

EE304 Probability and Statistics - Tutorial 2

Question 1

- (i) A country has 7 major cities. Each pair of cities is connected by a direct rail link. How many rail links are needed?
- (ii) How many distinct arrangements of the word “allegorical” are possible?
- (iii) A password for a computer system must consist of 3 letters (all lower case) followed by 3 digits. Letters and digits can be repeated. How many distinct passwords are possible?
- (iv) A password for a computer system must consist of 6 characters, 3 of which must be distinct letters and 3 of which must be distinct digits. How many distinct passwords are possible?
- (v) A password consists of 6 distinct characters, at least one of which must be a digit and at least 1 of which must come from the special characters #, *, &. How many passwords are possible?

Question 2

3 Maths books, 4 History books and 2 Computing books are to be arranged side by side on a shelf. If the arrangement is done randomly so that every arrangement is equally likely calculate the probability that:

- (i) the 3 maths books are all next to each other;
- (ii) the 2 books at the ends of the arrangement are computing books;
- (iii) the two books at the ends of the arrangement are History books.

Question 3

A simple communications system sends the two symbols 0, 1 over a noisy channel. The probability of a bit being received incorrectly is 0.05. If 55% of all the bits transmitted are 0, calculate:

- (i) the probability that a 1 is received;
- (ii) the probability that a 0 is received.

If the probability of a transmitted 1 being received as a 0 is 0.05 but the probability of a 0 being received as a 1 is 0.08 and a 1 is received, what is the probability that a 1 was actually transmitted?