SEQUENCES & SERIES (Q 5, PAPER 1)

1998

5 (a) The first two terms of an arithmetic sequence are 17, 13,...
     Find
     (i) d, the common difference

     (ii) T_7, the seventh term.

   (b) The nth term of a geometric sequence is

   $$T_n = \frac{2^n}{3^n}.$$

     (i)   Find the first three terms of the sequence.

     (ii) Show that S_5, the sum of the first five terms, is $\frac{422}{243}$.

   (c) The first three terms of an arithmetic series are
                $2d + 3d + 4d + ...$
     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.

ANSWERS

5   (a) (i) −4   (ii) −7
     (b) (i) $\frac{2}{3}$, $\frac{4}{9}$, $\frac{8}{27}$
     (c) (i) $11d$ (ii) $65d$ (iii) $d = 3$; 6, 9, 12, 15,....