

國立中央大學八十九學年度轉學生入學試題卷

資訊工程學系 三年級

科目：離散數學

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1. In how many ways can a man climb a flight of n stairs if he climbs one or two stairs at a time? (20)
2. The genetic code, which contains the genetic material for all plants and animals, can be viewed as a sequence of four letters T, A, G, C. How many six-letter sequences are there? How many seven-letter sequences are there? How many eight-letter sequences are there? (20)
3. Count the number of edges of the complete graph K_n . (20 Points)
4. A man wants to invite seven guests to seven dinners. His table seats three persons besides himself. He wants to arrange the invitations in such a way that no two guests are ever invited at the same time. Can this be done? (20 points)
5. An insurance company believes that people can be divided into two classes: those who are accident-prone and those who are not. Their statistics show what an accident-prone person will have an accident at some time within a fixed 1 year period with probability .5, whereas this probability decreases to .3 for a non-accident-prone person. If we assume that 40 percent of the population is accident prone,
 - (a) what is the probability that a new policyholder will have an accident within a year of purchasing a policy ? (5 points)
 - (b) Suppose that a new policyholder has an accident within a year of purchasing a policy. What is the probability that he or she is accident-prone? (5 points)
 - (c) What is the conditional probability that a new policy holder will have an accident in his or her second year of policy ownership, given that the policyholder has had an accident in the first year? (10 points)