NMTC PREVIOUS YEAR PAPER – 7 & 8th

PAPER - 2019

Q.1.- Q.15 – Objective – (1 Marks Each)

Q.15.- Q.30 – Subjective– (1 Marks Each)

GENERAL INSTRUCTIONS

Max Marks: 30

Time : 120 min

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1) Fill in the response sheet with your name, class, the institution through which you appear in the specified paper.
2) Diagrams are only visual aids; they are not drawn to scale.
3) You are free to do rough work on separate sheets.
4) Duration of the test: 2 pm to 4 pm – 2 hours.

PART - A

Note:

- Only one of the choices A, B, C and D is correct for each question. Shade that alphabets of your choice in response sheet (If you have doubt in the method of answering seek the guidance of your supervision)
- For each correct response you get 1 mark; for each incorrect response you lose ½ mark.

1. If 4921 × D – ABBBD, them the sum of the digits of ABBBD × D is _____

(a) 19 (b) 20 (c) 25 (d) 26

2. What is the 2019^{th} digit to the right of the decimal point, in the decimal representation of $\frac{5}{28}$?

(a) 2 (b) 4 (c) 8 (d) 7

3. If X is a 1000-digit number, Y is the sum of its digits, Z the sum of the digits of Y and W the sum of the digits of Z, then the maximum possible value of W is

(a) 10 (b) 11 (c) 12 (d) 22

4. Let x be the number 0.000….001 which has 2019 zeroes after the decimal point. Then which of the following numbers is the greatest?

5. (a) 10000 + x (b) 10000·x (c) $\frac{10000}{x}$ (d) $\frac{1}{x^2}$

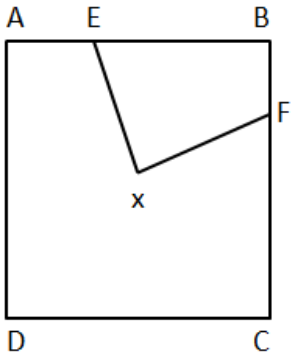
6. $\begin{array}{r} ABC \\ +CBA \\ \hline DEDD \end{array}$ then the number of possible values for A, B, C, D, E satisfying this equation where A, B, C, D and E are distinct digits is

(a) 6 (b) 5 (c) 4 (d) 3

7. In a 5 × 5 grid having 25 cells, Janani has to enter 0 or 1 in each cell such that each sub square grid of size 2 × 2 has exactly three equal numbers. What is the maximum possible sum of the numbers in all the 25 cells put together?

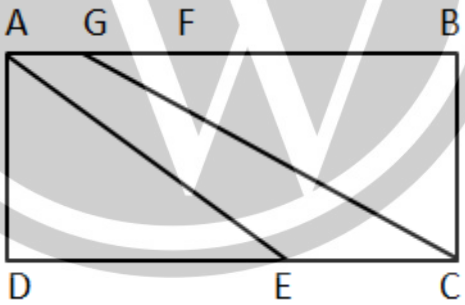
(a) 23 (b) 21 (c) 19 (d) 18

8. ABCD is a square E is one fourth of the way from A to B and F is one fourth of the way from B to C. X is the center of the square. Side of the square is 8 cm. Then the area of the shaded region in the figure in cm^2 is



(a) 14 (b) 16 (c) 18 (d) 20

9. ABCD is a rectangle with E and F are midpoints of CD and AB respectively and G is the mid-point of AF. The ratio of the area of ABCD to area of AECG is



(a) 4 : 3 (b) 3 : 2 (c) 6 : 5 (d) 8 : 3

10. If $\begin{array}{r} RAT \\ +MAT \\ +VAT \\ \hline FLAT \end{array}$ and each alphabet represents a different digit, what is the maximum possible value of FLAT?

(a) 2450 (b) 2405 (c) 2305 (d) 2350

11. How many positive integers smaller than 400 can you get as a sum of eleven consecutive positive integers?

(a) 37 (b) 35 (c) 33 (d) 31

12. Let x, y and z be positive real numbers and let $x \geq y \geq z$ so that $x + y + z = 20.1$. Which of the following statements is true?

(a) Always $xy < 99$ (b) Always $xy > 1$

(c) Always $xy \neq 75$ (d) Always $yz \neq 49$

13. A sequence $\{a_n\}$ is generated by the rule, $a_n = a_{n-1} - a_{n-2}$ for $n \geq 3$. Given $a_1 = 2$ and $a_2 = 4$, the sum of the first 2019 terms of the sequence is given by

(a) 8 (b) 2692 (c) – 2692 (d) – 8

14. There are exactly 5 prime numbers between 2000 and 2030. Note: $2021 = 43 \times 47$ is not a prime number. The difference between the largest and the smallest among these is

(a) 16 (b) 20 (c) 24 (d) 26

15. Which of the following geometric figures is possible to construct?

(a) A pentagon with 4 right angled vertices.

