INDUS RANGERS DEFENCE ACADEMY

4TH Floor Shakumbhari Complex, Chetmani Near: IP Vijaya Mall Bhelupur Varanasi, (U.P.– 221010)

CDS [MATHEMATICS]
PRACTICE SHEET - 4

Time: 1:30 Hr **M. M.: 200**

General Instructions:

- There are 50 questions
- All questions have 4 marks for correct and –1 mark for wrong answer as a penalty.
- The name, date, and exam must be filled in OMR sheet otherwise the result will not be published.
- OMR fill should be properly.

1. If the number 413283P759387 is divisible by 13, then what is the value of P?
   A. 3 B. 6 C. 7 D. 8
2. What is the remainder when $2^{1000000}$ is divided by 7?
   A. 1 B. 2 C. 4 D. 6
3. Consider the pairs of prime numbers (m, n) between 50 and 100 such that m – n = 6. How many such pairs are there?
   A. 2 B. 3 C. 4 D. 5
4. What is the unit digit in the expansion of 67^{32}?
   A. 1 B. 3 C. 7 D. 9
5. What are distinct prime factors of the number 26381?
   A. 29, 17, 37 B. 31, 17, 47 C. 19, 37, 13 D. 23, 31, 37
6. What is the remainder after dividing the number 37^{1000} by 9?
   A. 1 B. 3 C. 7 D. 9
7. If x is negative real number, then which of the following are not correct?
   1.There is some natural number k such that $kx > 0$
   2.$x^2 + x > 0$ always
   3.$2x < x < -x$
   4. x^2 is always a rational number
   Select the correct answer using the code given below:
   A. 1, 2 and 3 B. 1, 2 and 4 C. 1, 3 and 4 D. 2, 3 and 4
8. How many zeros are there in the product $1^{50} \times 2^{49} \times 3^{48} \times .... \times 50^{1}$?
   A. 262 B. 261 C. 246 D. 235
9. A two-digit number is such that the product of the digits is 8. If 63 is added to this number, the digits interchanged their places. What is the sum of the digit in the number?
   A. 6 B. 7 C. 8 D. 9
10. Consider the following statements:
    1.The sum of the cubes of three consecutive natural numbers is divisible by 9.
    2.Every even power of every odd number (>1) when divided by 8 gives 1 as remainder.

Which of the above statements is/are correct?

A. 1 only B. 2 only C. Both 1 and 2 D. Neither 1 nor 2

11. What is the number of divisors of 1000 (excluding 1 and 1000)?

A. 12 B. 13 C. 14 D. 16

12. $27^5 + 3^{13}$ is divisible by:

A. 8 B. 10 C. 12 D. 21

13. Let $p = 2^{2n+2} + m$ and $q = 2^{4n} – m$ (where n is even natural number). What should be the least value of m such that p as well as q is divisible by 5?

A. – 1 B. 1 C. 4 D. 6

14. Let a, b, c, d be positive integers. If $\frac{1}{a+\frac{1}{b+\frac{1}{c+\frac{1}{d}}}} = \frac{17}{60}$ then what is the product of a, b, c, d?

A. 24 B. 51 C. 68 D. 102

15. What is the value of least value of n if $194480 + n = m^4$, where m and n are natural numbers?

A. 1 B. 2 C. 3 D. 4

16. $41^{43} + 43^{43}$ is divisible by

A. 80 B. 84 C. 86 D. 88

17. $4^{61} + 4^{62} + 4^{63} + 4^{64}$ is divisible by:

A.7 B. 9 C. 11 D. 17

18. There are two natural numbers x and y, where x > y. When x is divided by 6, it leaves the remainder 2 and when y is divided by 6, it leaves the remainder 3. What is the remainder when (x – y) is divided by 6?

A. 1 B. 3

C. 5 D. Remainder cannot be determined

19. If three times the greater of two numbers is divided by the smaller number, the quotient will be 6 and the remainder will be 6. If five items the smaller number is divided by the greater number is divided by the greater number, the quotient will be 2 and the remainder will be 3. What is the difference between the numbers?

