Q.17) The statement can be expressed as:

$$\forall k \in \mathbb{Z}, \forall x \in \mathbb{Z}, x^2 + 5x + k \text{ is composite}$$

- We can use proof by negation and we get:

$$\neg(\forall k \in \mathbb{Z}, \forall x \in \mathbb{Z}, x^2 + 5x + k \text{ is composite})$$
$$\Rightarrow \exists k \in \mathbb{Z}, \exists x \in \mathbb{Z}, x^2 + 5x + k \text{ is prime}$$

- This is true as when $x = 2$ and $k = 3$

$$\Rightarrow x^2 + 5x + k$$
$$\Rightarrow 2^2 + 10 + 3$$
$$\Rightarrow 4 + 10 + 3$$
$$\Rightarrow 17 \leftarrow \text{which is prime}$$

∴ Since $\neg(A)$ is true (A) is false so the original statement must also be false.