

1. (a) Write equivalent C++ statements for the following :

$$(i) \quad x = \sqrt{\frac{\sin^3 x + \cos^2 x + x^4 y}{(x^2 y + y^2 x)^3}}$$

$$(ii) \quad \text{Num} = \frac{7x + 2y}{4x + 3z} - \frac{3xyz}{2ab}$$

$$(iii) \quad \text{root} = \frac{1}{2} \pi (\alpha^2 + \beta^2)$$

$$(iv) \quad \text{sum} = |a+b| + a^3 + b^3 + 3ab$$

- (b) Given the values of a, b and c evaluate the following expressions (True or False):

int a=5, b=9, c= 4

- (i) $(a+b)/c < 5 \ \&\& \ ! \ (\ b \% a = a \% b \ || \ (b+c)/a > 2)$
 (ii) $a+b <= a+c \ || \ a-c >= b-a \ \&\& \ ! \ a > b+c$
 (iii) $(a+b >= c \ || \ (a+c) > (a+b)) \ \&\& \ (a+b+c > 10)$
 (iv) $a \% b > 3 \ \&\& \ ! \ (a/b > 2 \ || \ a < b)$ (4 + 4)

2. (a) Write a program to input a three digit number and print whether it is an Armstrong number or not. An Armstrong number is one where the sum of the cube of the individual digits is equal to the number itself

$$\text{e.g } 153 = 1^3 + 5^3 + 3^3$$

- (b) Identify the errors in the programs given below :

- | | |
|-----------------------------|--------------------------------|
| (i) # include <iostream .h> | (ii) # include <iostream.h> |
| main(); | void main() |
| { float a, b=7, c; | { int a=7, b=3; |
| c= a%b; | a=ceil(); |
| cout <<a<<b<<c<<; | if (a=b) cout<<"Equal" |
| cout<<sqr(a); } | else (a<b) cout<<"Not Equal" } |
- (5 + 4)

3. Answer the following :

- (i) What are library functions ? Explain any one such function
 (ii) What is the conditional operator . Distinguish between the = and == operators.
 (iii) What are syntax errors and runtime errors . Explain with examples.
 (iv) Arrange the following in ascending order of the number of bytes occupied by each data type – mention the number of bytes for each.

float , long double , char , unsigned int , long (4 * 2 = 8)

4. (a) Write the output of the following program segments . Show all the calculations :

(i) void main()
 { int a=2, b=4, c=9;
 cout<<+++a<< - -b<< a--<<c++<< --c<<b<<endl;
 a = ++b%c--;
 cout<< a--<<+++b<<+++a<<c--<<c++<<+++b<<endl; }

(ii) void main()
 { int a=7, b=3, c ; float x =5.6, y=2.3, z= 4.2 ;
 c= (a+ b++) % 7 ; y = ceil(z)/2 + floor(x) ;
 a= b/ c ; x= pow(floor(x), sqrt(floor(z)));
 cout << a << ' << b<< ' <<c<< endl;
 cout << x << ' << y<< ' <<z<< endl; }

```
(iii) void main( )
{ int a=6, b=8, c ;
  c= ++a + a++ + --b + --b ;
  a++ ; ++b ; c--;
  cout << a << ' <<< b<<< ' <<<c<<<endl;
  b= c++ + --c + ++a + ++a ;
  cout << a << ' <<< b<<< ' <<<c<<< endl; }
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(b) WAP to input two integer vales and a character code. If the code is '+' the program should print the sum of the two numbers , if '-' the difference etc. the code should be either +, -, *, / , % . If any other character is input an appropriate message should be displayed.

(c) Convert the following using a Conditional operator

```
void main( )
{ char code ;
  if (code == 'A') cout<< "Well Done!! " ;
  else if ( code == 'B' ) cout << "Very Good";
  else cout<<" Poor "; }
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(6 + 4 + 3)

5. (a) List the rules of naming of variables Which of the following variables are invalid and why

(i) 12sum (ii) setw (iii) total marks (iv) _12abc

(b) Input the choice by an user T for triangle and C for circle . Depending on the choice input the base and height of triangle or radius of circle and print out the area accordingly .

(c) Evaluate the following where a, b,c are integers and x, y and z are float. For each line of calculations , take the original values of the variables. :

```
int a=7, b=3, c ; float x=8.5 , y=2, z;
```

- (i) $z = a/b + \text{pow}(\text{floor}(x), a/3);$
 (ii) $z = \text{pow}(y, b) + (\text{int})\text{ceil}(x)\%b;$
 (iii) $c = ++a + b\%a + \text{ceil}(x)/ b;$
 (iv) $c = ++b * a++ - \text{floor}(x)/\text{ceil}(y);$
- (3 + 4 + 4)

6. a) What is a compound statement ? How do you specify a compound statement ?

(b) Write a program to input three numbers and use the conditional operator to print out the greater of the three numbers . DO NOT use the if statement

(c) Explain the following functions with examples . Also write the header file for each function

(i) fmod() (ii) cout.setf(ios::fixed) (iii) floor() (iv) setw() (2+ 4 + 6)

7. (a) WAP to input Item number and price of a HP Computer . A dealer gives a discount of 7.5% for a computer costing above Rs 35,000 , 6% for Computer costing between Rs 25,000 and Rs 35,000 and 3.2% for other Computers . Print the item no , price and discounted price of the Computer . Also calculate a VAT of 12.5% on the discounted Price and print the Total Bill which is discounted price + VAT..

(b) WAP to input the code 'S' for State Bank of India or 'I' for ICICI Bank, input the Amount and time period. Calculate the Simple interest, the Compound interest and Total amount according to the following criteria :

For SBI

if Amount > 100000 and time between 5 and 10 years interest = 8%

if Amount < 100000 and time less than 10 interest = 7.5%

otherwise interest = 6.5%

For ICICI Bank

if Amount > 500000 interest = 7%

if Amount < 500000 and time between 5 and 10 interest = 6%

otherwise interest = 5.5%

(4 + 5)