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x-D

FIRST TERM EXAMINATION 2024-25
CLASS 10 – MATHEMATICS (STANDARD) (041)

Max Marks: 80

Time: 3 hours

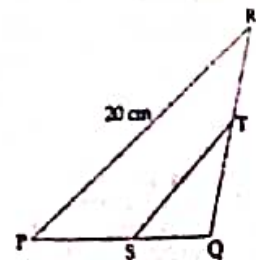
General Instructions:

Read the instructions carefully and follow them:

1. This question paper contains 38 questions. All questions are compulsory.
2. In section A, questions 1 to 18 are MCQs and 19 & 20 are Assertion-Reason based questions of 1 mark each.
3. In section B, questions 21 to 25 carry 2 marks each.
4. In section C, questions 26 to 31 carry 3 marks each.
5. In section D, questions 32 to 35 carry 5 marks each.
6. In section E, questions 36 to 38 are case-study based questions carrying 4 marks each. Internal choice is provided in 2 marks questions in each case study.
7. There is no overall choice. However, internal choice has been provided in 2 questions of section B, 2 questions of section C, 2 questions of section D and 3 questions of 2 marks in section E.

Section A

- Q1 If $xy = 180$ and $HCF(x,y) = 3$, then $LCM(x,y)$ is:
A) 360 B) 60 C) 180 D) 30
- Q2 The roots of a quadratic equation $2x^2 - 5x + 3 = 0$ are:
 A) $\frac{3}{2}, 1$ B) $\frac{-3}{2}, 1$ C) $\frac{3}{2}, -1$ D) $\frac{2}{3}, -1$
- Q3 If α and β are the zeroes of a polynomial $P(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then p is:
 A) $\frac{-2}{3}$ B) $\frac{2}{3}$ C) $\frac{1}{3}$ D) $\frac{-1}{3}$
- Q4 The discriminant of $2x^2 - 4x + 3 = 0$ is:
A) 8 B) -8 C) $2\sqrt{2}$ D) 0
- Q5 The n^{th} term of the A.P. $a, 3a, 5a, \dots$ is:
 A) na B) $(2n-1)a$ C) $(2n+1)a$ D) $2na$
- Q6 $\sec \theta$ when expressed in terms of $\cot \theta$ is equal to:
A) $\frac{1 + \cot^2 \theta}{\cot \theta}$ B) $\sqrt{1 + \cot^2 \theta}$ C) $\frac{\sqrt{1 + \cot^2 \theta}}{\cot \theta}$ D) $\frac{\sqrt{1 - \cot^2 \theta}}{\cot \theta}$
- Q7 The distance of the point $(-1, 7)$ from x axis is:
A) -1 B) 7 C) 6 D) $\sqrt{50}$
- Q8 In ΔPQR , ST is drawn such that $\angle PRQ = \angle STQ$, if ST divides QR in the ratio $2:3$, then the length of ST is:
A) $\frac{10}{3}$ cm B) 8 cm C) 12 cm D) $\frac{40}{3}$ cm



- Q9 The value of 'x' for which $2x$, $(x+10)$ and $(3x+2)$ are the three consecutive terms of an A.P. is:
A) 6 B) -6 C) 18 D) -18
- Q10 The exponent of 5 in the prime factorisation of 3750 is:
A) 3 B) 4 C) 5 D) 6
- Q11 The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are:
A) intersecting B) parallel C) coincident D) either intersecting or parallel
- Q12 The degree of polynomial having zeroes -3 and 4 only is:
A) 2 B) 1 C) more than 3 D) 3

18/2/25

$$b^2 - 4ac$$

$$(b)^2 - 4(a)(c)$$

$$b^2 - 4ac$$

Q13 If the quadratic equation $ax^2+bx+c=0$ has two real and equal roots, then 'c' is equal to:

- A) $\frac{-b}{2a}$ B) $\frac{b}{2a}$ C) $\frac{-b^2}{4a}$ D) $\frac{b^2}{4a}$

$$kx^2 - (x+A)(x+B)$$

$$k(x^2 - (A+B)x + AB)$$

Q14 A quadratic polynomial, the product and the sum of whose zeroes are 5 and 8 respectively is:

