UNIT TEST – 2(Numbers and sequence, Graphs, Practical geometry)
MATHEMATICS

CLASS: X standard   **MARKS: 100**

PART-I [Marks 14]

Answer all the 14 questions   **14x1=14**

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.

(a) $1 < r < b$ (b) $0 < r < b$ (c) $0 \leq r < b$ (d) $0 < r \leq b$

2. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are

(a) 0, 1, 8   (b) 1, 4, 8   (c) 0, 1, 3   (d) 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

(a) 4   (b) 2   (c) 1   (d) 3

4. The sum of the exponents of the prime factors in the prime factorization of 1729 is

(a) 1   (b) 2   (c) 3   (d) 4

5. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

(a) 2025   (b) 5220   (c) 5025   (d) 2520

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

(a) 1   (b) 2   (c) 3   (d) 4

7. Given $F(1)= 1$,$F(2)= 3$ and $F_n= F_{n-1}+F_{n-2}$ then $F5$ is

(a)3   (b)5   (c)8   (d)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.?

(a) 4551   (b) 10091   (c) 7881   (d) 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

(a) 0   (b) 6   (c) 7   (d) 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

(a) 16 m   (b) 62 m   (c) 31 m   (d) 312 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?

(a) 6   (b) 7   c) 8   (d) 9

12. The next term of the sequence 3/ 16, 1/8, 1 /12. /1 18 , , , ,is
(a) 1 /24   (b) 1/ 27   (c) 2/3   (d) 1/ 81

13. If the sequence $t_1.t_2,t_3$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, , , ,...$ is

(a) a Geometric Progression   (b) an Arithmetic Progression
(c) neither an Arithmetic Progression nor a Geometric Progression
(d) a constant sequence

14. The value of $(1^3+2^3+.........15^3)-(1+2+......15)$

(a) 14400   (b) 14200   (c) 14280   (d) 14520

PARTS-II [MARKS: 20]

Answer all the questions [Question number 28 is compulsory]   10x2=20

15. If the Highest Common Factor of 210 and 55 is expressible in the form 55x, - 325, find x

16. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively

17. State Euclid's division lemma

18. Find the least positive value of x such that $78 + x \equiv 3 \pmod 5$

19. The general term of a sequence is define as

$$an= \begin{cases} n(n+3); n\in N \text{ is odd} \\ n^2+1; n\in N \text{ is odd} \end{cases}$$ Find the eleventh and eighteenth terms.

20. Find the first six terms of the sequences If a1 = 1, a2 = 1 an=2an-1 +a n-2.

21. Find the number of terms in the A.P. 3, 6, 9, 12,..., 111

22. Find the 19th term of an A.P. -11,-15,- 19 ....

23. Find the middle term(s) of an A.P. 9, 15, 21, 27,...,183

24. In a G.P. 729, 243, 81............ find t7

25. Find the sum $3 + 1 + 1/3 + \ldots\ldots + \infty$

26. Find the value of (i) $1 + 2 + 3 + \ldots\ldots\ldots 50$

27. Find the sum of $1^2 + 2^2 + 3^2 + \ldots\ldots\ldots\ldots + 19^2$

28. If $1 + 2 + 3 + \ldots\ldots + k = 325$ then find $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots\ldots + k^3$

PARTS-III [MARKS: 50]
Answer all the questions [Question number 42 is compulsory]   **10x5=50**

29. In an A.P., sum of four consecutive terms is 28 and the sum of their squares is 276. Find the four numbers

30. The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms

31. The 13th term of an A.P. is 3 and the sum of first 13 terms is 234. Find the common difference and the sum of first 21 terms

32. Find the sum of all natural numbers between 300 and 600 which are divisible by 7

33. The 104th term and 4th term of an A.P. are 125 and 0. Find the sum of first 35 terms

34. Raghu wish to buy a laptop. He can buy it by paying 40,000 cash or by giving it in 10 installments as 4800 in the first month, 4750 in the second month, 4700 in the third month and so on. If he pays the money in this fashion, find (i) total amount paid in 10 installments. (ii) how much extra amount that he has to pay than the cost?

35. Find the sum $\dfrac{a-b}{a+b} + \dfrac{3a-2b}{a+b} + \dfrac{5a-3b}{a+b} + \ldots\ldots 12$ terms

36. The sum of first n, 2n and 3n terms of an A.P. are S1, S2 and S3 respectively. Prove that S3=3(S2-S1)

37. If $Sn = (x+y) + (x^2+xy+y^2) + (x^3+x^2y+xy^2+y^3) + \ldots\ldots\ldots n$ then

prove that $(x-y)Sn = \left[\dfrac{x^2(xn-1)}{x-1} - \dfrac{y^2(yn-1)}{y-1} \right]$

38 In a G.P. the 9th term is 32805 and 6th term is 1215. Find the 12th term

39. Find the sum to n terms of the series $5 + 55 + 555 + \ldots\ldots\ldots\ldots n$ terms

40. Find the sum of $15^2 + 16^2 + 17^2 + \ldots\ldots\ldots\ldots + 28^2$

41. Find the sum of $10^3 + 11^3 + \ldots\ldots\ldots\ldots + 23^3$

42. If $S_1, S_2, \ldots\ldots\ldots, S_m$ are the sums of n terms of m A.P.'s whose first terms are 1, 2, 3...m and whose common differences are 1, 3, ,5,............ (2m-1) respectively, then show that
$S_1 + S_2, \ldots\ldots + S_m = 1/2 \, mn(mn+1)$

PARTS-IV [MARKS: 16]

Answer both questions   2x8=16

43.   a) Draw a circle of radius 4 cm. At a point *L* on it draw a tangent to the circle using the alternate segment

(OR)

b) Draw a triangle *PQR* of base *PQ* = 4.5 cm, R = 60° and the median from *R* to *RG* is 6 cm

44.   a) Draw the graph of $y = 2x^2$ and hence use it to solve $2x^2 - x - 6 = 0$

(OR)

b) Draw the graph of $y = x^2 + 3x + 2$ and hence use it to solve $x^2 + 2x + 1 = 0$

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