UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course Code & Name: CSEG1002 - Programming and Data Structures   **Semester: I**
Programme: B.Tech. CSE (AI&ML, BAO, BFSI, BigData, CCVT, CSF, DevOps, ECom&RA, GG, IT Infra, MAD, MFT, OGI, OS&OS), B.Tech. CSE LLB Cyber Law
Time: 03 hrs.   **Max. Marks: 100**
Nos. of page(s): 2
Instructions: Questions in each Section should be answered in the given sequence.

SECTION A (20 marks)			
S.No.		**Marks**	**CO**
Q1	Write a program to obtain the sum of the following series for a given value of 'n'. $(1/2) + (2/3) + ... + n/(n+1)$.	4	CO1
Q2	Write a recursive function to display the binary code of a given number.	4	CO2
Q3	Why do we need a Data Structure? How are data structures classified? Give examples.	4	CO3
Q4	Explain the concept of a Doubly Linked List.	4	CO3
Q5	List down the steps incurred for manually sorting the elements 23, 42, 4, 16, 18, 15 using insertion sort algorithm.	4	CO4
SECTION B (40 marks)			
Q6	Write a program to read the numbers until -1 is encountered. Calculate the sum and mean of all positive numbers, and the sum and mean of negative numbers separately.	10	CO1
Q7	Write a program that uses three float type arrays: num[10], square[10], squareroot[10]. Get the 'n' numbers from the user and write functions to compute square and square root and store in respective arrays.	10	CO2, CO3
Q8	Without using any built-in string handling function, write algorithm and code to extract the substring (s2) from the given source string (s1) by getting the substring start position (pos) and length of the substring (len). Assume s1 = "I live in INDIA". Then, extracted sub-string, s2 = "INDIA". **OR** Differentiate: (1) calloc() and malloc(), (b) Array and Linked List. (5+5)	10	CO5 CO3
Q9	Write a program to demonstrate the use of read, write and append file opening modes. (3+3+4)	10	CO4
SECTION-C (40 marks)			
Q10	Write algorithms and code to implement the following operations of a Circular Queue using an array. (a) Insertion, (b) Deletion, (c) Display (7+7+6) **OR** What is a self-referential structure? Implement the following stack operations using a Singly Linked List. (a) Push, (b) Pop, (c) Display (2+6+6+6)	20	CO5 CO3

Q11	We have a class of 60 students who study 5 subjects (100 Mark each). A student is considered "passed" only if the student meets both the criteria (a) Average marks of all subjects is 40% (b) Minimum score per subject is 30 marks. If the above is not achieved, the student is considered to be "failed". More over a student who fails in more than two subjects is considered as "Repeat Semester". Write a code to take input of all students for all subjects and to calculate and print the total number of students who had "passed", "failed" and have to "repeat semester".	20	CO5

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course Code & Name: CSEG1002 - Programming and Data Structures　　　**Semester: I**
Programme: B.Tech. CSE (AI&ML, BAO, BFSI, BigData, CCVT, CSF, DevOps, ECom&RA, GG, IT Infra, MAD, MFT, OGI, OS&OS), B.Tech. CSE LLB Cyber Law
Time: 03 hrs.　　　　　　　　　　　　　　　　　　　　　　**Max. Marks: 100**
Nos. of page(s): 1
Instructions: Questions in each Section should be answered in the given sequence.

	SECTION A (20 marks)		
S.No.		**Marks**	**CO**
Q1	Write a program to generate the Fibonacci series with 'n' terms.	4	CO1
Q2	Compare the purpose of using different Storage Class Specifiers.	4	CO2
Q3	Demonstrate the application of realloc() with an array using suitable code snippets.	4	CO3
Q4	Explain the concept of Priority Queue.	4	CO5
Q5	Differentiate a text file and binary file.	4	CO4
	SECTION B (40 marks)		
Q6	Classify the different operators used in C language. Provide simple code snippets to explain the use and property of different operators. (2+8)	10	CO1
Q7	What are pointers and pointers-to-pointers? With suitable code explain the use of function pointers. (3+7)	10	CO2
Q8	Without using any built-in string handling function, write algorithm and code to get two strings (s1 and s2), compare them and display whether they are identical or not. **OR** Write a function which returns a structure to main() after obtaining the value of its elements. Then print the elements of the structure in main().	10	CO5 CO2, CO3
Q9	Write a program to sort the elements in the array using Bubble sort algorithm. Insert an element into this sorted array such that the order is preserved. (5+5)	10	CO4
	SECTION-C (40 marks)		
Q10	Write algorithms and code to implement the following operations in a Singly Linked List. (a) Creation of 'n' linked nodes, (b) Insertion in Front of the List, (c) Display of all linked nodes (7+7+6) **OR** Given Expression is 5*((-3-2)*(4-6)+3*2). Write algorithm and draw stack diagrams with suitable connotations to perform the following: (a) Translate the given expression into postfix form, (b) Evaluate the obtained postfix expression. (10+10)	20	CO4 CO5
Q11	(a) Demonstrate the use of different built-in functions in random accessing a file. (b) Explain binary search with a suitable example and algorithm. (10+10)	20	CO4