Tree diagrams
Question Paper 1

Level	A LEVEL
Exam Board	Edexcel
Subject	Mathematics
Module	Mechanics and Statistics
Topic	Probability
Sub-Topic	Tree diagrams
Booklet	Question Paper 1

Time Allowed: 45 minutes

Score: /40

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1.   A group of students were surveyed by a principal and $\frac{2}{3}$ were found to always hand in assignments on time. When questioned about their assignments $\frac{3}{5}$ said they always start their assignments on the day they are issued and, of those who always start their assignments on the day they are issued, $\frac{11}{20}$ hand them in on time.

(a) Draw a tree diagram to represent this information.

(3)

(b) Find the probability that a randomly selected student

(i)   always start their assignments on the day they are issued and hand them in on time,

(2)

(ii) does not always hand in assignments on time and does not start their assignments on the day they are issued.

(4)

(c) Determine whether or not always starting assignments on the day they are issued and handing them in on time are statistically independent. Give reasons for your answer.

(2)

(Total 11 marks)

2. One of the objectives of a computer game is to collect keys. There are three stages to the game. The probability of collecting a key at the first stage is $\frac{2}{3}$, at the second stage $\frac{1}{2}$. ans at the third stage is $\frac{1}{4}$.

(a) Draw a tree diagram to represent the 3 stages of the game.

(4)

(b) Find the probability of collecting all 3 keys.

(2)

(c) Find the probability of collecting exactly one key in a game.

(5)

(d) Calculate the probability that keys are not collected on at least 2 successive stages in a game.

(5)

(Total 16 marks)

3. A company assembles drills using components from two sources. Goodbuy supplies 85% of the components and Amart supplies the rest. It is known that 3% of the components supplied by Goodbuy are faulty and 6% of those supplied by Amart are faulty.

(a) Represent this information on a tree diagram.

(3)

An assembled drill is selected at random.

(b) Find the probability that it is not faulty.

(3)

(Total 6 marks)

4. A bag contains 9 blue balls and 3 red balls. A ball is selected at random from the bag and its colour is recorded. The ball is not replaced. A second ball is selected at random and its colour is recorded.

   (a) Draw a tree diagram to represent the information.

(3)

Find the probability that

   (b) the second ball selected is red,

(2)

   (c) both balls selected are red, given that the second ball selected is red.

(2)

(Total 7 marks)