Half Yearly Examination 2017-2018

Std. : XI **Full Marks : 70**

Subject : COMPUTER SCIENCE PAPER 1 (THEORY) **Time : 3 Hrs.**

(Candidates are allowed additional 15 minutes for only reading the paper.
They must NOT start writing during this time.)

*Answer **all** questions in Part I (compulsory) two questions from Section-A. Three fom Section-B*

All working, including rough work, should be done on the same sheet as the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [ ].

PART I (20 Marks)

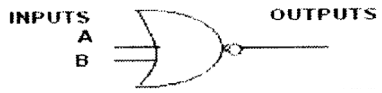
Answer **all** *questions.*

While answering questions In this Part, Indicate briefly your working and reasoning, wherever required.

Question 1. **[2x5=10]**

a. Obtain the truth table to verify the following expression: X(Y+Z)= XY+XZ. Also name the law stated above.

b. Answer the following questions related to the gate given below:



i. Name the gate.

ii. What is the input required for getting 1 as the output.

c. Given F= A+(B.C).(D'+E) find F'.Use De-Morgan's law.

d. State the dual for the following expression: P=A.B+C.D

e. For the given truth table write the sum of product for X Boolean expression for x.

A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

Question 2. **[5x2=10]**

(z) The following function is a part of some class which prints,whether a number is a MagicNumber or not. It returns the value 1 when the number is a Magic Number, otherwise it returns O.There are some places in the code marked by ?!?, ?2?, ?3?, ?4?, ?5? which must be replaced by a statement / expression so

that the function works properly:

/* A Magic Number is a number whose sum of the digits equals to 1, when this addition of digits is performed till the number itself becomes a single digit number.

Example:

289, adding 2+8+9 it gives 19, then add, 1+9 it gives 10, then add 1+0, itgives 1, which is a single digit number, and since its sum is equal to 1, so, 289 is a magicnumber
*/

```
int isMagic (int n)
{
int dig = 0, s = n;
while (?1?)
{
n = s, s = 0;
while (n > 0)
{
dig =? 2 ?;
s = s +? 3 ?;
?4?;
} //end of inner while
}//end of outer while
iff? 5?)
return 1;
else
return 0;
}
```

(i) What is the expression/value at ? 1 ? [1]

(ii) What is the expression/value at ? 2 ? [1]

(iii) What is the expression/value at ? 3 ? [1]

(iv) What is the expression/value at ? 4 ? [1]

(v) What is the expression/value at ? 5 ? [1]

(b) What do these functions do? Explain with example. [1x5=5]

i. indexOf() ii. nextToken() iii. substring() iv. random() v. iswhiteSpace()

Part II Section A

Answer any two

Question 1 **[2x5=10]**

a. What is meant by a logic gate? State any one application of a logic gate circuit.

b. Verify using the truth table, if (X.Y).(Y+X) is a tautology, contradiction or contingency.

c. Name the Universal Gates. Why are they called so?

d. Name any two visibility mode and describe them.

e. Draw the logic gate diagram for the following. XY + (XZ)'

Question 2 **[2x5=10]**

a. Find the complement of the following: [(x.y)'. x] [(x.y)'.y]

b. Draw the truth table to verify (x')'=x.

c. Find the dual of following: AB'+BC'+1=1

d. Define Function overloading.

e. What is constructor? What are the different types of constructor?

Question 3

(a) Using a truth table, verify the following expression :

X + (Y + Z) = (X + Y) + Z

Also state the law

(b) Given. F (X, Y, Z) = (X' + Y') . (Y + Z')

write the function in canonical procduct-of-sum form.

(c) Draw the truth table and logic circuit for a 2-input XNOR gate.

d) Find complement of the following expression :

X'+XY'

e) if (X => Y) then write its :

(i) Converse

(ii) Contra positive

Section B

Answer any three questions

Question 1 **[10]**

A library issues a book on rental basis at a 2% charge on the cost price of the book per day. As per the library, a book can be retained for 7 days without any fine. If the book is returned after 7 days, a fine will also be charged for the excess days as per the chart given below :

Number of excess days Fine per day ()

1 to 5 - 2.00

6 to 10- 3.00

Above 10 days 5.00

Design a class Library as per given details :

Class name : Library

Data members/instance variables:

Name, author : string variables to store name of book and authors name

p : Price of the book in decimals.

r : to store the fine.

Member functions/ methods:

Library(): Non parameterized constructor to initialize the data members.

Void getInfo(): accepts name, of book, author's name and cost of the book from the user during program execution.

void show() : displays the book details

void fine(int days): calculates the fine for the excess days where days stores number of days taken in returning the book.

void display(): displays the book details along with the number of days, fine and total amount to be paid as fine. The

Amount is calculated as: (2% of price of book * total no. of days) + fine

Question 2 **[10]**

Write methods of class Compare:

int arrange(int num): arranges the digits of a number in ascending order.

String arrange (String wrd): arranges the letters in alphabetical order. [10]

Questions 3 **[10]**

A Special number is a number in which the sum of the factorial of its digits is equal to the number.
Example : 145(1!+4!+5!=145). Thus 145 is a special number.
Design a class Special to check if the given number is a Special number or not. Some of the members of the class are given below:

Class name :	Special
Data Members:	
n:	integer to store the number
Member Methods:	
Special():	default constructor
void read():	to accept the number
int factorial(int x):	return the factorial of a number using recursion.
boolean isSpecial():	checks for the special number by invoking the function factorial() and returns true if Special, otherwise returns false.
void display():	to show the result with an appropriate message.

Specify the Special, giving details of the Constructor, void read(), int factorial(int), boolean is Special() and void display(). Define the main() function to create an object and call the member function according to enable the task.

Question 4 **[10]**

Create a class StringManip to convert the given string to all capital case and display the words of the sentence in reverse order.

Class Name : StringManip

Data Members :

sen, rev (Both String)

Member Methods:

StringManip():	Non parameterized constructor
void read():	to accept the sentence
void reverseOrder():	reverses the order of the word in the sentence and stores the new content in rev.
void display():	to show the original sentence and the new sentence with appropriate messages.