BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-II

ASSIGNMENTS

(July - 2019 & January - 2020)

MCS-011, MCS-012, MCS-015, MCS-013, BCSL-021, BCSL-022,

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068

CONTENTS

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	**:**	**ECO-02**
Course Title	**:**	**Accountancy-1**
Assignment Number	**:**	**BCA (2)/02/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)**
	:	**15th April, 2020 (For January 2020 Session)**

Here is the link of assignment https://webservices.ignou.ac.in/assignments/bcom.htm

Course Code	**:**	**MCS-011**
Course Title	**:**	**Problem Solving and Programming**
Assignment Number	**:**	**BCA(2)/011/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

There are seven questions in this assignment, which carry 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Insert comments in the code for better understanding.

Q1. Write the following functions that: **(2 ½ X 4 =10)**

a) Request the user for two integers and outputs them and their sum.
b) Request the user for two integers and outputs their remainder after division.
c) Request the user for two floats and outputs their product.
d) Request the user for a word and prints it twice on the same row.

Write a C (main) program to provide the above functions as options to the user using ***switch*** statement and performs the functions accordingly.

Q2. Write an algorithm, draw a corresponding flowchart and write an interactive program to convert a binary number to its decimal equivalent. **(20)**

Q3. Write the following functions that: **(2 ½ X 4 =10)**

a) Request the user to input a 5 digit number and reverse the given number and print it.
b) Request the user to input two floats and outputs the largest of the inputs.
c) Request the user to input an integer and, if the number is divisible by two, divides it by two, otherwise multiplies it by three and output the result.
d) Request the user for three integers and output whether any of them are equal. Use only one if-else-statement

Write a C (main) program to provide the above functions as options to the user using switch statement and perform the functions accordingly.

Q4. Write a program which reads characters from a string and calculates the number of vowels in it. It should print the string and the number of vowels in it. **(10)**

Q5. Following is the Taylor-series expansion for sin(x): **(10)**

$\sin(x) = x - x^3/3! + x^5/5! - x^7/7! + \ldots..$

Write a program that reads a value of x and calculates sin(x) using the first 10 terms only and prints out the result.

Q6. Using structures, write an interactive C program to generate Grade Card for BCA first semester courses for 20 students of your study centre. **(10)**

Note: Follow the evaluation criteria given in your programme guide.

Q7. Write a C program: **(5 + 5 =10)**

(a) To generate 10 random numbers between -1.5 and 1.5 and writes them in a file ***ran.dat***.

(b) To read the data from the file ran.dat (created above) and computes the average of the data. It also finds the number of data above the average value.

Course Code	**:**	**MCS-012**
Course Title	**:**	**Computer Organisation and Assembly Language Programming**
Assignment Number	**:**	**MCA(2)/012/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

There are four questions in this assignment, which carries 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words. Make suitable assumption, if any.

Q1. (Covers Block 1)

(a) Please refer to Figure 4 of Unit 1 of Block 1 on page 11. Assuming the same machine to be used for execution of the following three consecutive instructions:

LOAD C ; Loads the content of Memory location C into the Accumulator Register.

ADD B ; Adds the content of memory location B in the Accumulator Register.

STORE A ; Stores the content of Accumulator register AC in memory location A.

The following are the details about the instructions, data and registers:

- Each word of memory is of 32 bits in length. Each instruction is also 32 bits long.
- Main Memory has 256 words.
- The three consecutive instructions as shown above starts from memory location $(1F)_h$; A is at location $(FD)_h$ and contains a value $(1000)_h$, B is at location $(FE)_h$ and contains a value $(FF3B)_h$ and C is at location $(FF)_h$ and contains a value $(2A2F)_h$.
- The AC, IR and MBR registers are of size 32 bits, whereas PC and MAR registers are of size 8 bits. The initial content of PC register is (1F)h

Draw the diagrams showing addresses and content of memory locations and Registers. Show how the content of memory locations and registers will change with the execution of the three instructions. Show all the addresses and values in hexadecimal notations. You must also perform the necessary arithmetic using signed 2's complement notation and show the results indicating overflow, if any. Also explain the process of execution of the instructions. **(4)**

(b) Perform the following conversion of numbers: **(2)**

i) Decimal $(3412454512)_{10}$ to binary and hexadecimal
ii) Hexadecimal $(FEDCBA9)_h$ into Octal.
iii) String "In file name % means blank." into UTF 8
iv) Octal $(7766432)_o$ into Decimal

