QUARTERLY EXAM-24
MATHS 10
TIRUPPUR AND COIMBATORE

Part - I

1	b	8	b
2	d	9	c
3	c	10	∅
4	∅	11	c
5	c	12	b
6	b	13	b
7	b	14	d

Part - II

15) $A = \{3, 5\}$
$B = \{2, 4\}$

16) $f(x) = x^2 - 5x + 6$
$f(2) = 2^2 - 5(2) + 6 = 0$

17) $f(2k) = 2k - 1$
$f[2k-1] = 5$
$2[2k-1] - 1 = 5$
$4k - 2 - 1 = 5$
$4k = 8$
$k = 2$

18) $800 = a^b \times b^a$
$800 = 2^5 \times 5^2$

19) $6 + 13 + 20 + \cdots + 97$
$n = \left(\frac{97-6}{7}\right) + 1$
$= \frac{91}{7} + 1$
$= 23 + 1$
$n = 24$
$S_n = \frac{n}{2}[a + l]$
$S_{24} = \frac{24}{2}[6 + 97]$
$= 12 \times 103$
$= 1236$

20) $x+6, x+12, x+15, \ldots$ in G.P.
$[x+12]^2 = [x+6][x+15]$
$x^2 + 24x + 144 = x^2 + 21x + 90$
$x = \frac{-54}{3}$
$x = -18$

21) $8x^4y^2 = 2^3 \times x^4 \times y^2$
$48x^2y^4 = 2^4 \times 3 \times x^2 \times y^4$
LCM $= 48x^4y^4$

22) $\frac{x^3}{x-y} + \frac{y^3}{y-x} = \frac{x^3 - y^3}{x-y} = \frac{[x-y][x^2+xy+y^2]}{x-y}$
$= x^2 + xy + y^2$

23) Sum $= -9$
Prod $= 20$
Eqn $x^2 + 9x + 20 = 0$

24) $\frac{\text{area of } \Delta ABC}{\text{area of } \Delta DEF} = \frac{BC^2}{EF^2}$
$\frac{54}{x} = \frac{3^2}{4^2}$
$x = 96 \text{ cm}^2$

25) $m = \frac{2-1}{-3+6} = \frac{1}{3}$

26) $\theta = 30°$, $c = -3$
$m = \tan 30° = \frac{1}{\sqrt{3}}$
$y = mx + c$
$y = \frac{x}{\sqrt{3}} - 3$
$x - \sqrt{3}y - 3\sqrt{3} = 0$

27) $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \sqrt{\frac{1+\cos\theta}{1-\cos\theta} \times \frac{1+\cos\theta}{1+\cos\theta}}$
$= \sqrt{\frac{[1+\cos\theta]^2}{1^2 - \cos^2\theta}}$
$= \sqrt{\frac{(1+\cos\theta)^2}{\sin^2\theta}}$
$= \frac{1}{\sin\theta} + \frac{\cos\theta}{\sin\theta}$
$= \operatorname{cosec}\theta + \cot\theta$

28) $5x + 23y + 14 = 0$ | $23x - 5y + 4 = 0$
$a_1 = 5$, $b_1 = 23$
$a_2 = 23$, $b_2 = -5$
$a_1a_2 + b_1b_2 = 115 - 115 = 0$
$\therefore$ It is $\perp^r$

Part - III

29) $A = \{5, 6\}$, $B = \{4, 5, 6\}$
$C = \{5, 6, 7\}$.
LHS $= \{(5,5), (5,6), (6,5), (6,6)\}$ → (1)
$B \times B = \{(4,4), (4,5), (4,6), (5,4), (5,5), (5,6), (6,4), (6,5), (6,6)\}$
$C \times C = \{(5,5), (5,6), (5,7), (6,5), (6,6), (6,7), (7,5), (7,6), (7,7)\}$
RHS $= \{(5,5), (5,6), (6,5), (6,6)\}$ → (2)
(1) = (2)

30) $A = \{1, 2, 3, 4\}$, $B = \{2, 5, 8, 11, 14\}$
i) set
$\{(1,2), (2,5), (3,8), (4,11)\}$
ii) table

A	1	2	3	4
B	2	5	8	11

iii) arrow
graph

31) $f(x) = 3 - 2x$
$f(x^2) = [f(x)]^2$
$3 - 2x^2 = [3 - 2x]^2$
$6x^2 - 12x + 6 = 0 \quad \div 6$
$x^2 - 2x + 1 = 0$
$x = 1, 1$.

