Sample Paper 7: Paper 1

Question 1 (25 marks)

Question 1 (a) (i)

First 10 natural squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Question 1 (a) (ii)

Consecutive numbers: $n-1$, n

Consecutive squares: n^2, $(n+1)^2$

$$n^2-(n-1)^2=n^2-(n^2-2n+1)=n^2-n^2+2n-1=2n-1$$

$2n$ is always an even number

$2n-1$ is always an odd number

Question 1 (b) (i)

$$1^2+2^2=\frac{2\times3\times5}{6}$$

$$1+4=\frac{30}{6}$$

$$5=5$$

Question 1 (b) (ii)

$$1^2+2^2+3^2=\frac{3\times4\times7}{6}$$

$$1+4+9=2\times7$$

$$14=14$$

Question 1 (b) (iii)

$$1^2+2^2+3^2+4^2=\frac{4\times5\times9}{6}$$

$$1+4+9+16=\frac{180}{6}$$

$$30=30$$

Question 1 (b) (iv)

$$1^2+2^2+3^2+4^2+.....+10^2=\frac{10\times11\times21}{6}=5\times11\times7=385$$

Question 1 (c) (i)

$$1^2+2^2+3^2+.....+n^2=\frac{n(n+1)(2n+1)}{6}$$

Question 1 (c) (ii)

$$S_{100}=\frac{100(101)(201)}{6}=338\ 350$$