(b) An octagon with all 8 sides equal and 4 angles each of measure 60° and other four angles of measure 210°.

(c) A parallelogram with 3 vertices of obtuse angle measures.

(d) A hexagon with 4 reflex angles.

16. If $y^{10} = 2019$, then

(a) $2 < y < 3$ (b) $1 < y < 2$ (c) $4 < y < 5$ (d) $3 < y < 4$

PART – B

Note:

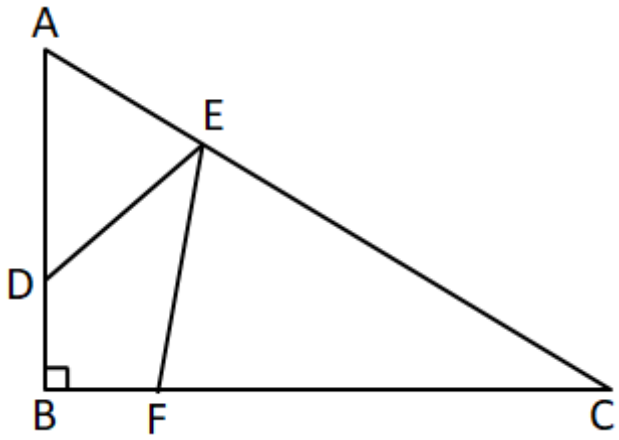
- **Write the correct answer in the space provided in the response sheet.**
- **For each correct response you get 1 mark; for each incorrect response you lose ¼ mark.**

17. A sequence of all natural numbers whose second digit (from left to right) is 1, is written in strictly increasing order without repetition as follows: 11, 21, 31, 41, 51, 61, 71, 81, 91, 110, 111…..Note that the first term of the sequence is 11. The third term is 31, eight term is 81 and tenth term is 110. The 100^{th} term of the sequence will be_____?

18. In ΔABC, AB = 6 cm, AC = 8 cm, median AD = 5 cm. Then, the area of ΔABC in cm^2 is _____

19. Given a, b, c are real numbers such that $9a + b + 8c = 12$ and $8a + 12b + 9c = 1$. Then $a^2 - b^2 + c^2$ = ____.

20. In the given figure, ΔABC is a right angled triangle with $\angle ABC = 90°$. D, E, F are points on AB, AC, BC respectively such that AD = AE and CE = CF: Then, $\angle DEF$ = _____ (in degrees).



21. Number of 5-digti multiples of 13 is _____.

22. The area of a sector and the length of the arc of the sector are equal in numerical value. Then the radius of the circle is _____.

23. If a, b, c, d are positive integers such that $a+\cfrac{1}{b+\cfrac{1}{c+\cfrac{1}{d}}}=\frac{43}{30}$, then d is _____.

24. A teacher asks 10 of her students to guess her age. They guessed it as 34, 38, 40, 42, 46, 48, 51, 54, 57 and 59. Teacher said "At least half of you guessed it too low and two of you are off by one. Also, my age is a prime number". The teacher's age is _____.

25. The sum of 8 positive integers is 22 and their L.C.M is 9. The number of integers among these that are less than 4 is _____.

26. The number of natural numbers $n \leq 2019$ such that $\sqrt[3]{48n}$ is an integer is _____.

27. Anita is riding her bicycle at the rate of 18 km/h. When Anita is riding her bicycle on a straight road, she sees Basker skating at the rate of 12 km/h in the same direction, $\frac{1}{2}$ km in front of her. Anita overtakes him and can see him in her rear-view mirror unitl he is $\frac{1}{2}$ km behind her. The total times in seconds that Anita can see Baskar is_____.

28. In a room, 50% of the people are wearing gloves, and 80% of the people are wearing hats. The minimum percentage of people in the room wearing both a hat and a glove is ____.

29. In ΔABC, AB = BC = 29 cm and AC = 42 cm. Then, area of ΔABC = _____ cm^2.

30. The smallest integer larger than the perimeter of any triangle with two sides of length 10 and 20 units is _____.

31. The number of perfect cubes that lie between $2^9 + 1$ and $2^{18} + 1$ is _____.

Answers Key

1. (a)	**2.** (c)	**3.** (b)	**4.** (d)	**5.** (c)
6. (b)	**7.** (b)	**8.** (d)	**9.** (a)	**10.** (d)
11. (d)	**12.** (d)	**13.** (d)	**14.** (b)	**15.** (a)
16. 1100	**17.** 24	**18.** Bonus	**19.** 45	**20.** 6923
21. 2	**22.** 4	**23.** 47	**24.** 7	**25.** 3
26. 600	**27.** 30%	**28.** 420	**29.** 60	**30.** 56