

SAMPLE PAPER 2014 (SET F): PAPER 2

QUESTION 1 (25 MARKS)

QUESTION 1 (a)

FUNDAMENTAL PRINCIPLE OF COUNTING

If there are a ways (outcomes) to do one operation and then b ways to do a second operation and then c ways to do a third operation then the number of ways of doing the first operation and then doing the second operation and then doing the third operation is given by $a \times b \times c$.

QUESTION 1 (b)

There are 5 ways to arrange the first object.

Once this is arranged, there are 4 ways to arrange the second object.

Once this is arranged, there are 3 ways to arrange the third object.

Once this is arranged, there are 2 ways to arrange the fourth object.

Once this is arranged, there is 1 way to arrange the last object.

$$n! = \text{Number of arrangement of } n \text{ different objects}$$

$$\begin{array}{ccccccccc}
 \text{1}^{\text{st}} \text{ object} & & \text{2}^{\text{nd}} \text{ object} & & \text{3}^{\text{rd}} \text{ object} & & \text{4}^{\text{th}} \text{ object} & & \text{5}^{\text{th}} \text{ object} \\
 \boxed{} & \text{and then} & \boxed{} & \text{and then} & \boxed{} & \text{and then} & \boxed{} & \text{and then} & \boxed{} \\
 5 & \times & 4 & \times & 3 & \times & 2 & \times & 1 = 5! = 120
 \end{array}$$

QUESTION 1 (c)

The 5 novels need to be together. There are $5!$ ways of arranging the 5 novels.

The 3 poetry books need to be together. There are $3!$ ways of arranging the 3 poetry books.

There are 2 ways of arranging these 2 groups of books.

$$\begin{array}{ccccccccc}
 \boxed{\text{N}} & & \boxed{\text{N}} & & \boxed{\text{N}} & & \boxed{\text{N}} & & \boxed{\text{N}} \\
 5 & \times & 4 & \times & 3 & \times & 2 & \times & 1 \\
 \boxed{\text{P}} & & \boxed{\text{P}} & & \boxed{\text{P}} \\
 3 & \times & 2 & \times & 1
 \end{array}$$

$$\text{Number of arrangements} = 5! \times 3! \times 2 = 1440$$