(c) Assuming that inverse is represented as ', simplify the following Boolean functions:
F= ((A' + B)' + (A'+B')')' **(1)**

(d) Simplify the following function using K-map: F(A, B, C, D) = Σ (0, 2, 6, 8, 10, 14)
Draw the circuit using NAND gates. **(2)**

(e) Consider the Adder-Subtractor circuit as shown in Figure 3.15 page 76 of Block 1. Explain how this circuit will perform subtraction, if the value of A is 1111 and B is 1100. You must list all the bit values including Cin and Cout and overflow condition. **(1)**

(f) Explain the functioning of a 2× 1 Multiplexer. You must draw its truth table and explain its logic diagram with the help of an example input. **(2)**

(g) Assume that a data value 1111 was received as 1011. Explain how use of Hamming's Error-Correcting code will send this data value from source and correct error at the destination. **(2)**

(h) Explain functioning of S-R flip flop with the help of logic diagram, characteristic table and excitation table. **(2)**

(i) Explain the functioning of Asynchronous and Synchronous counter. Explain how they are different from each other. **(2)**

(j) Differentiate between fixed point numbers and floating point numbers? Explain the representation for Zero in IEEE 754 single precision standard. Represent $(-32.25)_{10}$ and $(0.000125)_{10}$ in IEEE 754 single precision format. **(2)**

Q2. (Covers Block 2)

(a) Reference Figure 2(b) on page 8 in Unit 1 of Block 2. Draw the Internal organisation of a 64×8 RAM. Also answer the following:
(i) How many data input and data output lines does this RAM needs? Explain your answer.
(ii)How many address lines are needed for this RAM? Give reason in support of your answer.
(2)

(b) A computer has 16 MB RAM and has a word size of 32 bits. It has cache memory having 16 blocks having a block size of 64 bits. Show how the main memory address $(17F0AB)_h$ will be mapped to cache address, if

(i) Direct cache mapping is used
(ii) Associative cache mapping is used
(iii)Two way set associative cache mapping is used.
You must clearly identify tag, index, main memory block address and offset etc. in your answer. **(3)**

(c) Explain the process of Interrupt handling and Return from interrupt with the help of a diagram. You must answer this question in your own words. **(2)**

(d) Differentiate between the working of DMA and I/O processor. Explain the DMA configurations and I/O channel structures. **(3)**

(e) Assume that a disk has 2000 tracks with each track having 256 sectors and each sector is of size 2M. A file having the name *openUni.txt* is of size 32 M. Assume that disk has 16 free - continuous clusters of 4 sectors each at different locations on the disk. How can this file be allotted space on the disk? Also show the content of FAT after the space allocation to this file. You may make suitable assumptions. You may assume the cluster size as 4 sectors, if needed. **(4)**

(f) Explain the following giving their uses and advantages/disadvantages.
(Word limit for answer of each part is 50 words ONLY) **(6)**

(i) SCSI and IDE in the context of Interfaces
(ii) Scanner and its resolution
(iii) Scan codes in the context of keyboard
(iv) Access time on disks
(v) Virtual Memory
(vi) RAID level 0, 3 and 5

Q3. (Covers Block 3)

(a) A computer has a single core processor having 16 General purpose registers and 4 additional special purpose registers. The machine has 1MB RAM. The size of each register and memory word is 32 bits each. An instruction of the machine is of fixed length and is equal to one memory words. Each instruction of the machine can have two operands – one memory operand and second register operand (register operand can be in General purpose registers only). Memory operand either uses direct addressing or is an immediate operand; however, register operand can use either register direct or register indirect addressing. (Please note that if register operand uses indirect addressing, then stated register contains the address of the operand in the memory.) An instruction of a machine consists of operation code bits, two addressing mode bit, one register operand and one memory operand. The addressing mode bits specifies addressing mode as:

Addressing mode bit	Register Operand	Memory Operand
00	Indirect	Direct
01	Direct	Direct
10	Indirect	Immediate Operand
11	Direct	Immediate Operand

The special purpose registers are - Program Counter (PC), Memory Address Register (MAR), Data Register (DR) and Flag registers (FR). The First register of the General purpose registers can be used as Accumulator Register. The size of Integer operands on the machine is 32 bits and it may be assumed to be equal to size of accumulator register. In order to execute instructions the machine has an additional Instruction Register (IR) of size 32 bits as each instruction is of this size. Perform the following tasks for the machine.

