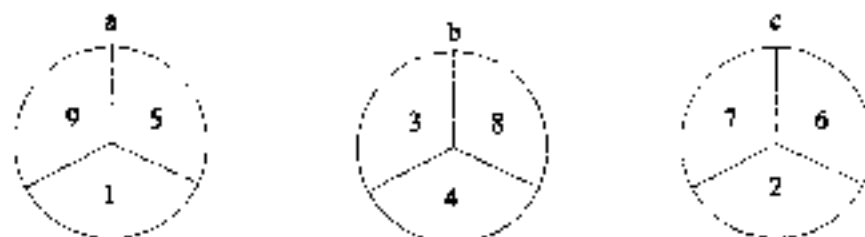


八十六學年度 數學系 系(所) 應數 組碩士班研究生入學考試

科目 機率論 科號 0205 共 2 頁第 / 頁 *請在試卷【答案卷】內作答

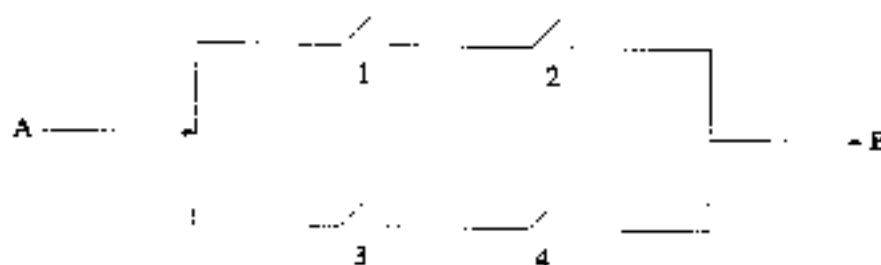
1. (15 points)

Two players play the following game. Player A chooses one of the three spinners a, b, c below and then player B chooses one of the remaining two spinners. Both players then spin their spinner and the one that lands on the higher number is declared the winner. Assuming that each spinner is equally likely to land in any of its 3 regions, would you be player A or player B ? Why?



2. Suppose the probability of the relay i in the following circuit being closed is $\frac{1}{i+1}$, $i = 1, 2, 3, 4$. If all relays function independently and a current can pass through relay i only when it is closed, find

- (a) (7 points) the probability that a current flows between A and B ;
 (b) (8 points) the conditional probability that the relay 1 is closed given a current flows between A and B .



3. (10 points)

An urn contains 10 black and 10 white balls. Draw 4 balls from the urn randomly without replacement. Compute the mean and the variance of the number of white balls drawn.

4. (15 points)

A line segment of length 1 is cut into three segments randomly. What is the probability that these three segments can form the three sides of a triangle?

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5. Let X_1, X_2, X_3 be independent and identically distributed standard normal random variables. Let $Y = X_1 + X_2 + X_3$, $Z = X_1 + 2X_2 + 2X_3$. Find

- (a) (5 points) $P(Y > Z)$;
- (b) (5 points) $\text{Var}(Y + Z)$;
- (c) (7 points) $E(Z|Y = 1)$;
- (d) (8 points) $\text{Var}(Z|Y = 1)$.