B.E. (Computer Science & Engineering (New)) Third Semester (C.B.S.)

Advanced C & Programming Logic Design

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.

1. a) Write a function which accepts a string and an integer number 'n'. The function should print that string 'n' number of times and return the length of the string. Print the length of the string in calling function i.e. main ( ). **7**

   b) Illustrate the use of following with an example of each. **6**

   i) Enumerated datatype

   ii) Size of

   iii) type def

OR

2. a) Write a program which accepts a matrix and checks whether that matrix is lower triangular. Display an appropriate message on output screen. **7**

   b) Explain the difference between array and structure. **3**

   c) Can we create an array of structure, in C? Justify your answer with the help of an example. **3**

3. A file student.dat contains information of several students in terms of rollno, name, sessional marks, PUT marks and percentage scored. Write a program which performs following operations on the file. **14**
   i) Add a new students record to the file.
   ii) Print the information of student with highest percentage.
   iii) Calculate and store internal marks of each student, where, intermarks = (sessional marks + PUT marks).

OR

4. a) Illustrate the use of error handling functions in file operations, with a suitable example. **7**

   b) A file numbers. dat contains several integer numbers. Write a program to add all odd numbers from the file and display the sum on output screen. **7**

5. a) Write a program to create an integer array and print the smallest element of that array. **9**
How would you dynamically change the size of that array, if needed.

b) Consider an integer array **4**
int $a[5] = \{1, 2, 5, 3, 10\}$ and a pointer 'ptr' which points to base address of the array 'a'.
Suppose the pointer 'ptr' is incremented by 2. Where will the 'ptr' point now? Use
appropriate pointer arithmetic rule and justify your answer.

OR

6. a) Explain the advantages of Dynamic memory allocation over static memory allocation. **4**

b) Explain a situation where you will use : **2+4**

i) Pointer within structure.

ii) Pointer to structure.

c) Write the meaning of 'm' in each of the following. **3**
i) float $* (*m)( )$
ii) int $*m[5]$
iii) char m(long $*$)

7. a) Write a program to display following figure on graphics screen. **8**
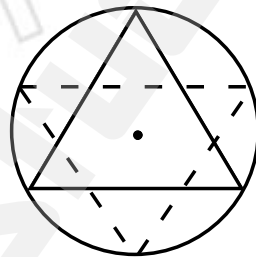
b) Demonstrate the use of following functions in graphics. **6**

i) initgraph ( )

ii) ellipse ( )

iii) line to ( )

OR

8. a) Illustrate the use and difference between fillpoly ( ) and drawpoly ( ) with the help of an **6**
example.

b) Write a program to draw circle, ellipse, line are on user choice. **8**

9. a) What is the use of models of computation in Computer Science? Explain the various **7**
models of computation in brief.

b)   Differentiate between iterative and recursive style of programming. Demonstrate an example for the same. **6**

<div align="center">**OR**</div>

10. a)   Explain with an example how mathematical induction is used to prove program correctness in Computer Science. Hence prove $1^2 + 2^2 + 3^2 + \ldots n^2 = \dfrac{n(n+1)\,2n+1)}{6}$. **7**

     b)   What is the need to measure time complexity of an algorithm? What are the different asymptotic notations and what is their use? **6**

11. a)   How to use Assertions and loop invariants to check correctness of a program? Write an example of each. **8**

     b)   Write the difference between object Oriented Programming and Procedural Programming. **5**

<div align="center">**OR**</div>

12. a)   Give an example where you would use **5**

       i)   top - down design and   ii)   Bottom - up design

     b)   Explain the following features of object oriented programming **8**

       i)   Class

       ii)   Object

       iii)   Encapsulation

       iv)   Polymorphism.

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