

**Series – 2022 O Level Additional Math****1. June/2022/Paper\_11/No.7**

- (a) The first three terms of an arithmetic progression are  $\lg 3$ ,  $3 \lg 3$ ,  $5 \lg 3$ . Given that the sum to  $n$  terms of this progression can be written as  $256 \lg 81$ , find the value of  $n$ . [5]

**(b) DO NOT USE A CALCULATOR IN THIS PART OF THE QUESTION.**

The first three terms of a geometric progression are  $\ln 256$ ,  $\ln 16$ ,  $\ln 4$ . Find the sum to infinity of this progression, giving your answer in the form  $p \ln 2$ . [4]

**2. June/2022/Paper\_12/No.5**

The first three terms, in ascending powers of  $x$ , in the expansion of  $\left(1 + \frac{x}{6}\right)^{12} (2 - 3x)^3$  can be written in the form  $8 + px + qx^2$ , where  $p$  and  $q$  are constants. Find the values of  $p$  and  $q$ . [8]

**3. June/2022/Paper\_21/No.5**

**(a) (i)** Write down, in ascending powers of  $x$ , the first three terms in the expansion of  $(1 + 4x)^n$ . Simplify each term. [2]

**(ii)** In the expansion of  $(1 + 4x)^n(1 - 4x)$  the coefficient of  $x^2$  is 6032. Given that  $n > 0$ , find the value of  $n$ . [3]

**(b)** Find the term independent of  $x$  in the expansion of  $\left(\frac{x}{2} - \frac{8}{x^4}\right)^{10}$ . [2]

**4. June/2022/Paper\_22/No.10**

**(a)** A geometric progression has first term  $a$  and common ratio  $r$ , where  $r > 0$ . The second term of this progression is 8. The sum of the third and fourth terms is 160.

**(i)** Show that  $r$  satisfies the equation  $r^2 + r - 20 = 0$ . [4]

**(ii)** Find the value of  $a$ . [3]

- (b) An arithmetic progression has first term  $p$  and common difference 2. The  $q$ th term of this progression is 14.  
A different arithmetic progression has first term  $p$  and common difference 4. The sum of the first  $q$  terms of this progression is 168.

Find the values of  $p$  and  $q$ .

[6]