(i) Design suitable instruction formats for the machine. Specify the size of different fields that are needed in the instruction format. Also indicate how many different operations can be coded for this machine. Give reasons in support of your answer. **(3)**

(ii) Put some valid values in registers and memory locations and demonstrate examples of different addressing modes of this machine. **(1)**

(iii) Assuming that the instructions are first fetched to Instruction Register (IR) and memory operands is brought to DR register; indirect operand is brought to Accumulator register; and result of operation is stored in the Accumulator register; write and explain the sequence of micro-operations that are required for fetch and execute cycles of an instruction which performs subtraction of two operands having addressing mode bits as 00. Please note that one of the operand is Indirect Register Operand and the second is a direct memory operand. Make and state suitable assumptions, if any. **(6)**

(b) Assume that you have a machine as shown in section 3.2.2 of Block 3 having the micro-operations as given in Figure 10 on page 62 of Block 3. Consider that R1 and R2 both are 8 bit registers and contains 11000011 and 11100101 respectively. What will be the values of select inputs, carry-in input and result of operation (including carry out bit) if the following micro-operations are performed? (For each micro-operation you may assume the initial value of R1 and R2 as given above) **(2)**
(i) Add R1 and R2 with carry
(ii) Decrement R1
(iii) Shift right R1 twice
(iv) AND R1 and R2

(c) What is the role of Control Signal in execution of an Instruction? Block 3, page number 68-70, explains the timing sequence for execution of ISZ instruction. Explain execution of an ADDITION instruction with the help of micro-operations and timing sequence. **(3)**

(d) What is the role of micro-programmed control Unit? How a micro-program is executed? Explain with the help of a diagram. **(2)**

(e) List and explain the characteristics of RISC machines. A RISC machine has 256 registers out of which 64 registers are reserved for the Global variables and 64 for Instruction related tasks. This machine has been designed to have 12 registers for storing three input parameters, three output parameters and six local variables for a function call. Explain with the help of a diagram, how the overlapped register window can be implemented in this machine for function/procedure calls. You must explain how the parameters will be passed when a function calls another function. How many levels of procedural calls, such a machine can support? **(3)**

Q4. (Covers Block 4)

(a) Write a program using 8086 assembly Language (with proper comments) that accepts an input of ten characters from the keyboard and store them in the memory. It then converts all the lower case alphabets of this stored string to uppercase alphabets. Make suitable assumptions, if any. **(7)**

(b) Write a program using 8086 assembly Language (with proper comments) that finds the sum and average of 10 byte numbers stored in two different arrays of size 5 each. **(7)**

(c) Explain the following in the context of 8086 Microprocessor **(6)**

(i) Use of Segment Registers

(ii) Use of Interrupts in Input/output

(iii).com and .exe programs

Course Code	**:**	**MCS-015**
Course Title	**:**	**Communication Skills**
Assignment Number	**:**	**MCA(2)/015/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last date of submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

This assignment has six questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1. Read the passage carefully and answer the questions given below. This passage is taken from the Commencement address delivered by late Steve Jobs, who was CEO of Apple Computer

When I was 17, I read a quote that went something like: "If you live each day as if it was your last, someday you'll most certainly be right." It made an impression on me, and since then, for the past 33 years, I have looked in the mirror every morning and asked myself: "If today were the last day of my life, would I want to do what I am about to do today?" And whenever the answer has been "No" for too many days in a row, I know I need to change something.

Remembering that I'll be dead soon is the most important tool I've ever encountered to help me make the big choices in life. Because almost everything — all external expectations, all pride, all fear of embarrassment or failure - these things just fall away in the face of death, leaving only what is truly important. Remembering that you are going to die is the best way I know to avoid the trap of thinking you have something to lose. You are already naked. There is no reason not to follow your heart.

About a year ago I was diagnosed with cancer. I had a scan at 7:30 in the morning, and it clearly showed a tumor on my pancreas. I didn't even know what a pancreas was. The doctors told me this was almost certainly a type of cancer that is incurable, and that I should expect to live no longer than three to six months. My doctor advised me to go home and get my affairs in order, which is doctor's code for prepare to die. It means to try to tell your kids everything you thought you'd have the next 10 years to tell them in just a few months. It means to make sure everything is buttoned up so that it will be as easy as possible for your family. It means to say your goodbyes.

