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**10.** (i) Prove by counter example that the statement

"if $p$ is a prime number then $2p + 1$ is also a prime number"

is not true.

**(1)**

(ii) Use proof by exhaustion to prove that if $n$ is an integer then

$$5n^2 + n + 12$$

is always even.

**(4)**

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**Question 10 continued**

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**Question 10 continued**

**Q10**

**(Total 5 marks)**

**TOTAL FOR PAPER IS 75 MARKS**

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