1. (a) Explain microprocessor and name the unit of its clock speed. [1]
(b) Write any two utility softwares. [1]
(c) Perform the following number conversions and write the value of x in each. [1]
   1. \((341)_{10} = (x)_{8}\)
   2. \((BAC)_{16} = (x)_{2}\)
(d) Differentiate between:
   1. PS-2 port and Infrared port
   2. Compiler and Assembler [2]
(e) Expand the following:
   1. PB
   2. BOSS [1]
(f) Write short notes on the following:
   1. Bluetooth
   2. Fire wire
(g) Name any two Spreadsheet software. [1]

2. (a) Write the C++ expression for the following: [2]
   (i) \(\frac{3}{(A+B*C)}\)
   (ii) \((P + Q) (R + S)^4\)
   (iii) \(|X - Y|\)
   (iv) \(A^2 + B^2 + 2AB\)
(b) Evaluate the value of \(Z\) in the following expressions: [3]
   (i) \(Z = ++X + X++;\) if \(X\) is 15 initially
   (ii) \(Z = 2 * 3 / 4 + 4 / 4 + 15 - 3 + 6 / 8;\)
   (iii) \(Z = 14 \% 3 + 7 \% 2;\) [P.T.O.]
(c) Write the purpose of the following character constants:

(i) \t
(ii) \b

(d) Evaluate the following expressions:

(i) \!\!10 \!\!1\!\!5 \&\& \!\!1\!\!(10 < 20) || 15 > 30
(ii) \!\!5 + 5 = = 10 || 1 + 3 = = 5
(iii) \!\!1\!\!(5 + 5 >= 10)
(iv) \!\!5 > 10 || 10 < 20 \&\& 3 < 5

(e) What are C++ shorthands? Write one example of it.

(f) Write the header file of setw().

3.

(a) What are the various stages of problem solving methodology?

(b) What is the modular approach of programming?

(c) Explain portability, reliability, user friendly and efficiency characteristics of a good program?

(d) Write short notes on the following:

(i) Prettyprinting
(ii) Guard Code
(iii) Robustness

(e) Differentiate between logical and run time error?

(f) Explain the importance of program maintenance?

(g) Why documentation is considered as integral part of the programming? Comment.

4.

(a) Rewrite the following program after removing the syntactical error(s), if any. Underline each correction done.

```c
#include <iostream.h>
struct game
{
    char magic[20];
    int score;
};

void main()
{
    game m;
    char ch[20]="Examination";
    m.score=100;
```
m.magic=ch;
m.score+=50;
cout<<m.magic<<m.score<<endl;
n=m;
n.score-=120;
cout<<n.magic<<n.score<<endl;
}

(b) Find the output of the following program:
#include<iostream.h>
void indirect(int temp=20)
{
    for(int i=10; i<=temp; i+=5)
        cout<<i<<"","
        cout<<endl;
}
void direct(int &num)
{
    num+=5;
    indirect(num);
}
void main()
{
    int number=10;
    direct(number);
    indirect();
    cout<<"Number="<<number<<endl;
}

(c) In the following program, if the value of ‘Guess’ entered by the user is 66, what will be the expected output(s) from the following option(i), (ii), (iii), (iv)? Justify your answer.
#include<iiostream.h>
#include<stdlib.h>
void main()
{
int Guess;
randomize();
cin>>Guess;
for(int i=1; i<=4; i++)
{
    int New=Guess + random(i);
    cout<<(char)New;
}

(i)  ABBC
(ii)  ACBA
(iii) BCDE
(iv)  CABD

(d) Change the following code using if statement without effecting the output: [2]
void main()
{
    int i;
    int a,b,c,d;
    a=b=c=d=0;
    cin>>i;
    switch(++i)
    {
    case 1: ++d;
    case 2: ++a;
    case 3: ++b; break;
    case 4: ++c; ++d; break;
    default: c++; 
    }
    cout<<a<<b<<c<<d;
}

(e) Change the following code using WHILE loop without effecting the output: [2]
#include<iostream.h>
void main()
{  
    int u=10, v=20;
    for(int i=1; i<=2; i++)
    {
        cout<<"[1]"<<u++<<""<<v<<endl;
        cout<<"[2]"<<++v<<""<<u+2<<endl;
    }
}

(f) Ten records of students in a class are stored in a student structure with the following information:

roll number integer type
subject1 marks integer type
subject2 marks integer type
subject3 marks integer type
subject4 marks integer type
subject5 marks integer type
name string type

Write a C++ program to display the names of the students whose average performance is above the average of a class.

(g) Enter the number of terms n and calculate the sum of the following series.  
\[ 1 + (1+2) + (1+2+3) + \ldots + (1+2+3+ \ldots + n ) \]

(h) Write a function with the name 'convert()' which takes a string and a character as an argument and function converts each occurrence of the given character to opposite case?

(i) Find and print the lowest element of each row in a two-dimensional array containing integer data in 2 rows and 3 columns?

(j) Display the following menu and do accordingly using switch case for a 2-dimensional array of 3x3

```
Main Menu
1. Lower Triangle
2. Upper Triangle
3. Exit
Enter your choice(1-3)
```

Computer Science/XI [ 5 ] [P.T.O.]
If the given array $A[3][3]$ is

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

LOWER TRIANGLE & UPPER TRIANGLE

1 & 123
45 & 56
789 & 99

(k) Which C++ header file(s) will be essentially required to be included to run / execute the following C++ code?

```cpp
#include<iostream.h>
void main()
{
    char school[]="APEEJAY";
    strlwr(school);
    getch();
}
```

(l) Write the usage of atoi() and itoa() functions in C++.

(m) What is the purpose of #define and typedef? Give one example of each.

(n) Find the number of elements occupied by the following arrays:

- long sno[2];
- float x[5][10];

(o) What is number of bytes required by myGame?

```cpp
struct Game
{
    int gameNo;
    char magic;
    float score;
}myGame;
```

(p) Differentiate between the following:

(i) Call by Value and Call by Reference

(ii) Local and Global variable

(iii) Data Hiding and Data Encapsulation