consider the following log image, state how the recovery procedure takes place using immediate update algorithm :   [5]

$$< T_1, \text{ start } >$$
$$< \text{write\_item } T_1 \text{ X } 20 >$$
$$< T_2, \text{ start } >$$
$$< \text{write\_item } T_1 \text{ Y } 300 >$$
$$< T_1 \text{ commit } >$$
$$< \text{check point } >$$
$$< T_3, \text{ start } >$$

$$< \text{write\_item } T_2 \text{ A } 500 >$$

$$< \text{write\_item } T_3 \text{ X } 82 >$$

$$< \text{write\_item } T_2 \text{ B } 45 >$$

$$< T_4 \text{ start } >$$

$$< T_2, \text{ commit } >$$

$$< \text{write\_item } T_4 \text{ Y } 50 >$$

X-system crash.

(2) Explain the mandatory access control mechanism in detail. [5]

(3) What are the different types of client-server architectures ? Explain any *one* in detail. [4]

6. Attempt the following :

(1) Explain different types of failures in detail. [4]

(2) What is shadow paging ? State any *two* disadvantages of shadow paging. [4]

(3) Write a note on statistical database security. [3]

(4) What are the different client components in an client-server architecture ? [3]

7. Attempt the following :

(*a*) Explain the two-phase locking protocol and list its varients. [4]

(*b*) What is the Phantom problem associated with dynamic databases ? [4]

(*c*) What are the different levels used with the RAISE statement ? Give syntax of each. [3]

(*d*) What are the different deadlock prevention algorithms ? Explain any *one* in detail. [3]

[5426]-302   5

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.   **[5426]-303**

S.Y. B.C.A. (SCIENCE) (III Sem.) EXAMINATION, 2018
BCA-303 : SOFTWARE ENGINEERING
(2016 PATTERN)

Time : 3 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 all of the following :   [7]

(1)   It is a super system in which any organisation operates :

(*a*)   Environment   (*b*) Boundaries

(*c*)   Interfaces   (*d*) Subsystem

(2)   Which of the following is *not* a McCALL's quality factor under "product operation".

(*a*)   Reliability   (*b*) Usability

(*c*)   Flexibility   (*d*) Efficiency

(3)   ....is a tabular method for describing the logic of the decisions to be taken.

(*a*)   Decision Tables   (*b*) Decision Tree

(*c*)   Decision Method   (*d*) Decision Data

(4)   SRS stands for :

(*a*)   Software Request Specification

(*b*)   Software Requirement Specification

(*c*)   System request specification

(*d*)   System requirement specification

P.T.O.

(5)   A context diagram is used :

(a)   as the first step in developing a detailed DFD of a system

(b)   in system analysis of very complex systems

(c)   as an aid to system design

(d)   as an aid to system developer and system programmer

(6)   Which defines "Are we building the right product".

(a)   Verification   (b) Validation

(c)   Both (a) and (b)   (d) None of these

(7)   DSDM stands for :

(a)   Dynamic System Development Model

(b)   Dynamic Software Deployment Model

(c)   Dynamic System Deployment Model

(d)   Dynamic Software Development Model

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

(1)   Enlist the names of layers of Software Engineering.

(2)   In which phase of spiral model requirements are gathered and risk is assessed

(3)   Physical DFD shows "what is going on". State true/false.

(4)   Define data flow diagram.

(5)   List any *two* techniques used in Black Box techniques.

(6)   Define corrective maintenance.

(7)   List any *two* phases of Adaptive Software Development life cycle.

Group-I

2. Attempt all of the following :

(*a*) Explain McCALL's quality factors of "Product operation" group. [5]

(*b*) Explain Waterfall Model with a neat diagram. [5]

(*c*) Explain any *two* types of feasibility study. [4]

3. Attempt all of the following :

(*a*) Write any *two* advantages and *two* disadvantages of protolyping model. [4]

(*b*) Explain any *two* tasks of requirement engineering. [4]

(*c*) Explain any *two* activities involved in "System Design" phase of SDLC model. [3]

(*d*) Explain any *three* characteristics of a system. [3]

4. Attempt all of the following :

(*a*) Draw context level and level '1' DFD for "Hostel Management System". [4]

(*b*) Differentiate between Alpha Testing and Beta Testing. [4]

(*c*) Write any *two* advantages and disadvantages of DFD. [3]

(*d*) Explain any *three* human factors used for Agile process. [3]

Group-II

5. Attempt all of the following :

(*a*) A co-operative bank XYZ will grant loans under the following conditions : [5]

(1) If a customer has an account with the bank and has no loan outstanding, loan will be granted.

     (2)   If a customer has an account with the bank but some amount outstanding from previous loans, then loan will be granted if special management approval is obtained.

     (3)   Reject loan applications in all other cases.

     Draw decision tree and decision table for the above case study.

(b) State and explain any *five* principles of Agile process. [5]

(c) Explain the PDCA cycle diagrammatically. [4]

6. Attempt all of the following :

(a) Explain any *four* phases of performance testing. [4]

(b) Define and explain any *four* elements of data dictionary. [4]

(c) Define "Reengineering". What are the advantages of Re-engineering. [3]

(d) Differentiate between structured and unstructured interview. [3]

7. Attempt all of the following :

(a) Differentiate between spiral model and prototype model. [4]

(b) With the help of diagram describe Requirement Engineering process. (RE Process) [4]

(c) Define code restructuring and Data restructuring. [3]

(d) Explain any *two* phases of "XP Process" along with a neat diagram. [3]

Total No. of Questions—7]　　　　　[Total No. of Printed Pages—4

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[5426]-304

S.Y. B.C.A. (SCIENCE) (III Sem.) EXAMINATION, 2018
BCA-304 : INTRODUCTION TO COMPUTER NETWORK
(2016 PATTERN)

Time : 3 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]

(*a*) In.........................topology computer are connected in a circular fashion.

