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FIRST REVISION TEST -2020
X – STD – MATHEMATICS – UNIT – I, II, III, IV
Time: 3.00 Hrs   Maximum Marks: 100
Note: this question paper contains **four** parts.

PART – I (Marks 14)

Note: (i) Answer all the 14 questions. $1 \times 14 = 14$
(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.

1. If a function $f: A \to B$ is both one – one and onto then f is called a

   _____ from A to B

   (1) bijection (2) onto (3) one- one (4) not a function

2. Let n(A) = m and n(B) = n then the total number of non-empty

   relations that can be defined from A to B is

   (1) m^n (2) n^m (3) $2^{mn} - 1$ (4) 2^{mn}

3. If   g = $\{(1,1), (2,3), (3,5), (4,7)\}$ is a function given by

   $g(x) = \alpha(x) + \beta$ then the values of α and β are

   (1) $(-1, 2)$ (2) $(2, -1)$ (3)$(-1, -2)$ (4) $(1, 2)$

4. The least number that is divisible by all the numbers from 1 to

   10(both inclusive) is   (1) 2025   (2) 5220 (3) 5025   (4) 2520

5. . If 6 times of 6th term of an A.P. is equal to 7times the 7th term, then

   the 13th term of the A.P. is   (1) 0   (2) 6   (3) 7   (4) 13

6. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots \dots$ is

   (1) $\dfrac{1}{24}$ (2) $\dfrac{1}{27}$ (3) $\dfrac{2}{3}$ (4) $\dfrac{1}{81}$

7. *The square root of the* $\dfrac{256\, x^8 y^4 z^{10}}{25\, x^6 y^6 z^6}$ *is equal to*

(1) $\frac{16}{5} \left| \frac{x^2 z^4}{y^2} \right|$ (2) $16 \left| \frac{y^2}{x^2 z^4} \right|$ (3) $\frac{16}{5} \left| \frac{y}{xz^2} \right|$ (4) $\frac{16}{5} \left| \frac{xz^2}{y} \right|$

8. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are (1) 100, 120 (2) 10, 12 (3) $-120, 100$ (4) 12, 10

9. Graph of a linear polynomial is a   (1) Straight line   (2)   circle
   (3) parabola   (4) hyperbola

10. Transpose of a column matrix is
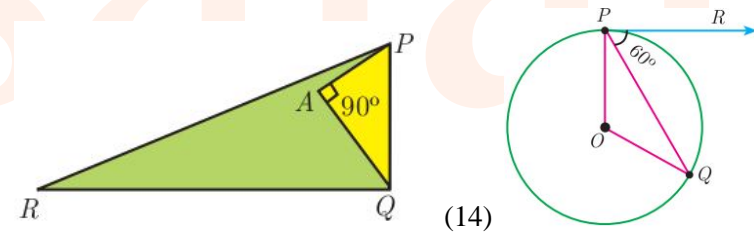   (1) unit matrix (2) diagonal matrix   (3) column matrix   (4) row matrix

11. If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when
    (1) ∠B = ∠E (2) ∠A = ∠D   (3) ∠B = ∠D (4) ∠A = ∠F

12. In a ΔABC, AD is the bisector of ∠BAC. If AB = 8 cm, BD = 6 cm and DC = 3 cm. The length of the side AC is
    (1) 6cm   (2) 4cm   (3) 3cm   (4) 8cm

13. In the given figure, PR = 26 cm, QR = 24 cm, ∠PAQ = 90°, PA = 6 cm and QA = 8 cm. Find ∠PQR

(14)

    (1) 80°   (2) 85°   (3) 75°   (4) 90°

14. In figure if PR is tangent to the circle at P and O is the centre of the circle, then ∠POQ is
   (1) 120°   (2) 100°   (3) 110°   (4) 90°

K.MURUGANANDHAM .MSC.Med.MPhil   Page | 1

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PART – II (Marks: 20)   10×2=20

II. Answer 10 Questions. Question No. 28 is compulsory.

15. If $B \times A = \{-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ find A and B

16. Let $A = \{3, 4, 7, 8\}$ and $B = \{1, 7, 10\}$. Which of the following sets are relations from A to B? $(i)\ R_1 = \{(3,7), (4, 7), (7, 10), (8, 1)\}$ $(ii)\ R_2 = \{(3, 1)(4, 12)\}$

17. find k if $fo\ f(k) = 5$ where $f(k) = 2k - 1$

18. Is $7 \times 5 \times 3 \times 2 + 3$ a composite number? Justify your answer

19. If $13824\ 23 = 2^a \times 3^b$ then find a and b.

20. Find the 19th term of an A.P. $-11, -15, -19, \ldots\ldots$

21. Determine the nature of roots for the following quadratic equations $(i)\ 2x^2 - 2x + 9 = 0$

22. Find the values of x, y and z from the following equations

    (i) $\begin{pmatrix} 12 & 3 \\ x & \frac{3}{2} \end{pmatrix} = \begin{pmatrix} y & z \\ 3 & 5 \end{pmatrix}$ (ii) $\begin{pmatrix} x + y & 2 \\ 5 + z & xy \end{pmatrix} = \begin{pmatrix} 6 & 2 \\ 5 & 8 \end{pmatrix}$

23. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 & 0 \\ 1 & 3 & 1 \\ 2 & 4 & 0 \end{pmatrix}$, $find\ A + B$

24. Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

25. In $\triangle ABC$, if DE ∥ BC, AD = x, DB $= x - 2$, and $AE = x + 2$, $and\ EC = x - 1$ then find the lengths of the sides AB and AC.

26. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?

27. An artist has created a triangular stained glass window and has one strip of small length left before completing the window. She needs to figure out the length of left out portion based on the lengths of the other sides as shown in the figure.
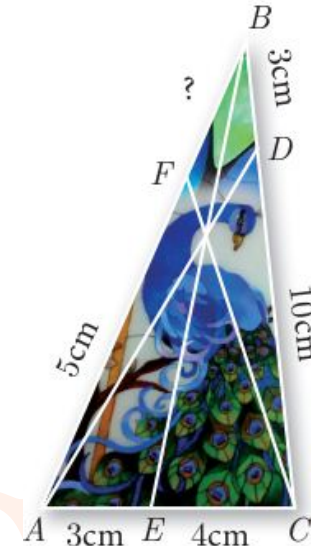
28. If α and β are the roots of $x^2 + 7x + 10 = 0$ find the values of $(i)\alpha^2 + \beta^2$

PART – III (Marks: 50)   10×5=50

III. Answer 10 Questions. Question No. 42 is compulsory.

29. Let $A = \{x \in \mathbb{N}|\ 1 < x < 4\}, B = \{x \in \mathbb{w}|\ 0 \le x < 2\}$ and $C = \{x \in \mathbb{N}|\ x < 3\}$ then verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$

30. If the function f is defined by $f(x) = \begin{cases} x + 2 & if\ \ x > 1 \\ 2 & if -1 \le x \ge 1 \\ x - 1 & if -3 < x < -1 \end{cases}$

    find the value of (i) $f(3)$ (ii) $f(0)$ (iii) $f(-1.5)$ (iv) $f(2) + f(-2)$

31. consider the functions $f(x)$, $g(x)$ and $h(x)$ as given below. Show that $(fo\ g)\ o\ h = fo\ (g\ o\ h)$ in each case $f(x) = x - 1,\ g(x) = 3x + 1,\ \ and\ h(x) = x^2$

K.MURUGANANDHAM .MSC.Med.MPhil   Page | 2

32. The sum of first n, 2n and 3n terms of an A.P. are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$.

33. Find the sum to n terms of the series $7 + 77 + 777 + \cdots..$ to n terms

34. The sum of the squares of the first n natural numbers is 285, while the sum of their cubes is 2025. Find the value of n.

35. Find the values of m and n if the following expressions are perfect squares

$$\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$$

36. $A = \begin{pmatrix} 4 & 3 & 1 \\ 2 & 3 & -8 \\ 1 & 0 & -4 \end{pmatrix}, B = \begin{pmatrix} 2 & 3 & 4 \\ 1 & 9 & 2 \\ -7 & 1 & -1 \end{pmatrix}, C = \begin{pmatrix} 8 & 3 & 4 \\ 1 & -2 & 3 \\ 2 & 4 & -1 \end{pmatrix}$

    Then verify that $A + (B + C) = (A + B) + C$

37. Let $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}, B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}, C = \begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$ show that $(A - B)^T = A^T - B^T$

38. In ΔABC, D and E are points on the sides AB and AC respectively such that DE ∥ BC   If AD = $8x - 7$, DB = $5x - 3$, AE = $4x - 3$ and EC = $3x - 1$, find the value of x.

39. Angle Bisector Theorem

40. In the adjacent figure, ABC is a right angled triangle with right angle at B and points D, E trisect BC. Prove that $8AE^2 = 3AC^2 + 5AD^2$
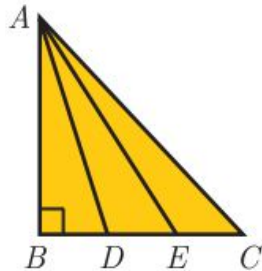
41. Show that in a triangle, the medians are concurrent.

42. If $x = \frac{a^2 + 3a - 4}{3a^2 - 3}$ and $\frac{a^2 + 2a - 8}{2a^2 - 2a - 4}$ find the value of $x^2 y^{-2}$

IV. Answer both questions.   **2×8=16**

43. Graph the following quadratic equations and state their nature of solutions. $x^2 - 6x + 9 = 0$ **(OR)**

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

44. Draw ΔPQR such that PQ = 6.8 cm, vertical angle is 50° and the bisector of the vertical angle meets the base at D where PD =5.2cm. **(OR)** Draw a circle of radius 4cm. At a point L on it draw a tangent to the circle using the alternate segment.

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