COUNTING & PROBABILITY (Q 6, PAPER 2)

2005

6 (a) (i) Evaluate 6!

(ii) Evaluate $\binom{12}{3}$.

(b) Ten teams take part in a competition. The teams are divided into two groups. Teams A, B, C, D and E are in group 1 and teams U, V, X, Y and Z are in group 2.
In the final, the winning team from group 1 plays the winning team from group 2.
Each team is equally likely to win its group.
(i) How many different team pairings are possible for the final?

(ii) What is the probability that team C plays team X in the final?

(iii) What is the probability that team A plays in the final?

(iv) What is the probability that team B does not play in the final?

(c) Seven horses run in a race.
All horses finish the race and no two horses finish the race at the same time.
(i) In how many different orders can the seven horses finish the race?

(ii) A person is asked to predict the correct order of the first three horses to finish the race. How many different such predictions can be made?

(iii) A person is asked to predict, in any order, the first three horses to finish the race. How many different such predictions can be made?

(iv) A person selects two of the seven horses at random. What is the probability that the selected horses are the first two horses to finish the race?

ANSWERS
6 (a) (i) 720   (ii) 220
    (b) (i) 25   (ii) $\frac{1}{25}$ (iii) $\frac{1}{5}$ (iv) $\frac{4}{5}$
    (c) (i) 5040   (ii) 210   (iii) 35   (iv) $\frac{1}{21}$