(*i*) BUS　　　　　　　(*ii*) Star

(*iii*) Tree　　　　　　(*iv*) Ring

(*b*) As data pockets move from lower to upper layers, headers are :

(*i*) Added　　　　　　(*ii*) Modified

(*iii*) Rearranged　　　(*iv*) Subtracted

(*c*) UTP stands for.................................

(*i*) Universal twisted pair

(*ii*) Universal transmission pair

(*iii*) Unique twisted pair

(*iv*) Unshielded twisted pair

(d) Which type of noise is coused due to spikes ?

    (i) Thermal   (ii) Crosstalk

    (iii) Induced   (iv) Impulse

(e) In....................available bandwidth is divided into frequency bands.

    (i) FDMA   (ii) TDMA

    (iii) CDMA   (iv) CSMA/CA

(f) HAN is.................................

    (i) Hybrid area network   (ii) Home area network

    (iii) Home access network   (iv) House access network

(g) Which topology requires multipoint connection ?

    (i) Mesh   (ii) Star

    (iii) Ring   (iv) Bus

(B) Attempt the following :   [7]

    (i) List the different forms of data representations.

    (ii) What is meant by reference model.

    (iii) Define guided and unguided media.

    (iv) What is digital signal ?

    (v) Define channelization.

    (vi) Define internetworking and routing.

    (vii) List the network layer services.

Group-I

2. Attempt the following :

    (a) State the goals of computer networks.   [5]

    (b) Explain infrared transmission in brief.   [5]

(*c*) Draw graph for NRZ-L, NRZ-I coding for the following data :

(1) 00000000

(2) 11111111

(3) 01010101

(4) 00110011. [4]

3. Attempt the following :

(*a*) Define PURE ALOHA. Explain frames in it with diagram.[4]

(*b*) What is Noise ? Explain with diagram. [4]

(*c*) Define Netid and Hostid. [3]

(*d*) Differentiate between point-to-point network and Broadcast network. [3]

4. Attempt the following :

(*a*) Explain network address translation in brief. [4]

(*b*) Give the function of physical layer. [4]

(*c*) List important criterias for measuring network performance.[3]

(*d*) Explain Encoding and Decoding in detail. [3]

Group-II

5. Attempt the following :

(*a*) Explain Token passing in detail. [5]

(*b*) Explain subnetting and supernetting. [5]

(*c*) Write a short note on Point-to-Point Network. [4]

6. Attempt the following :

(*a*) What are different switching techniques ? Explain any *one* of them in detail. [4]

(*b*)   What is difference between polling and selecting ?   [4]

(*c*)   State the advantage of network layer.   [3]

(*d*)   What is interface and peers.   [3]

7.   Attempt the following :

(*a*)   Write a short note on CSMA/CD.   [4]

(*b*)   A channel with an intended capacity of 20 mbps. The bandwidth of channel is 3 MHz. What signal-to-noise ratio is required in order to achieve this capacity ?   [4]

(*c*)   What is the purpose of cladding in an optical fibre ?   [3]

(*d*)   Write a short note on TCP/IP model.   [3]

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[5426]-401

S.Y. B.C.A. (Science) (Fourth Semester) EXAMINATION, 2018

BCA-401 : C++

(2016 PATTERN)

Time : Three Hours　　　　　　　　　Maximum Marks : 70

N.B. :— (*i*)　Q. 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.

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

　　　　(*i*)　In object oriented programming focus is on ....

　　　　　　(*a*)　Data

　　　　　　(*b*)　Procedure

　　　　　　(*c*)　Functions

　　　　　　(*d*)　Inheritance

　　　　(*ii*)　The insulation of data from direct access by unauthorized

　　　　　　functions is called ....

　　　　　　(*a*)　inheritance

　　　　　　(*b*)　data hiding

　　　　　　(*c*)　polymorphism

　　　　　　(*d*)　message passing

(*iii*) .... allows a portion of memory to be shared by different variables.

(*a*) structure

(*b*) class

(*c*) unions

(*d*) none of the above

(*iv*) A .... function is a non-member function of a class but can access private data members.

(*a*) inline

(*b*) static

(*c*) private

(*d*) friend

(*v*) Whenever an object is destroyed .... function is called ....

(*a*) destructor

(*b*) constructor

(*c*) copy constructor

(*d*) default constructor

(*vi*) What is the multiple inheritance ?

(*a*) when parent class has two or more child classes

(*b*) when base class has two or more derived classes

(*c*) when a child class has two or more parent class

(*d*) where two classes inherit from each other

(*vii*) .... header file is used for manipulators.

(*a*) <iomanipulator.h>

(*b*) <manip.h>

(*c*) <stdmanip.h>

(*d*) <iomanip.h>

(B) Attempt the following :   [7×1=7]

  (*i*) State the advantage of encapsulation.

  (*ii*) List any *four* applications of OOP.

  (*iii*) What is the use of : : operator ?

  (*iv*) Default constructor is always called without any arguments. State true or false.

  (*v*) How many explicit arguments are required, if binary operator is overloaded using friend function ?

  (*vi*) Give any *two* ways to check the success or failure of a file open operation.

  (*vii*) Give the syntax for defining member function template.

