QQQ – Statistics Yr2 - Chapter 2 – Conditional Probability
Total Marks: 29
(29 = Platinum, 27= Gold, 24 = Silver, 21 = Bronze)

1.

A mechanic carried out a survey on the defects of cars he was servicing. He found that the probability of a car needing a new tyre is 0.33 and that a car needing a new tyre has a probability of 0.7 of needing tracking. A car not needing a new tyre has a probability of 0.04 of needing tracking.

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

(3)

(b) Find the probability that a randomly chosen car has exactly one of the two defects, needing a new tyre or needing tracking.

(2)

The mechanic also finds that cars need new brake pads with probability 0.35 and that this is independent of needing new tyres or tracking. A car is chosen at random.

(c) Find the probability that the car has at least one of these three defects.

(2)

(d) What advice would you give to motorists?

(1)

(Total 8 marks)

2.

$$P(E) = 0.25, P(F) = 0.4 \text{ and } P(E \cap F) = 0.12$$

(a) Find $P(E'|F')$

(2)

(b) Explain, showing your working, whether or not E and F are statistically independent. Give reasons for your answer.

(2)

The event G has $P(G) = 0.15$.

The events E and G are mutually exclusive and the events F and G are independent.

(c) Draw a Venn diagram to illustrate the events E, F and G, giving the probabilities for each region.

(5)

(d) Find $P([F \cup G]')$

(2)

(Total 11 marks)

3.

The table below shows the number of gold, silver and bronze medals won by two teams in an athletics competition.

	Gold	Silver	Bronze
Team *A*	29	17	18
Team *C*	21	23	17

The events *G*, *S* and *B* are that a medal is gold, silver or bronze respectively. Let *A* be the event that team A won a medal and *C* team C won a medal. A medal winner is selected at random. Find

(a) P(*G*),

(2)

(b) P([$A \cap S$]').

(2)

(c) Explain, showing your working, whether or not events *S* and *A* are statistically independent. Give reasons for your answer.

(2)

(d) Determine whether or not events *B* and *C* are mutually exclusive. Give a reason for your answer.

(2)

(e) Given that 30% of the gold medal winners are female, 60% of the silver medal winners are female and 40% of the bronze medal winners are female, find the probability that a randomly selected medal winner is female.

(2)

(Total 10 marks)