32)
HCF [210, 55]
$210 = [55 \times 3] + 45$
$55 = [45 \times 1] + 10$
$45 = [10 \times 4] + 5$
$10 = [5 \times 2] + 0$
HCF $= 5$
$55x - 325 = 5$
$x = 6$

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33) $t_6 : t_8 = 7 : 9$

$\frac{a+5d}{a+7d} = \frac{7}{9}$ | $\boxed{n=2}$

$\boxed{d=1}$

$\frac{t_9}{t_{13}} = \frac{a+8d}{a+12d} = \frac{10}{14}$

$\boxed{t_9 : t_{13} = 5 : 7}$

34) $S_{10} = [1^2+2^2+\cdots+24^2] - [1^2+2^2+\cdots+9^2]$

$= \frac{24[25][49]}{6} - \frac{9\times10\times19}{6}$

$= 4900 - 285$

$= 4615$

$\boxed{S_n = \frac{n(n+1)(2n+1)}{6}}$

35)

$x = \frac{a^2+3a-4}{3a^2-3}$ | $y = \frac{a^2+2a-8}{2a^2-2a-4}$

$= \frac{(a+4)(a-1)}{3(a+1)(a-1)}$ | $= \frac{[a+4][a-2]}{2[a-2][a+1]}$

$x = \frac{a+4}{3(a+1)}$ | $y = \frac{a+4}{2[a+1]}$

$x^2 y^{-2} = \frac{x^2}{y^2} = \left(\frac{x}{y}\right)^2$

$= \left[\frac{(a+4)}{3(a+1)} \times \frac{2[a+1]}{(a+4)}\right]^2$

$= \frac{2^2}{3^2}$

$= \frac{4}{9}$.

36) $\sqrt{6x^4-16x^3+17x^2-2x+1}$

	6	−16	17	−2	1
8	64	−16	17	−2	1
(−)	64				
16 −1		−16	17		
		(+) 16	(−) 1		
16 −2			16	−2	1
			(−) 16	(+) 2	(−) 1
				0	

$= |8x^2 - x + 1|$

37) $2x^2 - 7x + 5 = 0$

$\alpha+\beta = 7/2$; $\alpha\beta = 5/2$

1) $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \frac{7/2}{5/2} = \frac{7}{5}$

2) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2+\beta^2}{\alpha\beta}$

$= \frac{[\alpha+\beta]^2 - 2\alpha\beta}{\alpha\beta}$

$= \frac{\left(\frac{7}{2}\right)^2 - 2\left(\frac{5}{2}\right)}{5/2}$

$= \frac{29}{10}$

38) B.P.T

statement → (1)

$\frac{AD}{DB} = \frac{AE}{EC}$.

Refer Text Book

39) DIAGRAM

A [−4, 3], B [8, 6]

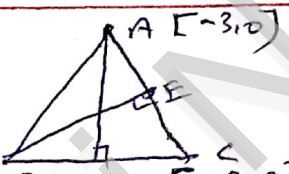
C [5, 11], D [−5, 12]

Area $= \frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{vmatrix}$

$= \frac{1}{2}\begin{vmatrix} -4 & 8 & 5 & -5 & -4 \\ 3 & 6 & 11 & 12 & 3 \end{vmatrix}$

$= \frac{1}{2}|251 - 93| = 79$ sq.units

40)



Altitude AD

$m = \perp^r$ slope of $BC = -\left[\frac{x_2-x_1}{y_2-y_1}\right]$

$= -\left[\frac{12-10}{3+2}\right] = -\frac{2}{5}$

$y - y_1 = m(x - x_1)$ $\quad (x_1, y_1) = [-3, 10]$

$y - 10 = -\frac{2}{5}[x+3]$

$\boxed{2x+5y+6=0}$

Altitude BE

$m = \perp^r$ slope of $CA = -\left[\frac{-3-12}{0-3}\right]$

$\boxed{m = -5}$ $\quad [x_1, y_1) = [10, -2]$

$y + 2 = -5(x - 10)$

$\boxed{5x+y-48=0}$

41) L.H.S $= \frac{\sin^2 A + [1+\cos A]^2}{[1+\cos A]\sin A}$

$= \frac{1+1+2\cos A}{[1+\cos A]\sin A}$

$= \frac{2[1+\cos A]}{[1+\cos A]\sin A} = \frac{2}{\sin A}$

$= 2\operatorname{cosec} A$ = R.H.S.

42) $x + y + z = 5 \rightarrow (1)$

$2x - y + z = 9 \rightarrow (2)$

$x - 2y + 3z = 16 \rightarrow (3)$

Solve (1) & (2)

$3x + 2z = 14 \rightarrow (4)$

Solve (2) & (3)

$3x + 5z = 26 \rightarrow (5)$

Solve (4) & (5)

$\boxed{-z = 4}$

$z = 4$ in (4) | $x = 2$, $z = 4$ in (1)

$\boxed{x = 2}$ | $\boxed{y = -1}$

$x = 2, y = -1, z = 4$

10

Register No.

