**FIRST TERM EXAMINATION (2025-26)**
**CLASS 10 – MATHEMATICS (STANDARD) (041)**

**TIME:3 HOURS** **MAX.MARKS:80**

**GENERAL INSTRUCTIONS:**

(i) This question paper contains 38 questions. All questions are compulsory.
(ii) This question paper is divided into 5 sections – A, B, C, D and E.
(iii) In Section A, Question numbers 1 to 18 are MCQs and question numbers 19 and 20 are Assertion – Reason based questions of 1 mark each.
(iv) In Section B, Question numbers 21 to 25 carry 2 marks each.
(v) In Section C, Question numbers 26 to 31 carry 3 marks each.
(vi) In Section D, Question numbers 32 to 35 carry 5 marks each.
(vii) In Section E, Question numbers 36 to 38 are case -study based integrated questions carrying 4 marks each. Internal choice is provided in 2 marks question in each case-study.
(viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions of 2 marks in Section E.
(ix) Draw neat diagrams wherever required.
(x) Take $\pi = \frac{22}{7}$, wherever required, if not stated.

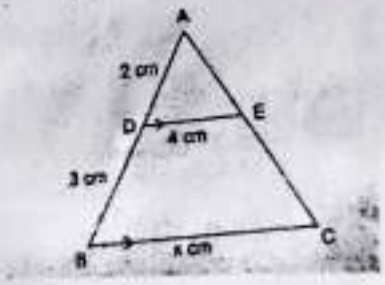
## SECTION A

Q1 If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a is
(a) 2 (b) 4 (c) 18 (d) 36

Q2 The probability of 2 friends sharing same birthday in February,2028 is
(a) $\frac{1}{365}$ (b) $\frac{1}{28}$ (c) $\frac{2}{29}$ (d) $\frac{1}{29}$

Q3 Trigonometric identity $\sec^2\theta - \tan^2\theta = 1$ is true for all values of $\theta$ satisfying the relation
(a) $0° \leq \theta \leq 90°$ (b) $0° \leq \theta < 90°$ (c) $0° < \theta \leq 90°$ (d) $0° < \theta < 90°$

Q4 In the given figure, DE ∥ BC, then the value of x is




(a) 6 (b) 12.5 (c) 10 (d) 8

Q5 The distance of point P (1, -1) from x-axis is:
(a) 1 (b) -1 (c) 0 (d) $\sqrt{2}$

Q6 The number of red balls in a bag is 10 more than the number of black balls. If the probability of drawing a red ball at random from this bag is $\frac{3}{5}$, then the total number of balls in the bag is
(a) 50 (b) 60 (c) 80 (d) 40

Q7 The graph of a quadratic polynomial p(x) passes through the points (-6,0), (0, -30), (4, -20) and (6,0). The zeroes of the polynomial are
(a) -6,0 (b) 4,6 (c) -30,-20 (d) -6,6

Q8 The next term of the A.P. $\sqrt{7}$, $\sqrt{28}$, $\sqrt{63}$, .....is
(a) $\sqrt{70}$ (b) $\sqrt{120}$ (c) $\sqrt{84}$ (d) $\sqrt{112}$

Q9 The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where $a,b$ are integers, if

(a) $a = b$ (b) $3a = 2b$ (c) $2a = 3b$ (d) $ab = 6$

Q10 Graphically, the pair of linear equations $3x-y+8=0$ and $3x-2y=24$ represents two lines which are:

(a) intersecting exactly at one point (c) coincident
(b) intersecting exactly at two points (d) parallel

Q11 For an A.P, if $a_n = 5 - 3n$, then common difference is

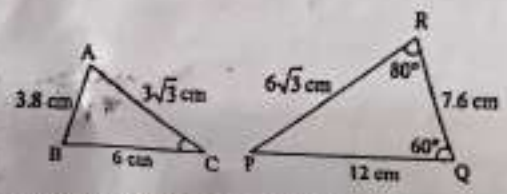
(a) 3 (b) 5 (c) -3 (d) -5

Q12 If the product of two co-prime numbers is 553, then their HCF is

(a) 1 (b) 553 (c) 7 (d) 79

Q13 $\Delta$ ABC and $\Delta$ PQR are shown in the adjoining figures. The measure of angle C is :

(a) 140° (b) 80°
(c) 60° (d) 40°




Q14 The coordinates of the centroid of a triangle whose vertices are (0,6), (8,12) and (8,0) are

(a) (0,18) (b) $(\frac{16}{3}, 6)$ (c) (3, 10) (d) (0,0)

Q15 If one root of $5x^2 + 13x + k = 0$ is the reciprocal of the other root, then k is:

(a) 6 (b) 5 (c) 4 (d) 13

Q16 The zeroes of a polynomial $x^2+px+q$ are twice the zeroes of the polynomial $4x^2-5x-6$. The value of p is:

(a) $\frac{-5}{2}$ (b) $\frac{5}{2}$ (c) -5 (d) 10

Q17 $(\sec^2\theta - 1)(1 - \text{cosec}^2\theta)$ is equal to

(a) 1 (b) 2 (c) -2 (d) -1

Q18 If $a = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeroes in a, where a is a natural number is

(a) 2 (b) 3 (c) 4 (d) 7

Q19 Assertion (A): If $\alpha, \beta$ are the zeros of polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1) = 1 - c$.

