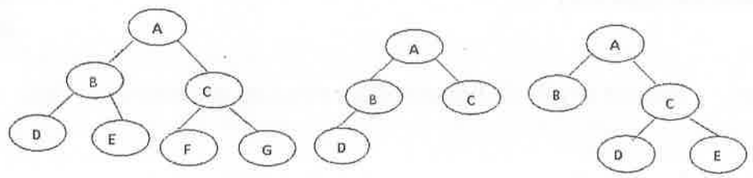
c) Design a Circular linked list that contains 100 patient information like patient name, disease, age. Count number of patients belonging to same disease and print disease name and number of patients belonging to each disease. 06

UNIT 3

4. a) Identify the following type of Binary trees and justify your answer. 06



b) Construct a Binary tree for the following preorder and inorder traversal. Write recursive pseudo code for Preorder and Inorder traversal 08
Preorder: ABDCEGHFIJ
Inorder: DBAGEHCIFJ

c) Write C function to create a Binary Search Tree. Create Binary Search Tree for the following list of elements 06
77, 88, 33, 66, 77, 99, 22, 55, 111, 44

UNIT 4

5. a) Construct an AVL tree for the following list of elements. 06
25, 26, 28, 23, 22, 24, 27

b) Explain with an example different types of Threaded Binary tree 06

c) Create a Huffman tree for the following data. Encode the text "ABACABAD" and Decode the text 100010111001010 08

Character	A	B	C	D	-
Percentage	40%	10%	20%	15%	15%

OR

6. a) Show the steps for inserting the values 2,1,4,5,3,6,7 into an empty splay tree 06
b) Discuss 4 cases of rotation when node x's uncle is black while creating Red-Black tree with an example 08
c) Explain with example, procedure of inserting a node into a B Tree 06

UNIT 5

7. a) Apply Radix sort technique to sort the following set of elements 06
55, 12, 36, 11, 40, 78, 83, 77, 83

b) Discuss with an example following Hash collision resolution techniques· 09
i) Linear Probing **ii)** Quadratic Probing **iii)** Double Hashing

c) Explain sorting by counting technique by sorting the following set of elements 05
28, 44, 9, 22, 55, 17

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BMS College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July / August 2018 Supplementary Examinations

Course: Data Structures
Course Code: 15CS3DCDST

Duration: 3 hrs.
Max Marks: 100
Date:02.08.2018

Instructions: **Answer any FIVE full questions, choosing one from each Unit.**

UNIT 1

1. a) Convert the following infix expression to postfix expression and show the stack content. 08
   i. (A+B/C) ^ (D ^E/F)/G
   ii. (X/Y+Z)^W-U-V
   Note: Symbol ' ^' represents exponentiation

   b) Illustrate the working of recursion technique with a space tree for Tower of Hanoi problem for n=3. Write an algorithm for the same. 06

   c) Outline the advantages of Circular Queue over Linear Queue. Write a function to insert and delete an element from a circular queue. 06

UNIT 2

2. a) Design a Singly linked list program for the following scenario. Create a linked list with starting address stored in Start. Each node contains information like: Student USN, Student name and number of previous backlog courses. Once the declaration of result, read USN and update total backlogs, then delete those students if number of backlogs is greater than 4 courses. 07

   b) Discuss the following dynamic memory allocation functions 07
   i) malloc() **ii)** calloc() **iii)** realloc() **iv)** free()

   c) Write a function to implement the following operations on Doubly Linked List 06
   i) Insert an element at the beginning
   ii) Deleting all nodes whose information field is even number

OR

3. a) Write a program to reverse a linked list (Assume linked list created with address of first node stored in Start pointer variable). 06

   b) Compare and Contrast between 08
   i) Singly linked list and Doubly linked list.
   ii) Doubly Linked List and Circular Linked List