FIRST TERM EXAMINATION 2024-25

Class- X

SUBJECT: MATHEMATICS

TIME: 3hrs **MM: 80**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory.

SECTION A

Q1. The LCM of two numbers is 2400. Which of the following cannot be their HCF?

(a) 400 (b) 500 (c) 600 (d) 300

Q2. The least number that is divisible by all the numbers from 1 to 8 (both inclusive) is

(a) 840 (b) 2520 (c) 8 (d) 420

Q3. If α and β are the zeroes of quadratic polynomial $P(x) = x^2 - (k+6)x + 2(2k - 1)$, then the value of k, if $\alpha + \beta = \frac{1}{2}(\alpha\beta)$, is

(a) -7 (b) 7 (c) -3 (d) 3

Q4. If the lines represented by the pair of equations $2x + 5y = 3$ and $(k+1)x + 2(k+2)y = 2k$ are coincident, then the value of k is

(a) –3 (b) 3 (c) –12 (d) no value

Q5. The sum of two natural numbers is 240 and they are in the ratio 3:5. Find the numbers.

(a) $x = 200, y = 40$ (b) $x = 160, y = 80$

(c) $x = 90, y = 150$ (d) None of these

Q6. Solution of the system : $29x + 37y = 103, 37x + 29y = 95$ is :
(a) $x = 1, y = 2$ (b) $x = -2, y = 1$ (c) $x = 2, y = 1$ (d) $x = 2, y = -1$

Q7. $(x^2+1)^2 - x^2 = 0$ has
(a) four real roots (b) two real roots (c) no real roots (d) one real root.

Q8. Which of the following equations has the sum of its roots as 3?
(a) $2x^2 - 3x + 6 = 0$ (b) $-x^2 + 3x - 3 = 0$ (c) $\sqrt{2}x^2 - \frac{3}{\sqrt{2}}x + 1 = 0$ (d) $3x^2 - 3x + 3 = 0$

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. If a, b, c are in A.P. then $\frac{a-b}{b-c}$ is equal to
(a) $\frac{b}{a}$ (b) 1 (c) $\frac{a}{c}$ (d) $\frac{c}{a}$

Q11. In a right triangle ABC, $\angle BAC = 90^0$ and AD ⊥ BC. Then:
(a) $BD \times CD = BC^2$ (b) $AB \times AC = BC^2$ (c) $BD \times CD = AD^2$ (d) $AB \times AC = AD^2$

Q12. If in two triangles ABC and PQR, $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$
(a) $\Delta PQR \sim \Delta CAB$ (b) $\Delta PQR \sim \Delta ABC$ (c) $\Delta CBA \sim \Delta PQR$ (d) $\Delta BCA \sim \Delta PQR$

Q13. D and E are respectively the points on the sides AB and AC of a ΔABC such that AD = 2cm,
BD = 3cm, BC = 7.5cm and DE ll BC. Then, length of DE is
(a) 2.5cm (b) 3cm (c) 5cm (d) 6cm

Q14. A circle drawn with origin as the centre passes through, (13/2 , 0). The point which does not lie in the interior of the circle is

(a) $\left(-\frac{3}{4}, 1\right)$ (b) $\left(2, \frac{7}{3}\right)$ (c) $\left(5, -\frac{1}{2}\right)$ (d) (a) $\left(-6, \frac{5}{2}\right)$

Q15. If $\sin\theta + \sin^2\theta = 1$, then $\cos^2\theta + \cos^4\theta =$ ..

(a) -1 (b) 0 (c) 1 (d) 2

Q16. $5\tan^2 A - 5\sec^2 A + 1$ is equal to

(a) 6 (b) -5 (c) 1 (d) -4

Q17. $\frac{1-\cos A}{\sin A}$ is equal to

(a) $\frac{\sin A}{1-\cos A}$ (b) $\frac{\sin A}{1+\cos A}$ (c) $\frac{\cos A}{1-\cos A}$ (d) $\frac{\cos A}{1+\cos A}$

Q18. If a tower 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the sun's elevation is:

(a) 60^0 (b) 45^0 (c) 30^0 (d) 90^0

DIRECTION: In the question number **19** and **20**, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option

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

(b) Both assertion (A) and reason (R) are true and 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.

Q19. Assertion: $x^2 + 4x + 5$ has two zeroes.

Reason : A quadratic polynomial can have at the most two zeroes.

Q20. Assertion: Mid-point of a line segment divides it in the ratio 1:1. .

Reason : The ratio in which the point (-3, k) divides the line segment joining the points (-5, 4) and (-2, 3) is 1:2.

SECTION B

Q21. The LCM of the two numbers is 9 times their HCF. The sum of LCM and HCF is 500. Find their HCF.

Q22. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

OR

If the mth term of an A.P. be $\frac{1}{n}$ and nth term be $\frac{1}{m}$, show that its (mn)th is 1.

Q23. Sides AB, BC and median AD of triangle ABC are respectively proportional to sides PQ, QR and median PM of triangle PQR. Show that ABC and PQR are similar.

Q24. Prove that $(\text{cosec}A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

OR

If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, then prove that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$.

Q25. Find a relation between x and y such that the point P(x,y) is equidistant from the points A(2,5) and B(-3, 7).

SECTION C

Q26. If α and β are the zeroes of polynomial $f(x) = x^2 + px + 45$ such that square of the difference of the zeroes is 144 find the value of p.

Q27. Prove that $\sqrt{7}$ is irrational.