I lived with that diagnosis all day. Later that evening I had a biopsy, where they stuck an endoscope down my throat, through my stomach and into my intestines, put a needle into my pancreas and got a few cells from the tumor. I was sedated, but my wife, who was there, told me that when they viewed the cells under a microscope the doctors started crying because it turned out to be a very rare form of pancreatic cancer that is curable with surgery. I had the surgery and I'm fine now.

This was the closest I've been to facing death, and I hope it's the closest I get for a few more decades. Having lived through it, I can now say this to you with a bit more certainty than when death was a useful but purely intellectual concept:

No one wants to die. Even people who want to go to heaven don't want to die to get there. And yet death is the destination we all share. No one has ever escaped it. And that is as it should be, because Death is very likely the single best invention of Life. It is Life's change agent. It clears out the old to make way for the new. Right now the new is you, but someday not too long from now, you will gradually become the old and be cleared away. Sorry to be so dramatic, but it is quite true.

Your time is limited, so don't waste it living someone else's life. Don't be trapped by dogma — which is living with the results of other people's thinking. Don't let the noise of others' opinions drown out your own inner voice. And most important, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.

When I was young, there was an amazing publication called *The Whole Earth Catalog*, which was one of the bibles of my generation. It was created by a fellow named Stewart Brand not far from here in Menlo Park, and he brought it to life with his poetic touch. This was in the late 1960's, before personal computers and desktop publishing, so it was all made with typewriters, scissors, and polaroid cameras. It was sort of like Google in paperback form, 35 years before Google came along: it was idealistic, and overflowing with neat tools and great notions.

Stewart and his team put out several issues of *The Whole Earth Catalog*, and then when it had run its course, they put out a final issue. It was the mid-1970s, and I was your age. On the back cover of their final issue was a photograph of an early morning country road, the kind you might find yourself hitchhiking on if you were so adventurous. Beneath it were the words: "Stay Hungry. Stay Foolish." It was their farewell message as they signed off. Stay Hungry. Stay Foolish. And I have always wished that for myself. And now, as you graduate to begin anew, I wish that for you.

Stay Hungry. Stay Foolish.

Thank you all very much.

Now answer the following questions:

i Why did Steve Jobs feel “Remembering that I’ll be dead soon is the most important tool that I’ve encountered to help me make the big choices in life”? Discuss in the light of the passage. **(2)**

ii What did the doctor mean when he told Steve Jobs to “get my affairs in order”? **(2)**

iii Why did the author feel that Death is the best invention of Life according to the passage? **(2)**

iv The author says “don’t waste it living someone else’s life”. What/who does ‘it’ refer to? How do we lead someone’s life? **(2)**

v What according to you did the author mean when he told the young graduates "Stay Hungry. Stay foolish." **(2)**

vi Find the meanings of the following words/phrases from the passage and use them in sentences of your own. **(10)**

i	Make/made an impression	vi	Sedated
ii	Encountered	vii	Destination
iii	Fear of embarrassment	viii	Dogma
iv	Fall away	ix	Drown out
v	Buttoned up	x	Intuition

Q2. Complete the following company profile with either the present perfect or past simple tense of the verbs in brackets: **(10)**

William Colgate…….(found) the Colgate Company in 1806 as a starch, soap and candle business in New York City. For the first one hundred years, the company…….(do) all its business in the United States. However, in the early 1900s, the company…….(begin) an aggressive expansion programme that …….((lead) to the establishment of Colgate operations in countries throughout Europe, Latin America and the Far East. Recently it…….(set up) operations in Turkey, Pakistan, Saudi Arabia, Eastern Europe and China. Colgate-Palmolive …….(become) a truly global consumer products company, worth $6.6 billion and selling in more than 160 countries.

Colgate-Palmolive's five main sectors of business are: Oral Care, Body Care, Household Surface Care, Fabric Care and Pet Nutrition and Health Care. In the area of Oral Care, Colgate-Palmolive is the world leader in toothpaste. Since 1980, the company …….(increase) its share of this market by more than 12% to over 40% today. Oral care revenues ……..(grow) significantly in recent years and in 1991, they ……..(exceed) $1.3 billion. As a result of the company's heavy investment in research and technology, it……(develop) many successful toothpaste, rinses and toothbrushes.

