Multiple choice questions

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy.
   (1) $1 < r < b$ (2) $0 < r < b$ (3) $0 \leq r < b$ (4) $0 < r \leq b$

2. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
   (1) $0, 1, 8$ (2) $1, 4, 8$ (3) $0, 1, 3$ (4) $1, 3, 5$

3. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
   (1) 4   (2) 2   (3) 1   (4) 3

4. The sum of the exponents of the prime factors in the prime factorization of 1729 is
   (1) 1   (2) 2   (3) 3   (4) 4

5. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   (1) 2025   (2) 5220   (3) 5025   (4) 2520

6. $7^{4k} \equiv$ _____ (mod 100)
   (1) 1   (2) 2   (3) 3   (4) 4

7. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
   (1) 3   (2) 5   (3) 8   (4) 11

8. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.
   (1) 4551   (2) 10091   (3) 7881   (4) 13531

9. If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is
   (1) 0   (2) 6   (3) 7   (4) 13

10. An A.P. consists of 31 terms. If its 16th term is m, then the sum of all the terms of this A.P. is
    (1) 16 m   (2) 62 m   (3) 31 m   (4) $\dfrac{31}{2}$ m

11. In an A.P., the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?
    (1) 6   (2) 7   (3) 8   (4) 9

12. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ \ + 2^0$ which of the following is true?
    (1) B is 2^{64} more than A (2) A and B are equal
    (3) B is larger than A by 1   (4) A is larger than B by 1