Group I

2. Attempt the following :

(A) Illustrate array of objects with examples. [5]

(B) Define constructor. Explain any *two* types of constructor. [5]

(C) Give the general format of class and state the significance of private, public and protected access specifier. [4]

3. Attempt the following :

(A) What is friend function ? Explain with the help of an example. [4]

(B) What is copy constructor ? Explain with the help of an example. [4]

(C) Trace the output of the following code (Assume there are no syntax errors) :   [3]

```
Class A
{
    public :
    A( )
    {
    count <<"\n object created";
    }
    ~ A( )
    {
        cout <<"\n object destroyed";
    }
};
A a₁;
main( )
{
    Aa₂;
        {
        Aa₃;
        }
        exit(0);
}
```

(D) What is operator overloading ? Write the rules for operator overloading.   [3]

4. Attempt the following :
(A) Explain hybrid inheritance with the help of an example. [4]
(B) What is function template ? Explain overloading of template function. Give example of any *one* type of overloading. [4]

(C) Give difference between virtual and pure virtual functions. [3]

(D) Identify the error in the following code segment and justify : [3]

Class Demo

{

    int x;

    int y;

    public :

    Demo(int i, int j) : y(i), x(y*j)

    {

    }

}

Group II

5. Attempt the following :

(A) What is an inheritance ? What ambiguity can arise in multiple inheritance ? How is it solved ? Give example. [5]

(B) Write a C++ program to change the case of every alphabet in a given text file. [5]

(C) Explain the use of the following : [4]

    (*i*) Try block

    (*ii*) Throw statement

    (*iii*) Catch block.

6. Attempt the following :

(A) What is the purpose of virtual function ? State the rules for virtual function. [4]

(B) Explain the following functions with an example : [4]

    (*i*) tellg( )

    (*ii*) tellp( )

(C) How to handle an exception in C++ ? [3]

(D) List the features of generic function. [3]

7. Attempt the following :

(A) What is function overloading ? Explain with the help of an example. [4]

(B) What is the purpose of reference variable ? Explain with the help of a suitable example. [4]

(C) Write the syntax for overloading insertion and extraction operator. [3]

(D) Illustrate use of 'this' pointer with the help of an example. [3]

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[5426]-402

S.Y. B.C.A. (SCIENCE) (IV Sem.) EXAMINATION, 2018
BCA-402 : INTRODUCTION TO WEB TECHNOLOGY
(2016 PATTERN)

Time : 3 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]

　　　(*i*)　URL stands for :

　　　　　　(*a*)　Universal Reference Locator

　　　　　　(*b*)　Universal Resource Locator

　　　　　　(*c*)　Uniform Resource Locator

　　　　　　(*d*)　Unique Resource Locator

　　　(*ii*)　Which of the tag represents a piece of content that is only slightly related to the rest of page in HTML5.

　　　　　　(*a*)　Section　　　　　　(*b*) Article

　　　　　　(*c*)　Aside　　　　　　(*d*) Header

　　　(*iii*)　CSS stands for :

　　　　　　(*a*)　Cascading Style Sheets

　　　　　　(*b*)　Collecting Style Sheets

　　　　　　(*c*)　Comparative Style Sheets

　　　　　　(*d*)　Comprehensive Style Sheets.

(iv) State the *correct* place of JavaScript code in HTML :

(a) Inside body   (b) Inside head

(c) Both (a) and (b)   (d) None of these

(v) What is the *correct* Javascript syntax to write "Welcome" ?

(a) System.out.println ("Welcome")

(b) Println ("Welcome")

(c) Document.write ("Welcome")

(d) Response.write ("Welcome")

(vi) Which function can be used to insert or remove the elements in an array ?

(a) Array_slice   (b) Array_splice

(c) Extract   (d) Array_chunk

(vii) Find the output :

```
<? php
    $b=5;
    function foo($a)
    {
        echo "$a $b";
    }
    foo(10);
}>
```

(a) 5 10   (b) 5 5

(c) Error   (d) 5

(B) Answer the following :   [7×1=7]

(i) Define Dynamic Website.

(ii) Enlist basic HTML tags.

(*iii*) What are the types of CSS ?

(*iv*) Enlist various operators in Javascript.

(*v*) What are the data types used in Javascript ?

(*vi*) State the types of arrays in php.

(*vii*) Define func-num-args( ) function.

Group-I

2. Attempt the following :

(*a*) Define Internet. What are the advantages of Internet. [5]

(*b*) Explain Image mapping and its types with example. [5]

(*c*) Write a Javascript program to check given number is perfect or not. [4]

3. Attempt the following :

(*a*) Differentiate between static web sites and dynamic web sites.[4]

(*b*) Explain any *two* HTML form elements. [4]

(*c*) Explain any *three* Dom object. [3]

(*d*) Write a php script to find area of circle. [3]

4. Attempt the following :

(*a*) Explain any *four* string related functions with example. [4]

(*b*) What is the difference between index and associative array.[4]

(*c*) State and explain built-in functions defined in the Javascript.[3]

(*d*) Write HTML code to create the following frame : [3]

Frame 1	Frame 2
Frame 3	Frame 4
Frame Creation	

Group-II

5. Attempt the following :

   (a) Explain advantages of Javascript.   [5]

   (b) Explain any *five* functions to sort an array in PHP.   [5]

   (c) Write a php function to display the factorial of given number.   [4]

6. Attempt the following :

   (a) Explain any *four* array methods used in Javascript.   [4]

   (b) How does FTP differ from HTTP ?   [4]

   (c) Write a HTML code to design the following table :   [3]

Student Details		
Sno	Sname	Class
101	Rupali	TYBCA

   (d) Write a PHP Script to display the elements along with key for an associate array.   [3]

7. Attempt the following :

   (a) Explain any *two* control statements with syntax and example in PHP.   [4]

   (b) Explain any *two* functions to retrieve the parameters passed to it in PHP. Explain with example.   [4]

   (c) Explain the advantages of CSS.   [3]

   (d) Write a Javascript program using the following string functions :

       (i)   to UpperCase( )

       (ii) to LowerCase( )

       (iii) Concat( )   [3]

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Total No. of Questions—**7**] [Total No. of Printed Pages—**4**

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[5426]-403

S.Y. B.C.A. (SCIENCE) (IV Sem.) EXAMINATION, 2018
BCA-403 : ADVANCED NETWORKING AND NETWORK SECURITY
(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.

1. (*a*) Choose the approprite options : [7×1=7]

(*i*) ....uses UDP as transport protocol.

(*a*) HTTP (*b*) Telnet

(*c*) DNS (*d*) SMTP

(*ii*) ....service ensures that message was received by receiver from actual sender and not from an attacker.