Q3. You recently moved to a new city on a job transfer. Write an email to your friend informing him of this move. In your email: **(20)**

i Describe the new city
ii Explain how life in this city is different compared to the previous city
iii Invite your friend and family to visit you in the new city
iv Say what your new job profile is.

Q4. Write a dialogue, in about 20 turns, between two friends discussing what they would like to do in their lives after completing their education. **(20)**

Q5. Select a company you would like to work for and a position you would like to have within that company. Write an application letter in which you explain your qualifications and request an interview. (You should assume that you have graduated, or that you will graduate soon.) Send your CV along with the cover letter.

(10+10=20)

Q6. Fill up the gaps with a suitable word from the choices in the brackets: **(10)**

i The secretary had completely forgotten that they had run out of ……..... (stationery/stationary)

ii The …….... meeting was scheduled to begin at 11:30. (council/counsel)

iii As soon as the director arrived, Seema …….... him of the situation. (appraised/apprised)

iv After the presentation, there was a lot of ……...about the project among the team members. (persuasion/discussion)

v The manager's comments ……...that he was surprised by the success of our project. (implied/inferred)

vi She had not considered the side ……...of such strong medication. (affects/effects)

vii There was visible tension ……...Anant and his manager. (between/among)

viii After the showdown with his manager, Anant spent the weekend in tension, dreading his …….... dismissal. (eminent/imminent)

ix Thankfully, there was no ……...discussion of the showdown on Friday. (farther/further)

x She …….... from the Professor's expression, that he was pleased with her paper. (inferred/implied)

Course Code	**:**	**MCS-013**
Course Title	**:**	**Discrete Mathematics**
Assignment Number	**:**	**MCA (2)/013/Assignment/2019-20**
Maximum Marks	**:**	**100**
Last Date of Submission	**:**	**15th October, 2019 (for July 2019 Session)** **15th April, 2020 (for January 2020 Session)**

There are eight questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1.

(a) What is proposition? Explain different logical connectives used in proposition with the help of example. **(3)**

(b) Make truth table for followings. **(4)**

i) $p \rightarrow (q \vee r) \wedge p \wedge \sim q$

ii) $p \rightarrow (\sim r \vee \sim q) \wedge (p \vee r)$

(c) Give geometric representation for followings: **(3)**

i) R x { 2}

ii) {1, 5) x (-2, -3)

Q2.

(a) Draw a Venn diagram to represent followings: **(3)**

i) $(A \cap B \cup C) \sim A$

ii) $(A \cup B \cup C) \cap (B \cap C)$

(b) Write down suitable mathematical statement that can be represented by the following symbolic properties. **(4)**

i) $(\exists x) (\exists z) (\forall y) P$

ii) $\forall (x) (\forall y) (\exists z) P$

(c) Show whether $\sqrt{3}$ is rational or irrational. **(3)**

Q3.

(a) Explain inclusion-exclusion principle with example. **(2)**

(b) Make logic circuit for the following Boolean expressions: **(4)**

i) (x'y'z) + (x'y'z)'

ii) (x'yz) (x'yz') (xy'z)

(c) What is a tautology? If P and Q are statements, show whether the statement $(P \rightarrow Q) \vee (Q \rightarrow P)$ is a tautology or not. **(4)**

Q4.

(a) How many words can be formed using letter of STUDENT using each letter at most once?

i) If each letter must be used,
ii) If some or all the letters may be omitted. **(2)**

(b) Show that: **(2)**

P=>Q and (~P $\vee$ Q) are equivalent.

(c) Prove that n! (n + 2) = n!+ (n +1)! **(4)**

(d) Explain principal of duality with the help of example. **(2)**

Q5.

(a) How many different professionals committees of 10 people can be formed, each containing at least 2 Professors, at least 3 Managers and 3 ICT Experts from list of 10 Professors, 6 Managers and 8 ICT Experts? **(4)**

(b) What are Demorgan's Law? Explain the use of Demorgen's law with example. **(4)**

(c) Explain addition theorem in probability. **(2)**

Q6.