Q28. Determine graphically, the vertices of the triangle formed by the lines $y = x$, $3y = x$ and $x + y = 8$.

OR

Solve for x and y

$6(ax + by) = 3a + 2b$ and $6(bx - ay) = 3b - 2a$

Q29. A piece of cloth costs Rs.200. If the piece was 5 m longer and each metre of cloth costs Rs.2 less than the cost of the piece would have remained unchanged. How long is the piece and what is the original rate per metre?

OR

A two-digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digit inter-change their places. Find the number.

Q30. Find the ratio in which the y- axis divides the line segment joining the points (-4,-6) and (10,12). Also find the coordinates of the point of division.

Q31. If tanA = n.tanB and sinA = m.sinB, then prove that $\cos^2 A = \frac{m^2-1}{n^2-1}$.

SECTION D

Q32. Vijay had some bananas and he divided them into two lots A and B. He sold the first lot at the rate of Rs.2 for 3 bananas and the second lot at the rate of Rs.1 per banana and got a total of Rs.400. If he had sold the first lot at the rate of Rs.1 per banana and the second lot at the rate of Rs.4 for 5 bananas, his total collection would have been Rs.460. Find the total number of bananas he had.

OR

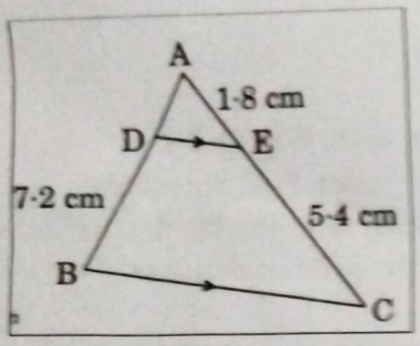
A railway half ticket cost half the full fare but the reservation charges are the same on a half ticket as on a full ticket. One reserved first-class ticket costs Rs.2530. One reserved first-class ticket and one reserved first-class half ticket from stations A to B costs Rs.3810. Find the full first-class fare from stations A to B and also the reservation charges for a ticket.

Q33. A thief, after committing a theft, runs at a uniform speed of 50 m/minute. After 2 minutes, a policeman runs to catch him. He goes 60 m in first minute and increases his speed by 5 m/ minute every succeeding minute. After how many minutes, the policeman will catch the thief?

OR

Find the common difference of an A.P. whose first term is 5 and the sum of its first four terms is half the sum of the next four terms.

Q34. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.



In the figure, DE ll BC. Find the length of side AD, given that AE = 1.8cm, BD = 7.2cm and CE = 5.4cm.

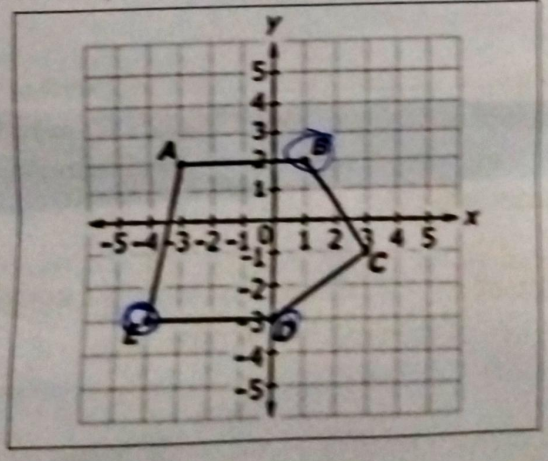
Q35. The angles of depression of the top and bottom of a 12m tall building, from the top of a multi-storeyed building are 30^0 and 60^0 respectively. Find the height of the multi-storeyed bui

lding.

SECTION E

Q36. *Ashok is a student of class IX.* He is doing a project work that Vidyalaya road maps. So Ashok visit in the Vidyalaya and observe some part of the Vidyalaya and draw a road map on a graph paper. He takes principal office on the origin of his graph and then give others locations. Observe the graph and give the answer of the following questions

A-sport room, B-maths lab, C-chemistry lab, D- library and E- staff room



i) what is the coordinate of sport room

ii) find the distance between staff room office to library.

iii) If we draw a straight-line staff room to chemistry lab (EC) is cut Y-axis. Then what ratio EC is divided by Y-axis.

OR

find the straight distance between staff room to maths lab.

Q37. Nidhi and Ria are very close friends. Nidhi's parents own a Maruti Alto. Ria's parents own a Toyota Liva. Both the families decide to go for a picnic to Somnath temple in Gujrat by their own cars.

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

(i) What will be the distance covered by Ria's car in two hours?

ii) Form the quadratic equation describe the speed of Nidhi's car?

iii) What is the speed of Nidhi's car?

OR

iv) How much time took Ria to travel 400 km?

Q38. In the figure shows the path of a diver, when she takes a jump from the diving board. Clearly, it is a parabola. Annie was standing on a diving board, 48 feet above the water level. She took a dive into the pool. Her height(in feet) above the water level at any time 't' in seconds is given by the polynomial h(t) such that $h(t) = -16t^2 + 8t + k$.

$1 - 4t = 0$

$-4t = -1$

i) what is the value of k?

ii) At what time will she touch the water in the pool?

iii) Rita's height (in feet) above the water level is given by another polynomial p(t) with zeroes -1 and 2. Then, find the polynomial.

or

The zeroes of the polynomial $r(t) = -12t^2 + (k - 3)t + 48$ are negative of each other. Then find the value of k.