Sample Question Paper - AG-TMC-TS-S
Class – X Session -2021-22
TERM 1
Subject- Mathematics (Standard) 041

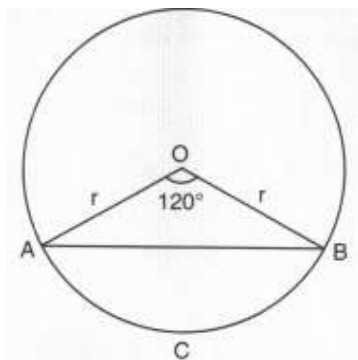**Time Allowed: 1 hour and 30 minutes**   **Maximum Marks: 40**

General Instructions:

1. The question paper contains three parts A, B and C.

2. Section A consists of 20 questions of 1 mark each. Attempt any 16 questions.

3. Section B consists of 20 questions of 1 mark each. Attempt any 16 questions.

4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.

5. There is no negative marking.

Section A

Attempt any 16 questions

1. On dividing a positive integer n by 9, we get 7 as remainder. What will be the remainder if (3n **[1]** - 1) is divided by 9?

   a) 4   b) 1

   c) 2   d) 3

2. The area of the triangle formed by the line $\frac{x}{a} + \frac{y}{b} = 1$ with the co – ordinate axis is **[1]**

   a) $2ab$ ab sq. units   b) $\frac{1}{4}ab$ sq. units

   c) ab ab sq. units   d) $\frac{1}{2}ab$ sq. units

3. The line segments joining the midpoints of the sides of a triangle form four triangles, each of **[1]** which is

   a) an isosceles triangle   b) an equilateral triangle

   c) similar to the original triangle   d) congruent to the original triangle

4. The difference between two numbers is 26 and one number is three times the other. The **[1]** numbers are

   a) 39 and 13   b) 30 and 10

   c) 36 and 12   d) 36 and 10

5. If 3x = cosec θ and $\frac{3}{x} = \cot\theta$ then $3\left(x^2 - \frac{1}{x^2}\right)$ = ? **[1]**

   a) $\frac{1}{9}$ b) $\frac{1}{81}$

   c) $\frac{1}{27}$ d) $\frac{1}{3}$

6. If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeros in n, where n is a natural **[1]** number, is

a) 2

b) 3

c) 7

d) 4

7. The zeros of the polynomial $7x^2 - \frac{11x}{3} - \frac{2}{3}$ are [1]

    a) None of these

    b) $\frac{2}{7}, \frac{-1}{3}$

    c) $\frac{-2}{3}, \frac{1}{7}$

    d) $\frac{2}{3}, \frac{-1}{7}$

8. ABCD is a square of side 4 cm. If E is a point in the interior of the square such that $\triangle CED$ is equilateral, then area of $\triangle ACE$ is [1]

    a) $2(\sqrt{3}-1)\text{cm}^2$

    b) $8(\sqrt{3}-1)\text{cm}^2$

    c) $6(\sqrt{3}-1)\text{cm}^2$

    d) $4(\sqrt{3}-1)\text{cm}^2$

9. The largest power of x in p(x) is the _____ of the polynomial. [1]

    a) zero

    b) root

    c) none of these

    d) degree

10. In the equilateral triangle ABC if $AD \perp BC$, then AD^2 is equal to [1]

    a) $3CD^2$

    b) $2CD^2$

    c) $4CD^2$

    d) CD^2

11. In a single throw of a pair of dice, the probability of getting the sum a perfect square is [1]

    a) $\frac{1}{6}$

    b) $\frac{2}{9}$

    c) $\frac{1}{18}$

    d) $\frac{7}{36}$

12. If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is [1]

    a) an even number

    b) an odd prime number

    c) an odd number

    d) a prime number

13. If area of a circle inscribed in an equilateral triangle is 48π square units, then perimeter of the triangle is [1]

    a) $48\sqrt{3}$ units

    b) $17\sqrt{3}$ units

    c) 36 units

    d) 72 units

14. In Fig, the area of segment ACB is [1]

Target Mathematics by- Dr.Agyat Gupta
Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
visit us: agyatgupta.com;Ph. :7000636110(O)   Mobile : 9425109601(P)

