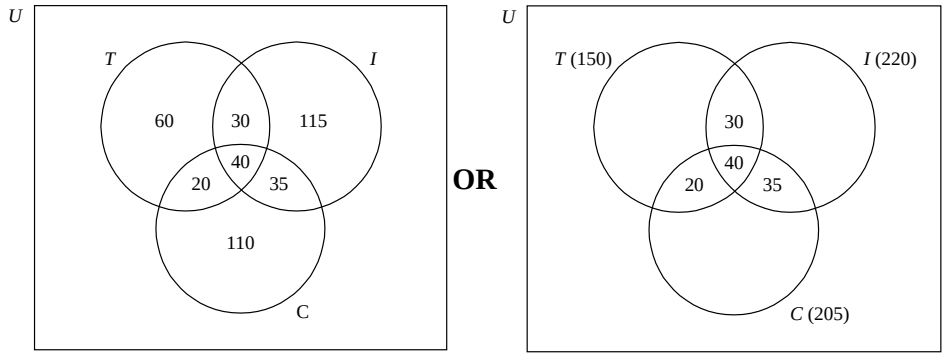
QUESTION 3.3

(a)



(A1)(A1)(A1)(A1) ***[4 marks]***

Notes: Award ***(A1)*** for labelled sets T, C, and I included inside an enclosed universal set. (Label U is not essential.)
Award ***(A1)*** for central entry 40.
(A1) for 20, 30 and 35 in the other intersecting regions.
(A1) for 60, 110 and 115 or $T(150), C(205), I(220)$.

In parts (b), (c) and (d) follow through from their diagram.

(b) (i) 110 ***(A1)*****(ft)**

(ii) 35 ***(A1)*****(ft)** ***[2 marks]***

(c) 60 ***(A1)*****(ft)** ***[1 mark]***

(d) $450-(60+20+40+30+115+35+110)$ ***(M1)***

Note: Award ***(M1)*** for subtracting all their values from 450.

$=40$ ***(A1)*****(ft)*****(G2)*** ***[2 marks]***

(e) (i) $\frac{230}{450}\times\frac{229}{449}$ ***(A1)(M1)***

Note: Award ***(A1)*** for correct fractions, ***(M1)*** for multiplying their fractions.

$\frac{52670}{202050}\left(\frac{5267}{20205}, 0.261, 26.1\%\right)(0.26067\ldots)$ ***(A1)(G2)***

Note: Follow through from their Venn diagram in part (a).

continued…

Question 3.3 continued

(ii) $\frac{220}{450}\times\frac{230}{449}+\frac{230}{450}\times\frac{220}{449}$ ***(A1)(A1)***

Note: Award ***(A1)*** for addition of their products, ***(A1)*** for two correct products.

OR

$\frac{230}{450}\times\frac{220}{449}\times 2$ ***(A1)(A1)***

Notes: Award ***(A1)*** for their product of two fractions multiplied by 2,
(A1) for correct product of two fractions multiplied by 2.
Award ***(A0)(A0)*** if correct product is seen not multiplied by 2.

$\frac{2024}{4041}\,(0.501, 50.1\%)\,(0.50086\ldots)$ ***(A1)(G2)*** ***[6 marks]***

Note: Follow through from their Venn diagram in part (a) and/or their 230 used in part (e)(i).

Note: For consistent use of replacement in parts (i) and (ii) award at most ***(A0)(M1)(A0)*** in part (i) and ***(A1)*(ft)*(A1)(A1)*(ft)** in part (ii).

(f) (i) $x+9y=13050$ ***(A1)***

(ii) $x=900$ ***(A1)*(ft)**
$y=1350$ ***(A1)*(ft)** ***[3 marks]***

Notes: Follow through from their equation in (f)(i). Do not award ***(A1)*(ft)** if answer is negative.
Award ***(M1)(A0)*** for an attempt at solving simultaneous equations algebraically but incorrect answer obtained.

continued…

Question 3.3 continued

(g) $49500 = 900 + 1350n$ ***(A1)*****(ft)**

Notes: Award ***(A1)*****(ft)** for setting up correct equation. Follow through from candidate's part (f).

$n = 36$ ***(A1)*****(ft)**

The total number of months is 37. ***(A1)*****(ft)*****(G2)***

Note: Award ***(G1)*** for 36 seen as final answer with no working. The value of n must be a positive integer for the last two ***(A1)*****(ft)** to be awarded.

OR

$49500 = 900 + 1350(n-1)$ ***(A2)*****(ft)**

Notes: Award ***(A2)*****(ft)** for setting up correct equation. Follow through from candidate's part (f).

$n = 37$ ***(A1)*****(ft)*****(G2)*** ***[3 marks]***

Note: The value of n must be a positive integer for the last ***(A1)*****(ft)** to be awarded.

Total ***[21 marks]***