

Non Calculator Section A

- 1) Given that $\log_a pq = 9$ and $\log_a p^2q = 15$, find the value of
- (i) $\log_a p$ and of $\log_a q$, [4]
 - (ii) $\log_p a + \log_q a$. [2]
- 2)
- (a) Find $\log_2 32$. [1 mark]
 - (b) Given that $\log_2 \left(\frac{32^x}{8^y} \right)$ can be written as $px + qy$, find the value of p and of q . [4 marks]
- 3)
- The first three terms of an infinite geometric sequence are 32, 16 and 8.
- (a) Write down the value of r . [1 mark]
 - (b) Find u_6 . [2 marks]
 - (c) Find the sum to infinity of this sequence. [2 marks]
- 4)
- The fifth term in the expansion of the binomial $(a+b)^n$ is given by $\binom{10}{4} p^6 (2q)^4$.
- (a) Write down the value of n . [1 mark]
 - (b) Write down a and b , in terms of p and/or q . [2 marks]
 - (c) Write down an expression for the sixth term in the expansion. [3 marks]

Calculator Section B

- 5) (a) Expand $\sum_{r=4}^7 2^r$ as the sum of four terms. [1 mark]
- (b) (i) Find the value of $\sum_{r=4}^{30} 2^r$.
- (ii) Explain why $\sum_{r=4}^{\infty} 2^r$ cannot be evaluated. [6 marks]
- 6) The first term of a geometric sequence is 200 and the sum of the first four terms is 324.8.
- (a) Find the common ratio. [4 marks]
- (b) Find the tenth term. [2 marks]
- 7) The first three terms of an arithmetic sequence are 5, 6.7, 8.4.
- (a) Find the common difference. [2 marks]
- (b) Find the 28th term of the sequence. [2 marks]
- (c) Find the sum of the first 28 terms. [2 marks]
- 8)c (i) Find the first 3 terms, in descending powers of x , in the expansion of $\left(x + \frac{2}{x^2}\right)^6$. [3]
- (ii) Hence find the term independent of x in the expansion of $\left(2 - \frac{4}{x^3}\right)\left(x + \frac{2}{x^2}\right)^6$. [2]