(*a*) Confidentiality (*b*) Access control

(*c*) Non-repudiation (*d*) authentication

(*iii*) DES (Data Encryption Standard) encrypts blocks of...................... bits.

(*a*) 32 (*b*) 64

(*c*) 56 (*d*) 128

(*iv*) To decrypt message that is encrypted using RSA, we need...................................

(*a*) Sender's Public key (*b*) Receiver's public key

(*c*) Receiver's private key (*d*) Sender's private key

(v) SSL (Secure Socket Layer) encrypts...........................layer data.

    (a) Network   (b) Transport

    (c) Application   (d) Data-link

(vi) IPsec defines two protocols...............and...................

    (a) AH & SSL   (b) PGP & ESP

    (c) AH & ESP   (d) SSL & PGP

(vii) MD5 and SHA-1 are.....................................

    (a) Symmetric encryption algorithm

    (b) Asymmetric encryption algorithm

    (c) Hashing algorithm

    (d) Digital Certificates.

(B) Answer the following :   [7]

    (i) What is socket address ?

    (ii) What are different types of firewalls ?

    (iii) What is role of TSA ?

    (iv) Define Digital Signature.

    (v) What is Denial of Service (DoS) ?

    (vi) What is stream cipher ?

    (vii) List different modes in which IPsec protocol works.

Group-I

2. Answer the follwoing :

(a) Explain TCP (Transmission Control Protocol) segment format. [5]

(b) What is computer security ? Explain key principles of security. [5]

(c) Explain the steps in Diffie-Hellman (DH) algorithm.   [4]

3. Answer the following :

(a) By using playfair technique, convert the following plain text into cipher text :

Plain Text : YELLOW CHILLIES

Keyword : RESTAURANT. [4]

(b) Explain how UDP (User datagram protocol) provides data integrity through checksum. [4]

(c) What is basic principle of DES (Data Encryption Standard) ? [3]

(d) Explain the concept of confusion and diffusion in brief. [3]

4. Answer the following :

(a) Differentiate between symmetric key cryptography and asymmetric key cryptography. [4]

(b) Explain the structure of digital certificate. [4]

(c) What are the features of Virtual Private Network (VPN) ? [3]

(d) What is the purpose of honeypots in network security. [3]

Group-II

5. Answer the following :

(a) Explain the model of digital signature using public key cryptography. [5]

(b) What is SSL (Secure socket layer) ? Explain working of SSL.[5]

(c) What are advantages and disadvantages of firewalls ? [4]

6. Answer the following :

(a) Given p = 7, q = 19, generate public and private keys using RSA algorithm. [4]

(*b*)   What are features of S-HTTP (Secure Hypertext Transfer
        Protocol) ?   [4]

(*c*)   What are types of biometric authentication technology ? [3]

(*d*)   What is intrusion ? Give *two* examples of intrusion.   [3]

7. Answer the following :

(*a*)   Explain the various services of TCP (Transmission Control
        Protocol).   [4]

(*b*)   Explain encryption and decryption technique diagrammatically.[4]

(*c*)   Define the following terms :

        (*i*)   Interruption

        (*ii*)   Interception

        (*iii*) Fabrication.   [3]

(*d*)   Write a short note on Electronic Code Book (ECB).   [3]

S.Y. B.C.A. (SCIENCE) (IV Sem.) EXAMINATION, 2018

BCA-404 : OOSE

(2016 PATTERN)

Time : 3 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.

1.   (*a*) Choose the approprite options :   [7×1=7]

(*i*) A collection of similar types of objects is considered as :

(*a*) Class   (*b*) Inheritance

(*c*) Object   (*d*) Constructor

(*ii*) UML building blocks are.............................

(*a*) Things   (*b*) Relationships

(*c*) Diagrams   (*d*) All these

(*iii*) An instance of association is called as a......................

(*a*) Visibility   (*b*) Link

(*c*) Connection   (*d*) Multiplicity

(*iv*) An object is an..........................of a class.

(*a*) Attribute   (*b*) Instance

(*c*) Operation   (*d*) Data

(v) A process is a....................that can execute concurrently with other processes

    (a) Light-weight flow   (b) Heavy-weight flow

    (c) Both (a) and (b)   (d) None of these

(vi) State chart diagram is simply presentation of a state...............................

    (a) Machine   (b) Activity

    (c) Melay   (d) None of these

(vii) A component is an executable......................... of an object.

    (a) Instance   (b) Class

    (c) Operations   (d) None of these

(B) Answer in *one* sentence :   [7×1=7]

(i) Define : Association.

(ii) Define the object "Student" with possible attributes and operations with visibility.

(iii) What is advanced class ?

(iv) What is meant by interface ?

(v) Define signal.

(vi) Define fork and joining.

(vii) What is deployment ?

Group-I

2. Answer the following questions :

(a) What do you mean by Relationships ? Explain *two* different kinds of relationships.   [5]

(b) Which symbols are used in object diagram ? Show with example.[5]

(c) Write a short note on class and object.   [4]

3. Answer the following questions :

(*a*) Describe principles of modeling. [4]

(*b*) Prepare object diagram for Internet Banking. [4]

(*c*) Explain roles and types with suitable example. [3]

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

    (*i*) System

    (*ii*) Class

    (*iii*) Software Engineering.

