Max. Points: 75

[Time: 90 Mins]

Part I: *Give short (half-a-page) and precise answers to the following questions.* [5 × 5 = 25]

1. List 4 operators that work on and results in `float`s. Explain each with an example.

2. What will happen if you try to compile and run the following code inside a valid `main(){..}`?

```
int i = 256, j = 256;
i >>= 8;    j <<= 24;
printf("%d , %d \n", i , j );
```

3. Given an array: `int arr[10];` , i) What is an index expression?, ii) what is the largest value that the index expression can take? why?

4. arrange the following data types in increasing order of space taken: `int, char, double, short`. Explain your answer with the space taken by each.

5. Arrange the following operators in decreasing (non-increasing) order of precedence, below.

    +   –   *   /   =   &   % || ==   ()

Part II: *Give brief and precise answers in the space provided.*

1. Given +ve integer i, Write a program to find the ith composite number (starting with 4). [10 marks]

2. Spot the errors in the following code fragments: [2 × 5 = 10]

The following code fragment is supposed to print x = 0.

```
int x = 5;
while( x > 0 );
    x /= 2;
print("x = %c\n", x);
```

The following code is supposed to print the sum of all elements in an array: `int a[10];`

```
for(int i=0, sum=0; i <= 10; i++)
    sum += a[i];
printf("Sum = %d\n",sum);
```

3. A set of integers is represented using an array `char S[128]`, where an integer i is present in the set if `S[i] = 1` (else `S[i] = 0`). Given two sets, `char S1[128]` and `char S2[128]`, write the code to:

   (a) Print the sum of elements in the *Intersection* of S1 and S2. You should NOT use a third array to compute the intersection. Give brief comments to help understand your code.   [10 marks]

   (b) The *Symmetric Difference* of S1 and S2 (defined as the set of elements that present in S1 OR S2, but NOT BOTH) and store the result in the set `char S3[128]`. Give brief comments to help understand your code.   [10 marks]

4. Write a program to read a sentence and count the number of capital letters in it.   [10 marks]