



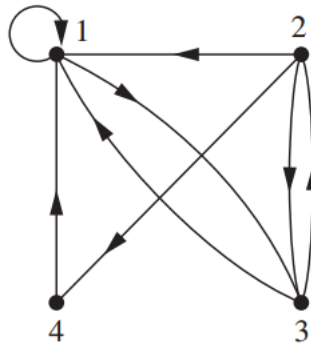
UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY 2018

COURSE NO : MA 170 Unihubgh.com
COURSE NAME: DISCRETE MATHEMATICS
CLASS : MA 1 TIME: 2 HRS

ANSWER TWO QUESTIONS ONLY

- 1. a) Using the generating function solve
un - un-1 - 2un-2 = n^2; n >= 2 given that u0 = 0, u1 = 1.
b) Prove by mathematical induction that n^3 - n is divisible by 3 for all n > 1.
2 a) Consider the digraph of the relation R below.



Find the digraph of the transitive closure

- b) Prove by induction that 1^2 + 2^2 + 3^2 + ... + n^2 = 1/6 n(n+1)(2n+1).
3. a) Find the monthly repayment on loan of £600 over period of 12 moths at an interest rate of 3% per month.
b) For each of these relations on the set {1, 2, 3, 4}, decide whether it is reflexive, whether it is symmetric, whether it is antisymmetric, and whether it is transitive.
i) R1 = {(2, 2), (2, 3), (2, 4), (3, 2), (3, 3), (3, 4)}
ii) R2 = {(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (4, 4)}
iii) R3 = {(2, 4), (4, 2)}
iv) R4 = (1, 2), (2, 3), (3, 4)}
v) R5 = {(1, 1), (2, 2), (3, 3), (4, 4)}
vi) R6 {(1, 3), (1, 4), (2, 3), (2, 4), (3, 1), (3, 4)}

Examiner: E. Danso-Addo