a) $\left(\frac{\pi}{3} + \frac{\sqrt{3}}{2} \right) r^2$

b) $\left(\frac{\pi}{3} - \frac{\sqrt{2}}{3} \right) r^2$

c) $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4} \right) r^2$

d) $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2} \right) r^2$

15. In a $\Delta PQR, \angle Q = 90^0, PQ = 5\ cm,\ QR = 12cm$. If $QS \perp PR$, then QS is equal to   **[1]**

a) $\frac{60}{13} cm.$

b) $\frac{12}{5} cm.$

c) $\frac{13}{5} cm.$

d) $\frac{80}{13} cm.$

16. If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A$ =   **[1]**

a) – 1

b) 1

c) 0

d) 2

17. The value of k so that the system of equations 3x - 4y - 7 = 0 and 6x - ky - 5 = 0 have a unique solution is   **[1]**

a) $k \neq$ -8

b) $k \neq$ 4

c) $k \neq$ -4

d) $k \neq$ 8

18. Someone is asked to take a number from 1 to 100. The probability that it is a prime is   **[1]**

a) $\frac{1}{40}$

b) $\frac{1}{5}$

c) $\frac{1}{4}$

d) $\frac{6}{25}$

19. If the sum of LCM and HCF of two numbers is 1260 and their LCM is 900 more than their HCF, then the product of two numbers is   **[1]**

a) 205400

b) 203400

c) 194400

d) 198400

20. The areas of two concentric circles are 1386 cm^2 and 962.5 cm^2. The width of the ring is   **[1]**

a) 2.8 cm

b) 3.8 cm

c) 3.5 cm

d) 4.2 cm

Section B

Attempt any 16 questions

21. If 2x - 3 y = 7 and (a + b) x - (a + b - 3) y = 4a + b represent coincident lines, then a and b satisfy the equation   **[1]**

a) a - 5b = 0

b) 5a - b = 0

c) a + 5b = 0

d) 5a + b = 0

Dr. AGYAT GUPTA MOB:9425109601

22. A vertical pole 6 m long casts a shadow of length 3.6 m on the ground. What is the height of a **[1]** tower which casts a shadow of length 18 m at the same time?

    a) 30 m   b) 10.8 m

    c) 28.8 m   d) 32.4 m

23. The LCM of two numbers is 1200. Which of the following cannot be their HCF? **[1]**

    a) 500   b) 200

    c) 600   d) 400

24. If $\tan\theta = \frac{m}{n}$, then $\frac{m\sin\theta - n\cos\theta}{m\sin\theta + n\cos\theta} =$ **[1]**

    a) $\frac{m^2 - n^2}{m^2 + n^2}$ b) $\frac{m^2 + n^2}{m^2 - n^2}$

    c) 1   d) $\frac{n^2 - m^2}{n^2 + m^2}$

25. If x = -y and y > 0, which of the following is wrong? **[1]**

    a) xy < 0   b) x + y = 0

    c) $\frac{1}{x} - \frac{1}{y} = 0$ d) $x^2 y > 0$

26. ABC is a right triangle right angled at B. BD is the altitude through B. If the value of the **[1]** triangle of sides BD = 4 cm and AD = 3 cm then AC is equal to

    a) $\frac{12}{5} cm$ b) $\frac{25}{3} cm$

    c) $\frac{13}{3} cm$ d) $\frac{20}{3} cm$

27. We have, $AB \| DE$ and $BD \| EF$. Then, **[1]**

    a) $BC^2 = AB \cdot CE$ b) $AC^2 = BC \cdot DC$

    c) $AB^2 = AC \cdot DE$ d) $DC^2 = CF \times AC$

28. The distance between (at^2, 2at) and $\left(\frac{a}{t^2}, \frac{-2a}{t}\right)$ is **[1]**

    a) $a\left(t^2 + \frac{1}{t^2}\right)$ units   b) $a\left(t - \frac{1}{t}\right)^2$ units

    c) $a\left(t + \frac{1}{t}\right)^2$ d) $\left(t + \frac{1}{t}\right)^2$ units

29. In the given figure, the value of $\cos\phi$ is **[1]**

    a) $\frac{5}{3}$ b) $\frac{3}{5}$

    c) $\frac{4}{5}$ d) $\frac{5}{4}$

30. If $\frac{3}{x+y} + \frac{2}{x-y} = 2$ and $\frac{9}{x+y} - \frac{4}{x-y} = 1$ then   **[1]**

    a) $x = \frac{1}{2}, y = \frac{3}{2}$ b) $x = \frac{5}{2}, y = \frac{1}{2}$

    c) $x = \frac{1}{2}, y = \frac{5}{2}$ d) $x = \frac{3}{2}, y = \frac{1}{2}$

31. Which of the following numbers have the non-terminating repeating decimal expansion?   **[1]**

    a) $\frac{117}{6^2 \times 5^3}$ b) $\frac{6}{15}$

    c) $\frac{21}{280}$ d) $\frac{77}{210}$

32. If two positive integers m and n can be expressed as m = x^2y^5 and n = x^3y^2, where x and y are prime numbers, then HCF(m, n) =   **[1]**

