Jaypee Institute of Information Technology, Noida
Test-1 Examination
Special Semester (June-July 2021)
Course Name: Theoretical Foundation of Computer Science
Course Code: 15B11CI212
Maximum Marks: 20
Maximum Time: 01 Hr.

Q1. [CO1][1 mark] Assuming Set A and Set B contain n and m elements respectively. Which of the following(s) holds true for functions?
1. For an injective function from B to A, n>=m.
2. For a surjective function from A to B, n>=m.

Q2. [CO1][1 mark] Given sets A={a,b,c,d} and B={1,2,3,4,5}. The total number of functions from A->B which are not injective is _____

Q3. [CO1][1 mark] Given sets Let A={1,2,3} and B={a,b,c,d,e}. The total number of functions from A->A which are bijective is_____

Q4. [CO1][1 mark] Given a series as:
0, 2, 5, 26, 96, 387, 1519…
Find the recurrence relation.

Q5. [CO1][1 mark] The relation S on the set of positive integers Z^+ is defined as
 S = {(a,b) ⎮ b = a^2+a+1}. Find the S^2.

Q6. [CO1][1 mark] No. of Equivalence Relations on a set {a,b,g,c,d,a,b,f} is _____.

Q.7 [CO1][1 mark] Is (Set A) x (Set B) equal to (Set B) x (Set A) or Not? (True/False). Justify your answer.

Q.8 [CO1][1 mark] |P((S × T) ∪ (T × S))| = |P((S × T) ∪ (S × T))| if and only if _____ OR_____OR _____.

Q.9 [CO1][1 mark] For Two finite sets A and B, where |A|=m and |B|=n. The total number of subsets of set A is 2016 more than the total number of subsets of set B. The values of m and n are _____ and _____respectively.

Q10. [CO1][1 mark] A^c- B^c is equal to the set difference of _____,

Q11 [CO1][3 marks] There are 7 Students each of them are from different batches (B1,B2,B3,B4,B5,B6,B7) and 3 hostel rooms named H1,H2,H3. How many ways are there to allocate hostel rooms to these 7 students such that each hostel room has at least 1 student?

Q11 [CO1][2 marks] Let there are 3 flags x,y,z of size 1 foot, 1 foot, and 2 feet. Find a recurrence relation for the number of ways to arrange given 3 types of flags on flagpole of n feet height.

Q13 [CO1][5 marks] Consider the given diagram
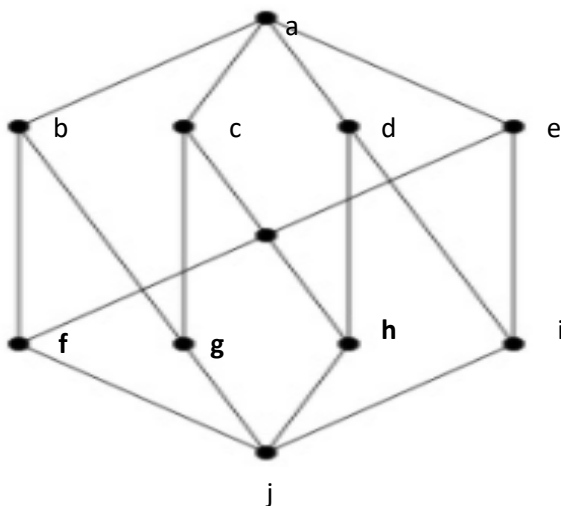
Find the maximum and minimum element .
Find the UB,LB, LUB and GLB of set {f,c,g,i} and {b,c,d}
State whether given hasse diagram is lattice or not ? justify your answer with explanation.