- A) $K(x^2-8x+5)$ B) $K(x^2+8x+5)$ C) $K(x^2-5x+8)$ D) $K(x^2+5x+8)$

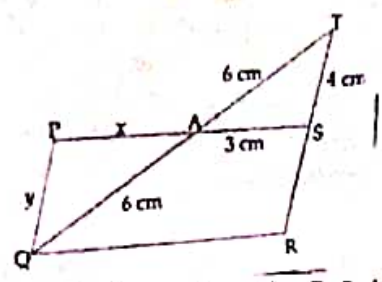
$$x^2 - 5x + 8$$

Q15 Two A.P.s have the same common difference. The first term of one of these is -1 and that of the other is -8. The difference between their 4th term is:

- A) 1 B) -7 C) 7 D) 9

Q16 In the given figure, PQRS is a parallelogram, if $AT = AQ = 6$ cm, $AS = 3$ cm and $TS = 4$ cm, then the values of 'x' and 'y' are:

- A) $x=4$ cm & $y=5$ cm B) $x=2$ cm & $y=3$ cm
 C) $x=1$ cm & $y=2$ cm D) $x=3$ cm & $y=4$ cm



Q17 The value of 'k' for which the system of linear equations $x+2y=3$ and $5x+ky+7=0$ is inconsistent is:

- A) 5 B) 7 C) 10 D) -7

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Q18 If $\sin \alpha = \frac{\sqrt{3}}{2}$ and $\cos \beta = 0$, then the value of $\beta - \alpha$ is:

- A) 30° B) 60° C) 0° D) 90°

$$\frac{1}{5} = \frac{3}{k} \neq \frac{3}{7}$$

$$10 = k$$

Q19 Assertion: If the distance between the point (4,p) and (1,0) is 5, then the value of 'p' is 4.
 Reason: The point which divides the line segment joining the points (7,-6) and (3,4) in the ratio 1:2 internally lies in the fourth quadrant.

- A) The Assertion and Reason both are true and Reason is the correct explanation of Assertion.
 B) The Assertion and Reason both are true but Reason is not correct explanation of Assertion.
 C) Assertion is true but Reason is false.
 D) Assertion is false but Reason is true.

Q20 Assertion: The value of $\frac{\tan 60^\circ}{\cot 60^\circ}$ is 3
 Reason: The value of the expression $(\sin 0^\circ - \cos 0^\circ)$ is negative.

- A) The Assertion and Reason both are true and Reason is the correct explanation of Assertion.
 B) The Assertion and Reason both are true but Reason is not correct explanation of Assertion.
 C) Assertion is true but Reason is false.
 D) Assertion is false but Reason is true.

Section B

Q21 A) If 1 is a zero of $ax^2-3(a-1)x-1$, then find the value of a.
 OR

B) $P(x) = 2x^2 - 6x - 3$. The two zeroes are of the form: $\frac{3 \pm \sqrt{k}}{2}$; where 'k' is a real number. Use the relationship between the zeroes and coefficients of a polynomial to find the value of k. Show your steps.

Q22 If HCF of 65 and 117 is expressible in the form of '65n-117', find the value of n.

Q23 A) In an A.P., if the sum of its first 'n' terms is $3n^2+5n$ and its kth term is 164, find the value of 'k'.

OR

B) Find the sum of all the 11 terms of an A.P. whose middle term is 30.

Q24 Find the value of 'p' for which the quadratic equation $px(x-2)+6=0$ has two equal real roots.

Q25 Find the value(s) of 'x', if the distance between the points A(0,0) and B(x,-4) is 5 units.

Section C

Q26 Prove that $\sqrt{5}$ is an irrational number.

Q27 A) A library has a fixed charge for the first three days and an additional charge for each day thereafter for borrowing books. Saritha paid ₹27 for a book kept for seven days, while Susy paid ₹21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.

OR

Q28 Given linear equation $2x + 3y - 8 = 0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is:

- (i) Intersecting lines (ii) Parallel lines (iii) Coincident lines

Q28 Find the zeroes of the polynomial $5\sqrt{5}x^2+30x+8\sqrt{5}$.

Q29 A) Find the number of odd integers between 2 and 100 divisible by 3. Also find their sum.

OR

B) The sum of first 8 terms of an A.P. is 100 and the sum of its first 19 terms is 551. Find the A.P.

Q30 ABCD is a trapezium in which AB||DC and its diagonals intersect each other at the point 'O'. Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

Q31 If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$. Prove that $a^2 + b^2 = m^2 + n^2$

Section D

Q32 How many terms of the A.P. 45,39,33,..... must be taken so that their sum is 180. Explain (justify) the double answer.

Q33 A) Two people are 16km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. Had they walked in the same direction with same speeds as before, they would have met in 8 hours. Find their walking speeds.

