

SAMPLE PAPER 4: PAPER 2

QUESTION 4 (25 MARKS)

Question 4 (a) (i)

If there are a ways of doing one operation, and b ways of doing another operation, then there are ab ways of doing both operations.

Question 4 (a) (ii)

$$5 \times 6 \times 4 = 120$$



There are five ways to fill the first box.

Once this box has been filled, there are four ways to fill the second box. Once the first two boxes have been filled, there are three ways to fill the third box.

Number of possible three-course meals = 120

Question 4 (b)

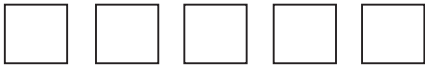
DIGITS CAN BE REPEATED:

There are nine ways to fill the first box (you cannot have a zero here as it would not be a five-digit number).

There are ten ways to fill the second box (you can use all digits).

There are ten ways to fill the third box, and so on.

$$9 \times 10 \times 10 \times 10 \times 10 = 90\,000$$



Number of five-digit numbers = 90 000

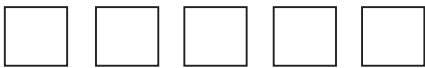
DIGITS CANNOT BE REPEATED:

There are nine ways to fill the first box (you cannot have a zero here as it would not be a five-digit number).

There are nine ways to fill the second box (you cannot use what is in the first box but you can use a zero).

There are eight ways to fill the third box (you cannot have a number that is in the first two boxes).

$$9 \times 9 \times 8 \times 7 \times 6 = 27\,216$$



Number of five-digit numbers with no digit repeated = 27 216

Question 4 (c)

$$6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$$



Number of arrangements of six people = 720

Glue the boys together and glue the girls together. There are two ways to arrange the groups.

There are six ways to arrange the three boys in their group and there are six ways to arrange the three girls in their group.

$$3 \times 2 \times 1 \quad 3 \times 2 \times 1$$



Number of arrangements where boys and girls sit together = $2(3 \times 2 \times 1 \times 3 \times 2 \times 1) = 72$