4. Answer the following questions :

(*a*) Discuss the component of use case diagrams. [4]

(*b*) Draw state chart diagram for college Administration system. [4]

(*c*) Explain behavioral aspects of Collaboration. [3]

(*d*) Consider a "Fixed Deposit" system, which allows customer to perform various transactions. Discuss different scenarios and draw a sequence diagram. [3]

Group-II

5. Answer the following questions :

(*a*) Describe time and space with an example. [5]

(*b*) Draw collaboration diagram for ATM system. [5]

(*c*) What is use case diagram ? Explain it with example. [4]

6. Answer the following questions :

(*a*) Draw component diagram for online shopping. [4]

(*b*) Explain with example of notations used in activity diagram. [4]

(*c*) Draw use case diagram for online Airline reservation system. [3]

(*d*) Draw sequence diagram for a Hospital Management system. [3]

7. Answer the following questions :

(*a*) Explain purpose of class and object diagrams. [4]

(*b*) Explain state machine in detail. [4]

(*c*) Describe Advanced classes with an example. [3]

(*d*) Draw activity and state chart diagram for vending machine.[3]

Total No. of Questions—**7**] [Total No. of Printed Pages—**3**

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No.

[5426]-405

S.Y. B.C.A. (SCIENCE) (IV Sem.) EXAMINATION, 2018

BCA-407 : GRID AND CLOUD COMPUTING

(2016 PATTERN)

Time : Two Hours Maximum Marks : 50

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.

1. (A) Choose the appropriate options : [5]

(*i*) The OGSA stands for......................................

(*a*) Open Grid Services Architecture

(*b*) Open Grid Sector Architecture

(*c*) Open Growth Services Architecture

(*d*) Open Grid Secure Architecture

(*ii*) A CPU-intensive...................application can be thought of as many smaller subjobs each executing on a different machine in the grid.

(*a*) Cluster (*b*) Cloud

(*c*) Grid (*d*) Server

(*iii*) E-mail service on cloud is an example of............................

(*a*) SaaS (*b*) PaaS

(*c*) IaaS (*d*) None of these

(*iv*) The....................network resources can be load balanced.

(*a*) Mobile (*b*) Storage

(*c*) PDA (*d*) None of these

(v) Amazon web services is an example of...........................

    (a) SaaS   (b) PaaS

    (c) IaaS   (d) None of these

(B) Answer the following :   [5]

    (i) What is grid computing ?

    (ii) What is the purpose of virtual organization ?

    (iii) Give examples of public cloud.

    (iv) Define hypervisor.

    (v) What is cluster computing ?

Group-I

2. Answer the following :

(a) What are characteristics of grid computing ?   [4]

(b) Explain NIST model of cloud computing.   [4]

(c) What is purpose of ADC (Application Delivery Controller) in load balancing ?   [2]

3. Answer the following :

(a) How resource balancing is possible using grid ?   [4]

(b) Differentiate between private and public cloud.   [4]

(c) What is Hardware virtualization ? List its types.   [2]

4. Answer the following :

(a) Compare peer to peer computing and grid computing.   [4]

(b) What are the advantages of virtualization ?   [4]

(c) What is community cloud ?   [2]

Group-II

5. Answer the following :

    (*a*)   Explain services model of cloud computing.   [4]

    (*b*)   How is grid beneficial to use underutilized resources ? [4]

    (*c*)   List any *two* benefits of cloud computing.   [2]

6. Answer the following :

    (*a*)   Explain the working of load balancing system.   [4]

    (*b*)   Write a note on reliability using grid computing.   [4]

    (*c*)   Cloud computing requires continuous internet connection. Justify.   [2]

7. Answer the following :

    (*a*)   Explain different types of grids in brief.   [4]

    (*b*)   What are essential features of cloud computing ?   [4]

    (*c*)   What is purpose of fabric layer in grid computing architecture ?   [2]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.

[5426]-501

T.Y. B.C.A. (SCIENCE) (V Sem.) EXAMINATION, 2018
BCA-501 : JAVA PROGRAMMING
(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.

1.   (*a*)   Choose the correct option.   [7]

(*a*)   Which of these classes is used to create user defined
exception ?

(*i*)   Object   (*ii*) Exception

(*iii*) Java.util   (*iv*) Runtime

(*b*)   Which of these interface must contain a unique element ?

(*i*)   Set   (*ii*) Collection

(*iii*) Array   (*iv*) List

(*c*)   Which is *not* valid keyword in Java ?

(*i*)   Final   (*ii*) Native

(*iii*) Double   (*iv*) This

(*d*)   Which of these methods of class string is used to find
first occurrence of character or substring ?

(*i*)   charAt()   (*ii*) indexOf()

(*iii*) substring()   (*iv*) split()

(e) Which type of statement is used to execute a call to a database store procedure ?

    (*i*)   Prepared Statement   (*ii*) Statement

    (*iii*) Callable Statement   (*iv*) All kinds of Statements

(f) Which is *not* a directive ?

    (*i*)   page   (*ii*) include

    (*iii*) expressions   (*iv*) taglib

(g) Which java tool creates HTML help files from source code ?

    (*i*)   java   (*ii*) javadoc

    (*iii*) javah   (*iv*) javap

(B) Answer the following :   [7]

(a) What is a use of super keyword ?

(b) "Import statement is not essential in Java." Justify True/ False.

(c) State any *two* differences between exception and error.

(d) Write any *two* constructors of JCheckBox class.

(e) Which class is super class of all classes in Java ?

(f) What is scriptlet in JSP ?

(g) Name the classes which implement the set interface.

Group-I

2. Attempt the following :

(a) What is a servlet ? Explain the lifecycle of servlet in detail.[5]

(b) Create a student table with fields (roll number, name, percentage). Write a jdbc program for the following :

    (*i*)   Insert student details.

