

2007 JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY

B.TECH INFORMATION TECHNOLOGY

MATHS

TIME : 3HOUR

MARK : 100

ANSWER ANY TEN QUESTIONS

1. Let A and B be finite sets. Suppose A has m elements and B has n elements. State the relationship which must hold between m and n for each of the following to be true:
 - (a) there exists a one-one (injection) map from A to B.
 - (b) there exists an onto (surjection) map from A to B.
 - (c) there exists a bijection (one-one onto) map from A to B.
2. Define floor, ceiling, integer, absolute value, remainder, exponential and logarithmic functions. Give two examples for each.
3. Let $f(x) = x + 2$, $g(x) = x - 2$, and $h(x) = 3x$ for Find
4. Let where State whether these functions are injective, surjective or bijective.
5. Let a and b be positive integers, and suppose Q is defined recursively as follows:
Find (i) Q (2, 5) (ii) Q (12, 5)
(iii) What does this function Q do? Find Q (5861, 7).
6. Let n denote a positive integer. Suppose a function L is defined recursively as follows:
Find L (25).
7. Consider a recursive function G from set of positive integers to integers, Is G well defined? Justify.
8. Let x and y be two integers and suppose that g(x, y) is defined recursively by Find g (2, 7), g (5, 3) and g (15, 2).
11. Suppose
12. Prove that
13. Show that
14. Show that
15. Using generating function solve the recurrence relation
16. Using generating function solve the recurrence relation