SEQUENCES & SERIES (Q 5, PAPER 1)

LESSON NO. 5: ARITHMETIC SERIES

2007

- 5 (b) The first term of an arithmetic series is 3 and the common difference is 4.
 - (i) Find, in terms of *n*, an expression for T_n , the *n*th term.
 - (ii) How many terms of the series are less than 200?
 - (iii) Find the sum of these terms.

2005

- 5 (b) The sum of the first n terms of an arithmetic series is given by
 - $S_n = n^2 + n.$
 - (i) Find *a*, the first term.
 - (ii) Find S_2 , the sum of the first two terms.
 - (iii) Find *d*, the common difference.
 - (iv) Write down the first five terms of the series.

2004

- 5 (b) The *n*th term of an arithmetic series is given by
 - $T_n = 1 + 5n.$
 - (i) The first term is *a* and the common difference is *d*. Find the value of *a* and the value of *d*.
 - (ii) Find the value of *n* for which $T_n = 156$.
 - (iii) Find S_{12} , the sum of the first 12 terms.

2003

- 5 (c) The fifth term of an arithmetic series is 21 and the tenth term is 11.
 - (i) Find the first term and the common difference.
 - (ii) Find the sum of the first twenty terms.
 - (iii) For what value of n > 0 is the sum of the first *n* terms equal to zero?

2001

5 (c) The sum of the first n terms of an arithmetic series is given by

$$S_n = 4n^2 - 8n$$

- (i) Use S_1 and S_2 to find the first term and the common difference.
- (ii) Starting with the first term, how many terms of the series must be added to give a sum of 252?

2000

- 5 (c) The first three terms of an arithmetic series are 5 + 10 + 15 + ...
 - (i) Find, in terms of *n*, an expression for T_n , the *n*th term.
 - (ii) Find, in terms of n, an expression for S_n , the sum to n terms.
 - (iii) Using your expression for S_n , find the sum of the natural numbers that are both multiples of 5 and smaller than 1000.

1998

5 (c) The first three terms of an arithmetic series are

 $2d + 3d + 4d + \dots$

where d is a real number.

- (i) Find, in terms of d, an expression for T_{10} , the tenth term.
- (ii) Find, in terms of d, an expression for S_{10} , the sum to 10 terms.
- (iii) If $S_{10} T_{10} = 162$, find the value of *d* and write down the first four terms of the series.

1996

- 5 (a) The first two terms of an arithmetic series are given as 2 + 8 +..... Find
 - (i) *d*, the common difference
 - (ii) T_{10} , the tenth term
 - (iii) the value of *n* such that $T_n = 200$
 - (iv) S_{16} , the sum to 16 terms.

Answers			
2007	5 (b) (i) $T_n = 4n - 1$	(ii) 50	(iii) 5050
2005	5 (b) (i) 2	(ii) 6	(iii) 2
	(iv) 2, 4, 6, 8, 10		
2004	5 (b) (i) $a = 6, d = 5$	(ii) 31	(iii) 402
2003	5 (c) (i) $a = 29, d = -2$	(ii) 200	(iii) 30
2001	5 (c) (i) $a = -4, d = 8$	(ii) 9	
2000	5 (c) (i) $T_n = 5n$	(ii) $S_n = \frac{n}{2}(5n+5)$	(iii) 99,500
1998	5 (c) (i) 11 <i>d</i>	(ii) 65 <i>d</i>	(iii) <i>d</i> = 3; 6, 9, 12, 15,
1996	5 (a) (i) 6	(ii) 56	(iii) 34
	(iv) 752		