(S.S.L.C.) QUARTERLY EXAMINATION – 2018

MATHEMATICS

10 - STD

Maximum Marks : 100
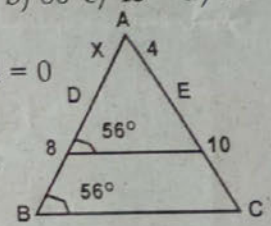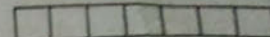
Time Allowed : 2.30 Hours

SECTION - I

Note : i) Answer all the questions. ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

15 × 1 = 15

1. If $A \subset B$ then $A \cap B$ is a) B   b) A\B   c) A   d) B\A

2. If $\{(7, 11), (5, a)\}$ represents a constant function, then the value of 'a' is a) 7   b) 11   c) 5   d) 9

3. If a, b, c are in A.P. Then $\dfrac{a-b}{b-c}$ is equal to   a) $\dfrac{a}{b}$ b) $\dfrac{b}{c}$ c) $\dfrac{a}{c}$ d) 1

4. If the third term of G.P. is 2, then the product of first 5 terms is
   a) 5^2 b) 2^5 c) 10   d) 15

5. if $1 + 2 + 3 + \ldots + n = k$ then $1^3 + 2^3 + 3^3 \ldots + n^3$ is equal to
   a) K^2 b) k^3 c) $\dfrac{k(k+1)}{2}$ d) $(k+1)^3$

6. The remainder when $x^2 - 2x + 7$ is divided by $x + 4$ is   a) 28   b) 29   c) 30   d) 31

7. The Lcm of a^k, a^{k+3}, a^{k+5} where $k \in N$ is a) a^{k+9} b) a^k c) a^{k+6} d) a^{k+5}

8. The GCD of $(x^3 + 1)$ and $x^4 - 1$ is   a) $x^3 - 1$ b) $x^3 + 1$ c) $x + 1$ d) x – 1

9. If $A = (1\ -2\ 3)$ and $B = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$ then A + B is   a) (0 0 0)   b) $\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$ c) (–14)   d) not defined

10. If $\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$, then the value of x and y respectively, are a) 2, 0   b) 0, 2   c) 0, –2   d) 1, 1

11. The angle of inclination of a straight line parallel to x - axis is equal to a) 0°   b) 60°   c) 45°   d) 90°

12. The equation of a straight line having slope 3 and y intercept –4 is
    a) 3x – y – 4 = 0   b) 3x + y – 4 = 0   c) 3x – y + 4 = 0   d) 3x + y + 4 = 0

13. In the figure the value x is equal to
    a) 4.2   b) 3.2   c) 0.8   d) 0.4

14. In ABC, DE is 11 to BE, meeting AB and at D, and E. If AD = 3cm, DB = 2cm and AE = 2.7cm, then, AC is equal to
    a) 6.5 cm   b) 4.5 cm   c) 3.5 cm   d) 5.5 cm

15. $(1 - \sin^2 \theta) \sec^2 \theta =$ a) 0   b) 1   c) $\tan^2 \theta$ d) $\cos^2 \theta$

SECTION - II

Note : i) Answer 10 questions. ii) Question number 30 is compulsorily. Select any 14 questions from the first 9 questions.

10 × 2 = 20

16. Let $A = \{0, 1, 2, 3, 4\}$, $B = \{1, -2, 3, 4, 5, 6\}$ and $C = \{2, 4, 6, 7\}$ then find $A \cup (B \cap C)$.

17. Draw Venn diagram for $A' \cap B'$.

18. Find the first five terms of the sequence given by $a_1 = 2$, $a_2 = 3 + a_1$ and $a_n = 2a_{n-1} + 5$.

19. Find S_n for the geometric series described here a = 2, $t_6 = 486$, n = 6.

20. Solve the following equation by elimination method 3x + y = 8, 5x + y = 10.

21. Fin the quotient and remainder using synthetic division. $(x^3 + x^2 - 3x + 5) + (x - 1)$

22. Simplify : $\dfrac{x+2}{x^2 + 3x + 2} + \dfrac{x-3}{x^2 + 2x - 3}$.

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23. Construct a 2 × 3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = |2i - 3j|$.

24. If $A = \begin{pmatrix} 4 & -2 \\ 5 & -9 \end{pmatrix}$ and $B = \begin{pmatrix} 8 & 2 \\ -1 & -3 \end{pmatrix}$ find 6A – 3B.