OR

Q34 Check graphically whether the pair of linear equations $4x-y-8=0$ and $2x-3y+6=0$ is consistent. Also, find the vertices of the triangle formed by these lines with the x-axis.

Q34 State and prove Basic Proportionality theorem.

Q35 A) (i) Prove that: If $\sqrt{3} \sin \theta = \cos \theta$, Find the value of: $\frac{\sin \theta \tan \theta (1 + \cos \theta)}{\sin \theta + \cos \theta}$
(ii) If $1 + \sin^2 \theta = 3 \sin \theta \cdot \cos \theta$, then prove that $\tan \theta = 1$ or $\tan \theta = \frac{1}{2}$

OR

B) (i) Prove that: $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$
(ii) Evaluate: $2 \sec^2 \theta + 3 \operatorname{cosec}^2 \theta - 2 \sin \theta \cdot \cos \theta$, if θ is 45°

Section E

Q36 Nidhi and Ria are very close friends. Nidhi's parents own a Maruti Alto, Ria's parents own a Toyota Liva. Both families decide to go for a picnic to Somnath temple in Gujarat by their own cars.

Nidhi's car travels x km/hr while Ria's car travels 5 km/hr more than Nidhi's car. Nidhi's car took 4 hours more than Ria's car in covering 400 km.



- (i) What will be the distance covered by Ria's car in two hours?
- (ii) Write a quadratic equation to find the speed of Nidhi's car.
- (iii) Find the speed of Nidhi's car.

OR

How much time Ria took to travel 400 km?

- Q37 Shruti's father gave her some money to buy kiwi from the market for rupees
 $p(x) = x^2 - 28x + 160$. Where α, β are the zeroes of $p(x)$.



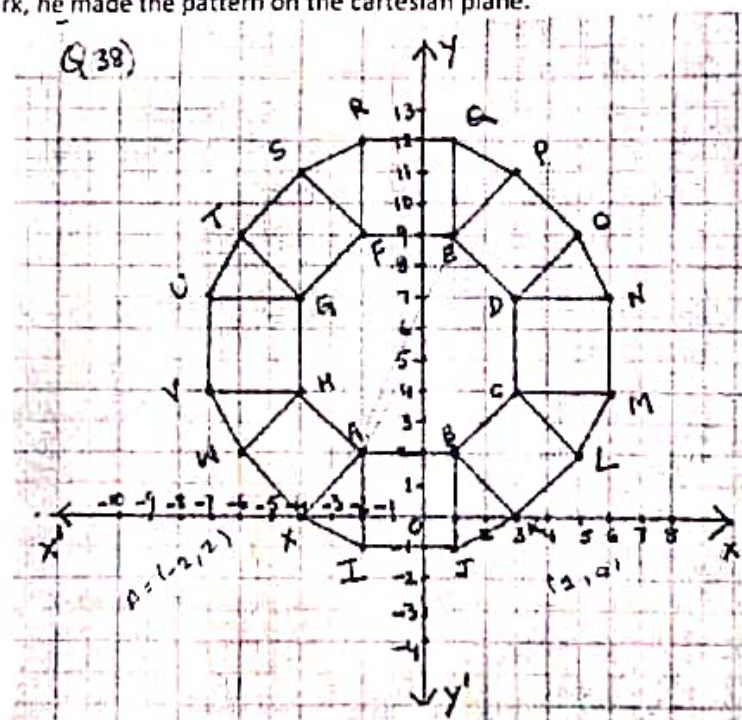
Based on the above information, answer the following:

- (i) Find the value of α and β where $\alpha < \beta$.
- (ii) Find a quadratic polynomial, whose zeroes are $\frac{1}{4}$ and -1 .
- (iii) If the sum of zeroes of $q(x) = kx^2 + 2x + 3k$ is equal to their product, then what is the value of k ?

OR

Write the polynomial, whose zeroes are $(3 + \sqrt{2})$ and $(3 - \sqrt{2})$.

- Q38 A tiled floor in an archaeological museum is shown below, made of squares, triangles and hexagons. A craftsman thought of making a floor pattern after being inspired by the given design. To ensure accuracy in his work, he made the pattern on the cartesian plane.



- (i) What is the length of the line segment joining points B and F?
- (ii) What are the co-ordinates of mid-point of line segment AE.
- (iii) Find the co-ordinates of the point which divides the line segment TK in the ratio 2:9.

OR

Find the co-ordinates of the point which divides the line segment joining IF in the ratio 2:3.