    (*ii*) Display all details of student table.   [5]

(*c*) Create a class Employee with data member as name and salary. Accept the information of 5 employees and display it (use array of objects). [4]

3. Attempt the following :

(*a*) What is applet ? Explain the mandatory attributes of the APPLET tag with suitable example. [4]

(*b*) Write a java program to create Hashtable containing city names and pincode. Display the details of Hashtable using Enumeration. [4]

(*c*) Write a difference between abstract class and interface. [3]

(*d*) Explain the use of try, catch and finally block. [3]

4. Attempt the following :

(*a*) Explain any *four* methods of string class with proper syntax.[4]

(*b*) Write a java program to accept two file names as command line agruments, copy the content of first file to second in reverse order. [4]

(*c*) Write a difference between ArrayList and LinkedList. [3]

(*d*) Write a java program to accept 'n' strings from user. Store it into vector. Display the first and last element of a vector. [3]

Group-II

5. Attempt the following :

(*a*) State the purpose of implicit objects. Explain any *four* implicit objects. [5]

(*b*) What is inheritance ? Explain any *two* types of inheritance with suitable example. [5]

(*c*)   Design an applet that has two textfields to accept two numbers and a button labeled as SUM. When that button is clicked, display the sum of that two numbers.   [4]

6.   Attempt the following :

(*a*)   What is ResultSet ? Explain the types of ResultSet with proper syntax.   [4]

(*b*)   Write a servlet program which counts how many times a user has visited a web page (use session).   [4]

(*c*)   How to create and access a package in Java ?   [3]

(*d*)   Explain any *three* features of Java.   [3]

7.   Attempt the following :

(*a*)   What is a nested class ? Explain static nested class and non-static nested class with suitable example.   [4]

(*b*)   Write a java program to create abstract class shape with methods calculate-area and display-area.
Derive two classes Cricle (radius), Rectangle (Length, width) from it. Calculate area and display the area of all classes.   [4]

(*c*)   Write a java program to accept a string from the user. Check whether given string is palindrome or not.   [3]

(*d*)   Explain the various ways used to accept input from console in Java with proper syntax and example.   [3]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.

                                                                    [5426]-502

T.Y. B.C.A. (SCIENCE) (V Sem.) EXAMINATION, 2018

BCA-502 : ADVANCED WEB TECHNOLOGY

(2016 PATTERN)

Time : 3 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)   Any information related to environment is stored in
                 .... array.

                 (*a*) $_ENV [ ]   (*b*) $_COOKIE [ ]

                 (*c*) $_SESSION   (*d*) $_GET

          (2)   .... function is used to getting the last access time
                 of file.

                 (*a*)   Fileatime   (*b*) Filectime

                 (*c*)   Filemtime   (*d*) Fileptime

          (3)   Ability of program to examine object characteristics such
                 as its properties, method known as ....

                 (*a*)   Introspection   (*b*) Interpolation

                 (*c*)   Inheritance   (*d*) All of these

                                                                    P.T.O.

(4)　XML stands for ....

(a)　Extensible markup language

(b)　Extended markup language

(c)　Both (a) and (b)

(d)　None of the above

(5)　................. function is used to start the session.

(a)　Sessionstart( )　　　　(b) Session_start( )

(c)　Session_register　　　(d) All of these

(6)　Ajax stands for ....

(a)　asynchronous java & XML

(b)　asynchronous javascript & XML

(c)　asynchronous jsp & XML

(d)　synchronous java & XML

(7)　................. function is used to delete the file.

(a)　Unlink　　　　　　　(b) Delete

(c)　Delete file　　　　　(d) All of these

(B)　Attempt the following :　　　　　　　　　　　　　　[7]

(1)　What is WSDL ?

(2)　State the use of $ this keyword.

(3)　Define sticky form.

(4)　What is the purpose of rewind( ) function ?

(5)　Give any *two* names of XML parser.

(6)　Cookie data stored on server. True or False. Justify.

(7)　Write syntax of Pg_connect( ) function.

Group-I

2. Attempt the following :

(*a*) Discuss the concept of constructor and destructor in PHP. [5]

(*b*) Write any *five* differences between XML and HTML. [5]

(*c*) Write a PHP script to accept directory name and print the contents of that directory. [4]

3. Attempt the following :

(*a*) Discuss any *four* file manipulation function with example. [4]

(*b*) Write a note on PEAR DB basics. [4]

(*c*) What is SSL ? Explain its use. [3]

(*d*) Write a PHP script to keep track number of times web page has been accessed using session. [3]

4. Attempt the following :

(*a*) Write a PHP script to create class shape and its sub-class triangle, square, circle and display the area of the selected shape. Use the concept of inheritance. [4]

(*b*) Explain the working of Ajax in detail. [4]

(*c*) Write any *four* advantages of web services. [3]

(*d*) Explain soap protocol. [3]

Group-II

5. Attempt the following :

(*a*) Consider the following entities and their relationship :

Student (studid, name, class)

Competition (cno, cname, type)

Relation between student and competition is many to many with extra attribute rank and year. Write a PHP script to accept competition name from user and print the student name who secure first rank in that competition.   [5]

(*b*) State the difference between GET and POST method.   [5]

(*c*) Explain the XML document structure in detail.   [4]

6. Attempt the following :

(*a*) Write an Ajax program to display the list of games stored in an array on click ok button.   [4]

(*b*) Write a PHP script to accept two strings and check if strings are equal or not using sticky forms.   [4]

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

(*d*) List any *four* applications of Ajax.   [3]

7. Attempt the following :

(*a*) What is inheritance ? Explain with an example.   [4]

(*b*) Write any *four* file handling functions with its use.   [4]

(*c*) What is cookies ? Discuss its advantages and disadvantages. [3]

(*d*) Write a short note on DOM document in XML.   [3]

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

Seat
No.   **[5426]-503**

T.Y. B.C.A. (Science) (Semester V) EXAMINATION, 2018

BCA-503 : SOFTWARE QUALITY ASSURANCE

(2016 PATTERN)

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

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

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

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

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

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

(*a*) .... refers to a behavioural derivation from the user requirement or the product specification.

(*i*)   error   (*ii*)   failure

(*iii*) fault   (*iv*) Software

(*b*) SQA product revision quality factors include ....

(*i*)   flexibility

(*ii*)   maintainability

(*iii*) testability

(*iv*) All of the above mentioned.

