5 **Two dice are thrown together and the total score is noted. The events E, F and G are 'a total of 4', 'a total of 9 or more' and 'a total divisible by 5', respectively. Calculate $P(E)$, $P(F)$ and $P(G)$ and decide which pairs of events, if any are independent.**

Two dice are thrown together *i.e.*, sample space $(S) = 36 \Rightarrow n(S) = 36$

$E =$ A total of $4 = \{(2, 2), (3, 1), (1, 3)\}$

$\Rightarrow \quad n(E) = 3$

$F =$ A total of 9 or more

$= \{(3, 6), (6, 3), (4, 5), (4, 6), (5, 4), (6, 4), (5, 5), (5, 6), (6, 5), (6, 6)\}$

$\Rightarrow \quad n(F) = 10$

$G =$ a total divisible by $5 = \{(1, 4), (4, 1), (2, 3), (3, 2), (4, 6), (6, 4), (5, 5)\}$

$\Rightarrow \quad n(G) = 7$

Here, $\quad (E \cap F) = \phi$ and $(E \cap G) = \phi$

Also, $\quad (F \cap G) = \{(4, 6), (6, 4), (5, 5)\}$

$\Rightarrow \quad n(F \cap G) = 3$ and $(E \cap F \cap G) = \phi$

$$\therefore \quad P(E) = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$$

$$P(F) = \frac{n(F)}{n(S)} = \frac{10}{36} = \frac{5}{18}$$

$$P(G) = \frac{n(G)}{n(S)} = \frac{7}{36}$$

$$P(F \cap G) = \frac{3}{36} = \frac{1}{12}$$

and $$P(F) \cdot P(G) = \frac{5}{18} \cdot \frac{7}{36} = \frac{35}{648}$$

Here, we see that $P(F \cap G) \neq P(F) \cdot P(G)$

[since, only F and G have common events, so only F and G are used here]

Hence, there is no pair which is independent.