A. 8 B. 9 C. 10 D. 12

20. Consider the number $N = 12^6 \times 3^8 \times 5^3$.

Which of the following statements is/are correct?

1. The number of odd factors of N is 60
2. The number of even factors of N is 720.

Select the correct answer using the code given below:

A. Only 1 B. Only 2 C. Both 1 and 2 D. Neither 1 nor 2

21. Consider the question and two statements given below:

A 2-digit number is added to the number formed by reversing the digits of the 2-digit number.

Question: What is the 2-digit number?

Statement-1: The sum is divisible by 9

Statement-2: The sum is divisible by 2.

Which one of the following is correct in respect of the question and the statements?

A. Statement-1 alone is suffering to answer the question

B. Statement-2 alone is suffering to answer the question

C. Both statement-1 and statement-2 are suffering to answer the question

D. Both statement-1 and statement-2 are not suffering to answer the question.

22. Let a, b, c and d be four positive integers such that a + b + c + d = 200.

If $S = (-1)^a + (-1)^b + (-1)^c + (-1)^d$, then what is the number of possible values of S?

A. One B. Two C. Three D. Four

23. The number $97^{30} - 14^{30}$ is divisible by:

A. 37 but not 83 B. 83 but not 37

C. Both 37 and 83 D. Neither 37 nor 83

24. Consider the following statements:

1. $\log_{10} 50$ is a rational number

2. $\log_{100} 10$ is an irrational number.

Which of the statements given above is/are correct?

A. 1 Only B. 2 Only C. Both 1 and 2 D. Neither 1 nor 2

25. Consider the following statements:

1. $n^3 - n$ is divisible by 6

2. $n^5 - n$ is divisible by 5

3. $n^5 - 5n^3 + 4n$ is divisible by 120.

Which of the statements given above are correct?

A. 1 and 2 only B. 2 and 3 only C. 1 and 3 only D. 1, 2 and 3

26. What is the last digit of the sum $S = 9^{27} + 27^9$?

A. 3 B. 6 C. 7 D. 9

27. Consider the following statements in respect of all factors of 360?

1. The number of factors is 24.

2. The sum of all factors is 1170.

Which of the above statements is/are correct?

A. 1 only B. 2 only C. Both 1 and 2 D. Neither 1 nor 2

28. Consider a 6-digit number of the form XYXYXY. The number is divisible by:

A. 3 and 7 only B. 7 and 13 only

C. 3, 13 and 37 only D. 3, 7, 13 and 37

29. Let m and n be natural numbers. What is the minimum value of (m + n) such that 33m + 22n is divisible by 121?

A. 3 B. 4 C. 5 D. 10

30. If a, b and c are the sides of a triangle ABC, then $\sqrt{a} + \sqrt{b} - \sqrt{c}$ is always:

A. Negative B. Positive C. Non – negative D. Non – positive

31. When every even power of every odd integer (greater than 1) is divided by 8, what is the remainder?

A. 3 B. 2

C. 1 D. the remainder is not necessarily 1

32. It is given that 5 does not divide n–1, n and n + 1, where n is a positive integer. Which one of the following is correct?

A. 5 divide (n^2 + 1) B. 5 divides (n^2–1)

C. 5 divides (n^2 + n) D. 5 divides (n^2 – n)

33. What is the largest power of 10 that divides the product 29 × 28 × 27 × ……2 × 1?

A. 4 B. 5 C. 6 D. 7

34. What is the remainder when 65^{99} is divided by 11?

A. 0 B. 5 C. 9 D. 10

35. Consider the following numbers:

1.437

2.797

3.1073

How many of the above numbers are prime?