Reason (R): Sum of the zeros of a polynomial is $\frac{-b}{a}$ and product of zeros is $\frac{c}{a}$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true, but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true, but reason (R) is false.
(d) Assertion (A) is false, but reason (R) is true.

Q20 Assertion (A) : $\cos 20° > \cos 70°$

Reason(R): The value of $\cos\theta$ decreases as $\theta$ increases.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true, but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true, but reason (R) is false.
(d) Assertion (A) is false, but reason (R) is true.

## SECTION B

Q21 A) The two angles of a right-angled triangle other than 90° are in the ratio 2:3. Express the given situation algebraically as a system of linear equations in two variables and hence solve it.

OR

Solve for x and y:

$\sqrt{2}x - \sqrt{3}y = 0$

$\sqrt{3}x - \sqrt{8}y = 0$

Q22 Evaluate the following:

$$\frac{3\sin 30° - 4\sin^3 30°}{2\sin^2 50° + 2\cos^2 50°}$$

Q23 Find the zeroes of the polynomial $p(t) = t^2 - 16$, and verify the relationship between the zeroes and its coefficients.

Q24 A) If $\cot\theta = \frac{1}{\sqrt{3}}$, show that $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta} = -\frac{1}{2}$

OR

B) Find acute angles A and B, such that $\sin(A+2B) = \frac{\sqrt{3}}{2}$ and $\cos(A+4B) = 0$, $A > B$.

Q25 Find the value of k for which the given quadratic equation has real and equal roots:

$(k+1)x^2 - 2(k-1)x + 1 = 0$

## SECTION C

Q26 A) Prove that $\sqrt{5} + \sqrt{3}$ is irrational, given that $\sqrt{15}$ is irrational.

OR

B) Aakriti decides to distribute milk in an orphanage on her birthday. The supplier brought two milk containers which contain 398 litres and 436 litres of milk. The milk is to be transferred to another vessel using a drum so that 7 litres and 11 litres of milk is left in both the containers respectively. What will be the maximum capacity of the drum?

Q27 A card is drawn at random from a well shuffled deck of 52 cards. What is the probability of getting:

(i) A face card
(ii) Not getting a red card
(iii) Either a heart or a black card

Q28 Solve the quadratic equation using quadratic formula:

$$\frac{1}{2x-3} + \frac{1}{x-5} = 1, \text{ where } x \neq \frac{3}{2}, 5$$

Q29 A) Prove that

$$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\,\text{cosec}\,\theta$$

OR

B) If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$.

Q30 Sides AB and BC and median AD of a Δ ABC are respectively proportional to sides PQ and QR and median PM of Δ PQR. Show that Δ ABC ~ ΔPQR.

Q31 If α and β are the zeroes of the quadratic polynomial $f(x) = 2x^2 - 5x + 7$, find a polynomial whose zeroes are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.

## SECTION D

Q32 State and prove Basic Proportionality Theorem.

Q33 A) The speed of a boat in still water is 8km/hr. It can go 15 km upstream and 22 km downstream in 5 hours. Find the speed of the stream.

OR

B) Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

Q34 A) Divide 56 into four parts in A.P. such that the ratio of the product of the extremes to the product of means is 5:6.

OR

B) The sum of first and eighth terms of an A.P. is 32 and their product is 60. Find the first term and common difference of the A.P. Hence, also find the sum of its first 20 terms.

Q35 Find the ratio in which the line x-y-2=0 divides the line segment joining (3, -1) and (8,9). Also find the coordinate of point of division.

## SECTION E

Q36 Essel World is one of India's largest amusement parks that offer a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The Park is known for its iconic "Water Kingdom" section, making it a popular destination for family outings and fun -filled adventure.

The ticket charges for the park are ₹150 per child and ₹250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹55,000 was collected.

Based on the above, answer the following questions:

(i) If the number of children visited be x and the number of adults visited be y, then write the given situation algebraically.

(ii) (A) How many children visited the amusement park that day?

OR

(B) How many adults visited the amusement park that day?

(iii) How much amount will be collected if 250 children and 100 adults visit the amusement park?

Q37 Ms Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern.

On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer.

On the basis of the above situation, answer the following questions:

(i) Write an A.P. whose terms represent the number of jars in different layers starting from top. Also, find the common difference.

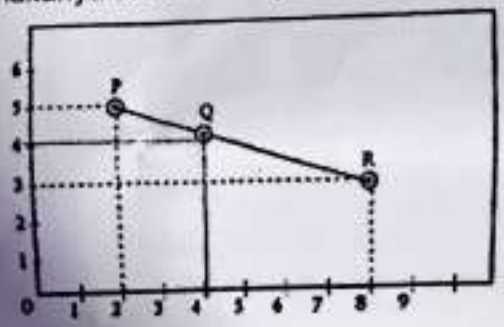
(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer.

(iii) (A) If there are 'n' number of rows in a layer then find the expression for finding the total number of jars in terms of n. Hence find $S_8$.

OR

(B) The shopkeeper added 3 jars in each layer. How many jars are there in the $5^{th}$ layer from the top?

Q38 A group of class X students goes to picnic during winter holidays. The position of three friends Aman, Kirti and Chaitanya are shown by the points P, Q and R.




Based on the above, answer the following questions:

(i) Find the distance between P and R.

(ii) Is Q, the midpoint of PR? Justify by finding midpoint of PR.

(iii) (A) Find the point on x-axis which is equidistant from P and Q.

OR

(B) Let S be a point which divides the line joining PQ in the ratio 2:3. Find the coordinates of S.