(*c*) BRS stands for ....
  (*i*) Business Registered Software
  (*ii*) Business Requirement Specifications
  (*iii*) Business Requirement Software
  (*iv*) Business Requirement System

(*d*) .... SDLC model is a combination of iterative and incremental process models with focus on process adapt-ability and customer satisfaction by rapid delivery of working software product.
  (*i*) Agile   (*ii*) Iterative
  (*iii*) Spiral   (*iv*) All of these

(*e*) .... audit should be performed prior to release of a product baseline or a revision of an existing baseline.
  (*i*) Physical configuration audit
  (*ii*) Functional configuration audit
  (*iii*) PCA
  (*iv*) None of the above

(*f*) .... metrics is used to indicate the size of a program.
  (*i*) The number of programmers
  (*ii*) Reliability
  (*iii*) Function point
  (*iv*) The number of paths

(*g*) .... standard is used for software verification and validation (V & V).
  (*i*) ISO 9000-3
  (*ii*) IEEE std 1012-1998
  (*iii*) IEEE/IEA 12207
  (*iv*) None of the above

(B) Answer in short : [7×1=7]

   (a) Enlist any *two* causes of software errors.

   (b) Define software quality.

   (c) What is software faults ?

   (d) What is CASE tool ?

   (e) Enlist any *four* elements of software quality plan.

   (f) What is Quality Control ?

   (g) What is Function Points ?

Group I

2. Attempt the following :

   (a) What is software quality assurance ? Explain the elements of development plan. [5]

   (b) Describe SQA architecture with diagram. [5]

   (c) Explain the different aspects of verification, validation and qualification for quality assurance activities. [4]

3. Attempt the following :

   (a) What is Project ? Explain software project life cycle components. [4]

   (b) Explain advantages and disadvantages of prototyping model. [4]

   (c) Explain the objectives of software quality assurance activities. [3]

   (d) Explain product transition software quality factors with examples. [3]

4. Attempt the following :

(*a*) Explain product operation software quality factors with diagram. [4]

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

(*c*) Explain management SQA components with examples. [3]

(*d*) Distinguish between software errors and software failures. [3]

Group II

5. Attempt the following :

(*a*) State and explain the objectives and uses of software quality metrices. Also state the features of good software quality metrics. [5]

(*b*) Explain the levels of CMM model with diagram. [5]

(*c*) Write a note on guiding principles of ISO 9000-3 quality management system. [4]

6. Attempt the following :

(*a*) Define the following terms :

(*i*) Product metrices

(*ii*) Adaptive maintenance

(*iii*) Process metrics

(*iv*) Corrective maintenance [4]

(*b*) List the main managerial tools for controlling software maintenance quality and explain its importance. [4]

(*c*) Explain the difference between classic and real CASE tools with examples. [3]

(*d*) Explain the difference between procedures and work instructions. [3]

7. Attempt the following :

(*a*) Explain the elements of quality plan and software risk items. [4]

(*b*) Describe the model of SQA defect removal effectiveness and cost. [4]

(*c*) Explain the contribution of templates to software quality assurance. [3]

(*d*) Explain the contribution of CASE tools to the quality of software maintenance. [3]

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

Seat
No.

[5426]-504

T.Y. B.C.A. (SCIENCE) (V Sem.) EXAMINATION, 2018
BCA-504 : OPERATING SYSTEMS
(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.

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

(*a*) In...........................more than one processes are executed simultaneously.

(*i*) Multiprogramming   (*ii*) Time-sharing

(*iii*) Multiprocessing   (*iv*) Real-time

(*b*) ....is a system program, which is an interface between user and operating system.

(*i*) System call   (*ii*) Command Interpreter

(*iii*) Status information   (*iv*) Error detection

(*c*) ....scheduler loads the job from secondary storage to memory.

(*i*) Long-term   (*ii*) Short-term

(*iii*) Mid-term   (*iv*) All of these

(*d*) The time required to submit the process to CPU and finish it, is called..........................

(*i*) Waiting time   (*ii*) Throughput

(*iii*) Response time   (*iv*) Turn around time

P.T.O.

(e)   ....is not a necessary condition in deadlock.

    (i)   Safe state   (ii) Mutual exclusion

    (iii) Hold and wait   (iv) Circular wait

(f)   The edge from process to resource in resource-allocation graph is called as..............................

    (i)   Claim edge   (ii) Allocation edge

    (iii) Request edge   (iv) None of these

(g)   ....is not a file access method.

    (i)   Sequential access   (ii) Random access

    (iii) Direct access   (iv) Indexed access

(B) Answer the following :   [7]

(a)   What are the objectives of operating system ?

(b)   What is a system call ?

(c)   List the different types of process states.

(d)   What is a dispatcher ?

(e)   What is rollback ?

(f)   What is compaction ?

(g)   Write any *four* file operations.

Group-I

2. Attempt the following :

(a)   List different types of scheduler. Explain any *two* types in detail.   [5]

(*b*) Consider the following set of processes with CPU burst time given in milliseconds : [5]

Process	Burst time	Arrival time
P1	5	1
P2	3	0
P3	2	2
P4	4	3
P5	8	2

Illustrate the execution of these processes using preemptive SJF. Calculate average turn around time and average waiting time.

(*c*) Explain deadlock recovery in detail. [4]

3. Attempt the following :

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

(*b*) Consider the following page reference string : [4]

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

How many page faults will occur for LRU algorithm ? Assume that number of frames is 3.

(*c*) State and explain different types of threads. [3]

(*d*) List advantages and disadvantages of indexed allocation. [3]

4. Attempt the following :

(*a*) State and explain the attributes of a file. [4]

(*b*) Write a short note on Direct Memory Access. [4]

(*c*) Differentiate between external and internal fragmentation. [3]

(*d*) Explain producer-consumer problem in detail. [3]

Group-II

5. Attempt the following :

(*a*) Consider the given snapshot of the system, that has five processes and four resources : [5]

Allocation

	A	B	C	D
P 1	0	6	3	2
P 2	0	0	1	2
P 3	1	0	0	0
P 4	1	3	5	4
P 5	0	0	1	4

Max

	A	B	C	D
P 1	0	6	5	2
P 2	0	0	1	2
P 3	0	7	5	0
P 4	2	3	5	6
P 5	0	6	5	6

Available

A	B	C	D
1	5	2	0

Answer the following questions using Banker's algorithm :
(1)   What is the contents of need matrix ?
(2)   Is the system in safe state ? If yes, give the safe sequence.