25. Find the area of the triangle whose vertices are (1, 2), (-3, 4) and (-5, -6). **10 -Maths (E.M) Page - 1**

26. Find the slope of the straight line passing through the points (3, –2) and (7, 2)

27. Find the equation of the straight line whose slope is $\frac{2}{3}$ and passing through (5, –4)

28. Prove that Identify $\sqrt{\dfrac{1-\cos\theta}{1+\cos\theta}} = \csc\theta - \cot\theta$.

29. In the above figure, AP = 3cm, AR = 4.5cm, AQ = 6cm, AB = 5cm and AC = 10cm. Find the length of AD.

30. a) The following table represents a function from A = (5, 6m 8m 10)m to B = (19, 15, 9, 11). Where f (x) 2x – 1. Find the values of a and b. **(OR)**

x	5	6	8	10
f(x)	a	11	b	19

   b) Prove the identify $\dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = 1 - 2\sin\theta\tan\theta + 2\tan^2\theta$.

SECTION - III

Note : i) Answer 9 questions. ii) Question number 45 is compulsory. Select any 8 questions from the first 14 questions. $9 \times 5 = 45$

31. Let A = {10, 15,20, 25,30, 35, 40, 45, 50} B = {1, 5, 10, 15, 20, 25, 30} and C = {7, 8, 15, 20, 35, 45, 48} Verify $A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$.

32. In a survey of university students, 64 had taken mathematics course, 94 had taken computer science course, 58 had taken physics course 26 had taken mathematics and computer science, 22 had taken computer science and physics course, and 14 had taken all the three courses. Find the number of students who were surveyed? Find how many had taken on course only?

33. Let A = {6, 9, 15, 18, 21}, B = {1, 2, 4, 5, 6} and $f : A \to B$ be defined by $f(x) = \dfrac{x-3}{3}$.
   Represent f by (i) an arrow diagram (ii) a set of ordered pairs (iii) a table (iv) a graph

34. In an arithmetic series, the sum of first 11 terms is 44 and that of the next 11 terms is 55. Find the arithmetic series.

35. Find the sum of first 'n' terms of the series 7 + 77 + 777 + ...

36. Factorise the polynomial $x^3 - 23x^2 + 142x - 120$.

37. Find the G.C.D. of $x^2 - x - 2,\ x^2 + x - 6,\ 3x^2 - 13x + 14$.

38. Multiply and simplify : $\dfrac{x^2-3x-10}{x^2-x-20} \times \dfrac{x^2-2x+4}{x^3+8}$.

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39. If $A = \begin{pmatrix} 3 & 3 \\ 7 & 6 \end{pmatrix}$, $B = \begin{pmatrix} 8 & 7 \\ 0 & 9 \end{pmatrix}$ and $C = \begin{pmatrix} 2 & -3 \\ 4 & 6 \end{pmatrix}$ then find (A+B) C and AB + BC is (A +B) C = AB + BC.

40. If $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$ Verify that $(AB)^T = B^T A^T$.

41. Find the area of the quadrilateral whose vertices are (–3, 4), (–5, –6), (4, –1) and (1, 2).

42. Find the equation of the straight lines each passing through the point (6, –2) and whose sum of the intercepts is 5.

43. State and prove basic proportionality theorem of Thales Theorem.

44. If x = a secθ + b tanθ and y = a tanθ + b secθ then prove that $x^2 - y^2 = a^2 - b^2$.   **(OR)**

45. a) Find the sum of all 3 - digit natural numbers, which are divisible by 8.

   b) What rational expression should be added to $\dfrac{x^3-1}{x^2+2}$ to get $\dfrac{2x^3 - x^2 + 3}{x^2 + 2}$?

SECTION - IV

Note : Answer both the questions by choosing either of the alternative. $2 \times 10 = 20$

46. Draw a circle radius 3cm. From an external point 7 cm away from its centre, construct the pair of tangents to the circle and measure their lengths. **(OR)**

   b) Construct ΔABC such that BC = 5cm, $\lfloor A = 45$ and the median from A to BC is 4cm.

47. a) Draw the graph of y = x^2 + 2x - 3 and hence find the roots of $x^2 - x - 6 = 0$. **(OR)**
   b) The cost of the milk per litre Rs. 15/-. Draw the graph for the relation between the quantity and cost hence find (i) The proportional constant (ii) the cost of 3 litres of milk.