University of Sargodha

BS 3rd Term Examination 2022

Subject: I.T **Paper: Discrete Structure (CMPC-205)**

Time Allowed: 02:30 Hours   Maximum Marks: 60

**Note:** Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part   (Compulsory)

Q.I.   Write short answers of the following in 2-3 lines each on your answer sheet.   (2*12)
   i.   Differentiate between pseudo graphs and multigraphs.
   ii.   Use a Truth Table to verify the first De Morgan law?
   iii. Find the value of this postfix expression 5 2 1 - - 3 1 4 + + *
   iv.   Using truth-table, verify the equivalence "p v T ≡ T".
   v.   Determine whether the relation R= {(1,1), (1,2), (2,1), (3,2)} on the set A = {1,2,3} is reflexive or not?
   vi.   Determine whether Euler or Hamilton path exists in the following graph.
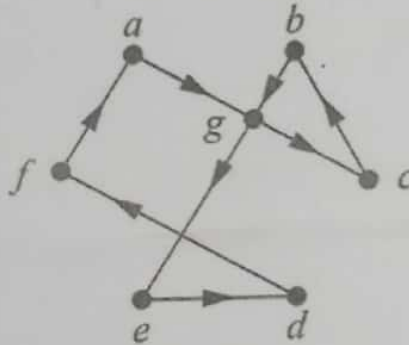
   vii. What is cardinality of these sets?
         i) {a, {a}, {a, {a}}}   ii) {{a}}
   viii. Define this function f(x) = x+1 onto or one-to-one. Domain consists of all integers.
   ix.   Derive average case complexity of insertion sort.
   x.   Define recurrence relation.
   xi.   Find spanning tree for the following graph by removing edges in simple circuits.
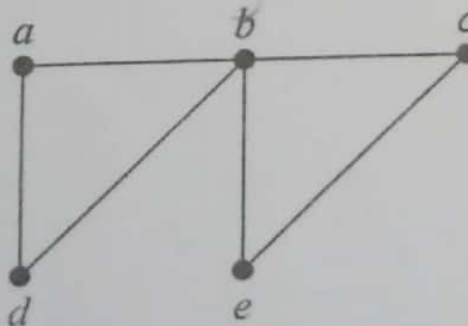
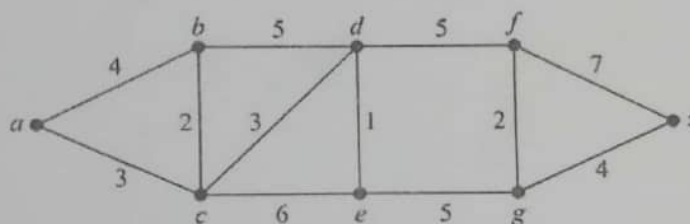   xii. What is the secret message produce from the message "MEET YOU IN THE PARK" using the Caesar Cipher?

Q.2.   In which order does a preorder and in order traversal visits the following tree.
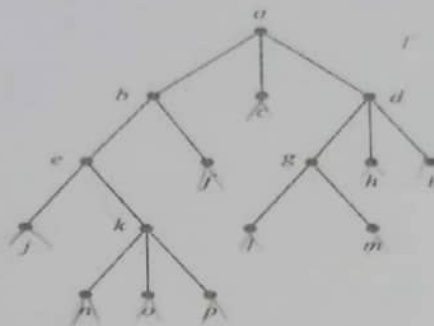
Q.3.   Find the length of shortest paths between the following vertices.
a) a and d   b) a and f
c) c and f   d) b and z

Q.4.   Use Divide and Conquer algorithm to put 6, 1, 2, 4, 3 into increasing order.

Q.5.   Describe the Linear Search algorithm and Find out the average case complexity of the linear search algorithm, assuming that the element x is in the list.

Q.6.   Let p,q and r be the propositions
p: You have the flu
q: you miss the final examination
r: You pass the course
Express each of these propositions as an English sentence.
a) p→q
b) q→¬r
c) ¬q↔r
d) (p^q)v(¬q^r)
e) P v q v r
f) (p→¬r) v (q→¬r)