8 **(a)** A 6-digit number is formed from the digits 0, 1, 2, 5, 6, 7, 8, 9. A number cannot start with 0 and each digit can be used at most once in any 6-digit number.

(i) Find how many 6-digit numbers can be formed if there are no further restrictions. [1]

(ii) Find how many of these 6-digit numbers are divisible by 5. [3]

(iii) Find how many of these 6-digit numbers are greater than 850 000. [3]

© UCLES 2022

(b) A team of 8 people is to be chosen from 12 people. Three of the people are brothers who must not be separated. Find the number of different teams that can be chosen. [3]

9 **(a)** Solve the equation $3\,\text{cosec}^2\left(2\phi - \frac{\pi}{3}\right) = 4$, for $0 < \phi < \pi$. Give your solutions in terms of π. [4]

(b) Given that $2x - 1 = \text{cosec}^2\theta$ and $y + 1 = \tan^2\theta$, find y in terms of x. [4]