(a) How many ways are there to distribute 17 district objects into 7 distinct boxes with:

i) At least two empty box.
ii) No empty box. **(3)**

(b) Explain principle of multiplication with an example. **(3)**

(c) Set A,B and C are: A = {1, 2, 5,7,8,9,12,15,17}, B = { 1,2, 3 ,4, 5,9,10 } and C { 2, 5,7,9,10,11, 13}. Find A $\cap$ B $\cup$ C , A $\cup$ B $\cup$ C, A $\cup$ B $\cap$ C and (B~C) **(4)**

Q7.

(a) Find how many 3 digit numbers are even? **(2)**

(b) What is counterexample? Explain how counter example helps in problem solving. **(3)**

(c) What is a function? Explain following types of functions with example.
i) Surgective
ii) Injective
iii) Bijective **(3)**

(d) Write the following statements in symbolic form:

i) Mohan is poor but happy

ii) Either work hard or be ready for poor result **(2)**

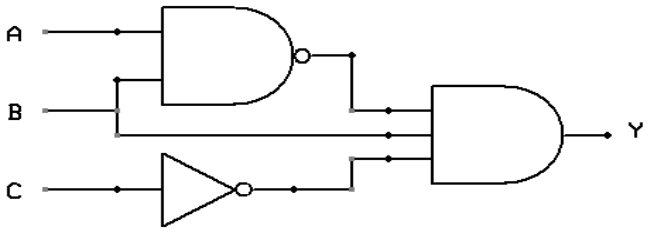
Q8.

(a) Find inverse of the following function: **(2)**

$$f(x) = \frac{x^2 + 6}{x - 2} \quad x \neq 2$$

(b) What is relation? Explain equivalence relation with the help of an example. **(3)**

(c) Find dual of Boolean Expression for the output of the following logic circuit. **(3)**



(d) Explain distributive and complement properties of set with the help of examples. **(2)**

Course Code	**:**	**BCSL-021**
Course Title	**:**	**C Language Programming**
Assignment Number	**:**	**BCA(2)/L-021/Assignment/2019-20**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**15th October, 2019 (for July 2019 Session)** **15th April, 2020 (for January 2020 Session)**

This assignment has one question. Answer the question. This question carries 40 marks. Rest 10 marks are for viva-voce. You may use illustrations and diagrams to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

Q1. Write an interactive ***C program*** which simulates an Electronic Voting Machine (EVM) with the following: **(40)**

a) To create and insert the candidate's name and assign any special character as "SYMBOL" for voting purpose correspondingly.

b) To cater to a maximum of 10 contestants from a constituency.

c) To allow voting by the voters (single vote per person)

d) To store the poll result candidate-wise in separate files

d) To display the winner and total no. of votes polled for him/her.

e) To display the result candidate-wise

Note: Assumptions can be made wherever necessary. As on pilot basis EVM can record a maximum of 100 votes. The EVMs don't allow electorates to vote more than once. After the voter presses a particular assigned SYMBOL or option, the vote is recorded.

Course Code	**:**	**BCSL-022**
Course Title	**:**	**Assembly Language Programming Lab**
Assignment Number	**:**	**BCA(2)/BCSL022/Assignment/2019-20**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

This assignment has two questions of total of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Q1. Design a two bit counter circuit that counts from 0 to 2. It should have states 00, 01 and 10. The initial state of the counter may be assumed to be 00. The counter will be in following successive states: 00, 01, 10, 00, 01, 10, 00, 01, 10, 00 ... Use J-K flip flop to design the circuit. You must design the circuit using state transition diagram and Karnaugh's maps. **(10)**

Q2. Write and run following programs using 8086 assembly language: **(3 × 10 = 30)**

(a) Write and run an Assembly language program that converts a packed 4 digit BCD number that has been stored in two consecutive byte locations in the memory, into an equivalent binary number. The output should be stored in DX register. For example, if two consecutive byte locations have BCD values $(12)_h$ and $(34)_h$ then output will be binary equivalent of $(1234)_{10}$ which is $(0000\ 0100\ 1101\ 0010)_2$. This binary value will be stored in DX register.

(b) Write and run (using appropriate calling program) a near procedure in 8086 assembly language that checks if the input parameter has a value less than 5. If the value is less than 5 then subroutines displays the line "Parameter value is less than 5" else it displays "Parameter value is >= 5".

(c) Write and run an 8086 assembly language program that finds the factorial of the value stored in BH register. You may assume that BH register will store a maximum value 8. Thus, you need not handle the overflow.