

94 學年度中央大學通訊工程學系碩士在職專班 【01】「機率」考題

考試日期：中華民國 94 年 3 月 19 日星期六，上午 08:30~10:10

考試地點：中央大學通訊館一樓 E1-109 教室

考試時間：100 分鐘

試題總分：100 分

1. A couple has 3 children. What is the probability that all children are boys if the eldest is a boy? (10%)
2. We have two coins; the first is fair and the second two-headed. We pick one of the coins at random. We toss it three times and the head shows three times. Find the probability that the coin picked is fair. (15%)
3. A card is selected at random from an ordinary deck of 52 playing cards. Let X be the event that the selected card is an ace and Y be the event that it is a heart. Show that X and Y are independent. (10%)
4. Three fair dice are rolled. Let X equal the sum of the 3 dice. Compute $P\{X = i\}$ for $i = 3, 4, \dots, 18$. (15%)
5. A box contains n identical balls numbered 1 through n . Suppose k balls are drawn in succession. (a) What is the probability that m is the smallest number drawn? (b) What is the probability that the smallest number drawn is larger than m ? (20%)
6. If X is uniformly distributed in the interval $(0,5)$, find the probability density function of $Y = 3X - 2$. (10%)
7. If X and Y are independent random variables, both uniformly distributed in the interval $(-1,1)$, calculate the probability density function of (a) $X + Y$ (b) $X - Y$. (20%)