A. Only one B. Only two C. All three D. None

For the next (4) items that follows: Each item contains a question followed by two Statement. Answer each item using the following instructions:

A. Choose this option if the question can be answered by one of the statements alone but not by the other.

B. Choose this option if the question can be answered by either statement alone.

C. Choose this option if the question can be answered by using both the statements together, but cannot be answered by using either statement alone

D. Choose this option if the question cannot be answered even by using both statements together.

36. A number 277XY5 (where X, Y are digits) is divisible by 25.

Question: what is the value of X?

Statement I: The given number is divisible by 9.

Statement II: X > 5.

Each item contains a question followed by two Statement. Answer each item using the following instructions:

37. Question: Is m > n, where m, n are non-zero numbers?

Statement I: $\frac{m}{n} > 1$

Statement II: m > 2n

38. x and y are consecutive odd integers.

Question: Can the value of (x + y) be determined uniquely?

Statement I: $(x + y)^4 = 256$

Statement II: $(x + y)^3 < 16$

39. Question: Is $p^2 + q^2 + q$ odd, where p, q are positive integers?
    Statement I: 2p + q is odd
    Statement II: q – 2p is odd

Consider the following for the next three items that follow:

A. Mark option (A) if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

B. Mark option (B) if the question can be answered by using either statement alone.

C. Mark option (C) if the question can be answered by using both the statements together, but cannot be answered using either statement alone.

D. Mark option (D) if the question cannot be answered even by using both the statements together.

40. Question: Is m > n if m, n are real numbers?
    Statement I: $M = (1 – p)(p^2 + p + 1)$ and $n = (p + 1)(p^2 – p + 1)$
    Statement II: m = p n
41. Question: What is the 3-digit number which is divisible by 10?
    Statement I: If the digits in hundred's place and ten's place of the number are interchanged, the resulting number is diminished by 180.
    Statement II: If the digit in hundred's place is halved and digit in ten's place and unit place of the number are interchanged, the resulting number is diminished by 336.
42. Question: Is (a – b + c) > (a + b – c), where a, b and c are real numbers?
    Statement I: b is negative
    Statement II: c is negative
43. A 2-digit number is such that the sum of the number and the number obtained by reversing the order of the digits of the number is 55. Further, the difference of the given number and the number obtained by reversing the order of the digits of the number is 45. What is the product of the digits?
    A. 5 B. 2 C. 1 D. 0

Consider the following for the next four items that follow: Each item contains a Question followed by two Statements. Answer each item using the following instructions:
Choose option

A. If the Question can be answered by one of the Statements alone, but not by the other.

B. If the Question can be answered by either Statement alone

C. If the Question can be answered by using both the Statements together, but cannot be answered by using either Statement alone.

D. If the Question can be answered even by using both Statements together.

44. Let a, b, c and d be positive integers.
    Question: Which one of a, b, c, d is closest to the product abcd?
    Statement-I: a > b > c
    Statement-II: c is not the smallest
45. Let mn = k, where m and n are prime numbers and k is an even number.
    Question: What is the value of mn − n + 1?
    Statement-I: m > n
    Statement-II: One of the numbers is 2.
46. Question: If p is a positive integer, then what is the remainder when p^n is divided by p + 1?
    Statement-I: n is even
    Statement-II: p is even
47. Question: Is xy positive?
    Statement-I: x = $\sqrt[3]{-0.19683}$
    Statement-II: y = $\sqrt[3]{x}$
48. What is the smallest natural number n such that (n + 1) × n × (n − 1) × (n − 2) × … 3 × 2 × 1 is divisible by 910?
    A. 91 B. 90 C. 13 D. 12
49. The expression $555^{777} + 777^{555}$ is divisible by which of the following?
    1. 2
    2. 3
    3. 37
    Select the correct answer using the code given below:
    A. 1 and 2 only B. 2 and 3 only
    C. 1 and 3 only D. 1, 2 and 3
50. What is the digit at the 100^{th} place of number $(225)^{40}$?
    A. 6 B. 5 C. 4 D. 6