    a) x^2y^2 b) x^2y^3

    c) x^3y^2 d) x^3y^3

33. If $\frac{x \csc^2 30° \sec^2 45°}{8 \cos^2 45° \sin^2 60°} = \tan^2 60° - \tan^2 30°$, then x =   **[1]**

    a) 0   b) 2

    c) -1   d) 1

34. If the area of a sector of a circle bounded by an arc of length 5π cm is equal to 20π cm^2, then find it's radius   **[1]**

    a) 10 cm   b) 16 cm

    c) 12 cm   d) 8 cm

35. A coin is tossed thrice. The probability of getting at least two tails is   **[1]**

    a) $\frac{4}{5}$ b) $\frac{2}{3}$

    c) $\frac{1}{4}$ d) $\frac{1}{2}$

36. 5 years hence, the age of a man shall be 3 times the age of his son while 5 years earlier the age of the man was 7 times the age of his son. The present age of the man is   **[1]**

    a) 50 years   b) 45 years

    c) 47 years   d) 40 years

37. A rational number can be expressed as a non-terminating repeating decimal if the denominator has the factors   **[1]**

    a) none of these   b) other than 2 or 5 only

    c) 2 or 5 only   d) 2 or 3 only

Dr. AGYAT GUPTA MOB:9425109601

38. $\frac{\sin\theta}{1+\cos\theta}$ is equal to [1]

    a) $\frac{1-\sin\theta}{\cos\theta}$ b) $\frac{1-\cos\theta}{\cos\theta}$

    c) $\frac{1-\cos\theta}{\sin\theta}$ d) $\frac{1+\cos\theta}{\sin\theta}$

39. 1000 tickets of a lottery were sold and there are 5 prizes on these tickets. If Ramesh has [1] purchased one lottery ticket, the probability of winning a prize is

    a) $\frac{1}{100}$ b) $\frac{5}{100}$

    c) $\frac{1}{200}$ d) $\frac{1}{1000}$

40. The base of an equilateral triangle ABC lies on the y-axis. The coordinates of the point C is $(0, -3)$. If origin is the midpoint of BC, then the coordinates of B are [1]

    a) (3, 0)   b) (0, – 3)

    c) (– 3, 0)   d) (0, 3)

Section C
Attempt any 8 questions

Question No. 41 to 45 are based on the given text. Read the text carefully and answer the questions:

Shruti is very good in painting. So she thought of exhibiting her paintings in which she want to display her later painting which is in the form of a graph of a polynomial as shown below:

41. The number of zeroes of the polynomial represented by the graph is [1]

    a) 1   b) 3

    c) 2   d) can't be determined

42. The sum of zeroes of the polynomial represented by the graph is [1]

    a) -5   b) 2

    c) -4   d) -3

43. Find the value of the polynomial represented by the graph when x = 0. [1]

    a) -8   b) -6

    c) 6   d) 8

44. The polynomial representing the graph drawn in the [1]

    a) quadratic polynomial   b) bi-quadratic polynomial

    c) linear polynomial   d) cubic polynomial

45. The sum of the product of zeroes, taken two at a time, of the polynomial represented by the **[1]**
graph is

    a) 2   b) 3

    c) -3   d) -2

Question No. 46 to 50 are based on the given text. Read the text carefully and answer the questions:

In order to facilitate smooth passage of the parade, movement of traffic on certain roads leading to the route of the Parade and Tableaux ah rays restricted. To avoid traffic on the road Delhi Police decided to construct a rectangular route plan, as shown in the figure.

46. If Q is the mid point of BC, then coordinates of Q are **[1]**

    a) (-1, 1)   b) (2, -4)

    c) (2, 4)   d) (1, -1)

47. Quadrilateral PQRS is a **[1]**

    a) Trapezium   b) Rectangle

    c) Rhombus   d) Square

48. What is the length of sides of quadrilateral PQRS? **[1]**

    a) 5 units each   b) 4, 5, 6, 7 units

    c) 8 units each   d) 3, 4, 5, 6 units

49. What is the length of route PQRS? **[1]**

    a) 20 units   b) 45 units

    c) 25 units   d) 35 units

50. What is the length of route ABCD? **[1]**

    a) 26 units   b) 29 units

    c) 28 units   d) 27 units

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Target Mathematics by Dr. Agyat Gupta