(*b*) Consider the following segment table : [5]

Segment	Base	Length
0	363	500
1	1272	20
2	1675	1500
3	986	240
4	211	130

What are the physical addresses for the following logical addresses :

Segment No.	Offset
0	425
2	500
1	150
3	285
4	125

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

   (*i*)   Throughput

   (*ii*) Response time

   (*iii*) Page fault

   (*iv*) Waiting time.

6. Answer the following :

(*a*) Write a short note on Process Control Block.   [4]

(*b*) Differentiate between deadlock and starvation.   [4]

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

(*d*) Explain overlays.   [3]

7. Answer the following :

(*a*) Suppose the disk drive has 200 cylinders, numbered from 0 to 199. The current head position is 53, the queue of pending requests is : 98, 183, 37, 122, 14, 124, 65, 67. Calculate the total distance that the disk arm moves to satisfy all the pending requests for disk scheduling algorithm SCAN. Assume that the disk arm is moving towards 0.   [4]

(*b*) State spooling with its advantages and disadvantages.   [4]

(*c*) Explain time sharing system.   [3]

(*d*) Write a short note on swapping.   [3]

Total No. of Questions—7]   [Total No. of Printed Pages—4

Seat
No.   **[5426]-505**

T.Y. B.C.A. (SCIENCE) (V Sem.) EXAMINATION, 2018

B.C.A.-507 : SOFT COMPUTING

(2016 PATTERN)

Time : Two Hours   **Maximum Marks : 50**

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

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

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

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

1. (A) Answer the following :   [5]

(*i*) Evolutionary computation is an umberella term that includes........................

(*a*) Genetic algorithms   (*b*) Evolution strategies

(*c*) Genetic programming   (*d*) All of these

(*ii*) An....................neuron is a model of a biological neuron.

(*a*) Genetic   (*b*) Artificial

(*c*) Both (*a*) and (*b*)   (*d*) None of these

(*iii*) If A is a convex single point normal fuzzy set defined on real line, then A is...........................number.

(*a*) Neuron   (*b*) Genetic

(*c*) Fuzzy   (*d*) None of these

(iv) ....the following neural network uses supervised learning.
   (a) Multilayer-perception
   (b) Self-organizing feature map
   (c) Hopfield networks
   (d) None of the above

(v) ....of the following can be used for clustering of data.
   (a) Single layer perception (b) Multilayer perception
   (c) Self-organizing map (d) Radial basic function

(B) Answer the following : [5]
   (i) List the components of soft computing.
   (ii) What do you mean by universal set ?
   (iii) Define chromosome.
   (iv) What is learning ?
   (v) Define height of a fuzzy set.

Group-I

2. Answer the following :
   (a) Write a short note on fuzzy relation. [4]
   (b) Define activation function. Explain linear activation function.[4]
   (c) State any *two* advantages of fuzzy logic system. [2]

3. Answer the following :
   (a) Using genetic algorithm maximize $f(x) = x^2$ over {0, 1, 2, ..., 31} with initial X values of (13, 24, 8, 19). Show one cross over and one mutation operation. Use Roulette wheel selection method to select individual that will participate in the crossover. [4]

(*b*)   Explain perception training algorithm.   [4]

(*c*)   What is core of a membership function ?   [2]

4.   Answer the following :

(*a*)   State the characteristics of neural networks.   [4]

(*b*)   Differentiate between feed-forward neural network and recurrent neural network.   [4]

(*c*)   What is optimization ? Give its classification   [2]

Group-II

5.   Answer the following :

(*a*)   Write a short note on unsupervised learning.   [4]

(*b*)   Consider two given fuzzy sets :   [4]

$$\underset{\sim}{A} = \left\{\frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8}\right\}$$

$$\underset{\sim}{B} = \left\{\frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8}\right\}$$

Find :

(*i*) $\underset{\sim}{A} \cup \underset{\sim}{B}$

(*ii*) $\underset{\sim}{B} \mid \underset{\sim}{A}$

(*c*)   What is fitness function ?   [2]

6.   Answer the following :

(*a*)   State the algorithm for general form of Genetic Algorithm. [4]

(*b*)   Consider the following fuzzy set :

$$\underset{\sim}{W} = \left\{\frac{1}{0} + \frac{0.9}{50} + \frac{0.3}{100} + \frac{0}{150} + \frac{0}{200}\right\}$$

Define on universe X = [0, 50, 100, 150, 200] and fuzzy set

$$\underset{\sim}{S} = \left\{ \frac{0}{0} + \frac{0}{50} + \frac{0.5}{100} + \frac{0.9}{150} + \frac{1}{200} \right\}$$

Determine the implication relation

"if W then not S". [4]

(c) What are the types of sigmoidal functions ? [2]

7. Answer the following :

(a) Explain the architecture of back propagation network. [4]

(b) Consider the following fuzzy set :

$$\underset{\sim}{A} = \left\{ \frac{0.15}{Winter} + \frac{0.33}{Spring} + \frac{0.52}{Summer} + \frac{0.25}{Fall} \right\}$$

$$\underset{\sim}{B} = \left\{ \frac{0.1}{Winter} + \frac{0.55}{Spring} + \frac{0.9}{Summer} + \frac{0.2}{Fall} \right\}$$

Find :

(i) Union and intersection of the fuzzy sets $\underset{\sim}{A}$ and $\underset{\sim}{B}$.

(ii) Complement of $\underset{\sim}{A}$ and $\underset{\sim}{B}$. [4]

(c) What is hexadecimal encoding ? [2]