MAU11S02 Group A1 Quiz 08 9am 27/3/19

Rules and procedures.
1. Answers must be handed up at the end of the tutorial, no other time. **2.** Attempt 3 questions. Only *your first three answers* will be marked. **3.** Each question carries 10 marks, so the maximum quiz mark is 30. **4.** Marked quizzes will be returned, and answers published, the following week. **5.** If a particular method of solution is stipulated, you get no marks if you don't use it. **6.** The (9) quizzes will contribute 20% to your overall mark. **7.** You are allowed to collaborate and compare answers during the tutorial. **8.** ***Show all work.*** No marks will be given for answers which do not show the calculations.

Question 1. A production process has 2 assembly lines, A, B, with relative production rates $2:1$, and respective probabilities of $D|X$ (D: defective), $(X = A, B)$,
$0.1500, 0.1000$. Calculate the probabilities $\text{prob}(X|D)$ where $X = A, B$, respectively.

Question 2. A production process has 3 assembly lines, A, B, C, with relative production rates $2:1:2$, and respective probabilities of $D|X$ (D: defective), $(X = A, B, C)$,
$0.0500, 0.1000, 0.1000$. Calculate the probabilities $\text{prob}(X|D)$ where $X = A, B, C$, respectively.

Question 3. There are two bags containing only red and green (billiard) balls: one contains 5 red and 9 green, and the other contains 9 red and 21 green. A ball is taken at random from each bag. Calculate the probability that both balls are the same colour.

Question 4. There are 4 numbered balls in a bag, numbered $1 \ldots 4$. A ball is chosen at random, its number i noted, and returned to the bag. A second time, a ball is chosen at random, its number j is noted, and it is returned to the bag.

Let E be the event i is odd, and F the event $i < j$.

(i) Calculate the probabilities of $E, F, E \cap F$. (ii) Are E and F independent? Explain your answer.

Question 5. There are 3 (**correction: 3, not 5**) balls in a bag, numbered 1 to 3. Three times, a ball is taken from the bag at random, its number is taken, and it is returned to the bag. Suppose that the first number is i, the second j, and the third k.

Calculate the probabilities of the three events E_5, E_6, in which $i + j + k = 5, 6$, respectively.