QUARTERLY EXAMINATION - 2024

Time : 3.00 Hours **MATHEMATICS** **Marks : 100**

I. Choose the best answer. **14x1=14**

1. If there are 1024 relation from a Set A = {1,2,3,4,5} to a set B, there the number of elements in B is
   a) 3 b) 2 c) 4 d) 8
2. If the ordered pairs (a+2,4) and (5, 2a+b) are equal then (a,b) is
   a) (2,-2) b) (5,1) c) (2,3) d) (3,-2)
3. If f(x)=2x² and g(x)=, then fog is
   a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$
4. Using Euclids division lemma, if the cube of any positive integer is divided by 9 then the possible remainders, are
   a) 0,1,8 b) 1,4,8 c) 0,1,3 d) 1,3,5
5. The sum of exponents of the prime factors in the prime factorization of 1729 is
   a) 1 b) 2 c) 3 d) 4
6. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}$ ..... is
   a) $\frac{1}{24}$ b) $\frac{1}{27}$ c) $\frac{2}{3}$ d) $\frac{1}{81}$
7. If (x-6) is the HCF of x²-2x-24 and x²-kx-6, then K is
   a) 3 b) 5 c) 6 d) 8
8. Which of the following should be added to make x⁴+64 a perfect square
   a) 4x² b) 16x² c) 8x² d) -8x²
9. The solution of (2x-1)² = 0 is Equal to
   a) -1 b) 2 c) -1,2 d) None of there
10. If is ΔABC, DE II BC, AB = 3.6cm, AC = 2.4 cm, and AD = 2.1 cm then the length of AE is
    a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm
11. The Point of intersection of 3x-y =4 and x+y=8 is
    a) (5,3) b) (2,4) c) (3,5) d) (4,4)
12. The straight line given by the equation x=11 is
    a) Pallel to X-aris b) Parllel to Y-axis c) Passing through Origin d) Passing through (0,11)
13. The Slope of the line which is perpendicular to a line joinig the points (0,0) and (-8,8) is
    a) -1 b) 1 c) $\frac{1}{3}$ d) 8
14. Tan θ Cosec² θ - Tan θ is Equal to
    a) Sec θ b) Cot² θ c) Sin θ d) Cot θ

II. Answer any 10 from the following and Q.No : 28 is compulsary **10x2=20**

15. If AxB = {(3,2) (3,4), (5,2), (5,4) } then find A and B
16. If f(x) = x² - 5x + 6 then evaluate f(2)
17. Find k if fof(k) = 5 Where f(k) = 2k-1
18. If 800 = $a^b x b^a$, then find a and b.

19. Find the sum of 6+13+20+.....+97
20. Find x so that x+6, x+12, and x+15 are Consecutive Terms of a geometric progression
21. Find the Lcm of 8 X^4Y^2, 48 X^2Y^4
22. Simplify : $\frac{x^3}{x-y} + \frac{y^3}{y-x}$
23. Determine the quadratic Equation, Whose Sum and Product of roots are -9,20
24. If ΔABC in Similar to ΔDEF Such that BC = 3cm, EF = 4 cm, and area of ΔABC = 54 Cm² find the area of ΔDEF
25. Find the slope of a line joining (-6,1) and (-3,2)
26. Find the equation of a line whose inclination is 30° and making as intercept - 3 on the Y - axis
27. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \text{Cosec}\,\theta + \text{Cot}\,\theta$
28. Show that the straight line 5x+23y+14=0 and 23x-5y+9=0 are perpendicular.

III. Answer any 10 from the following Q.No : 42 is compulsary **10x5=50**

29. If A = {5,6}, B = {4,5,6}, C = {5,6,7}, Shows that AxA = (BxB)∩(CxC)
30. Let A = {1,2,3,4} and B = {2,5,8,11,14} be two sets let f: A→B be a function given by f(x) = 3x-1, Represent this function
    (1) set of ordered pairs. (2) Table from. (3) arrow diagram. (4) Graphical form
31. A function f in defined by f(x) = 3-2x. find x such that $f(x^2) = [f(x)]^2$
32. If the highest common factor of 210 and 55 is Expressible in the form 55x-325. Then find x.
33. The ratio of 6th and 8th term of an A.P is 7:9. Find the ratio of 9th term to 13th term.
34. Rekha has 15 squares colour papers of sizes 10cm, 11cm, 12cm,..... 24cm how much area can be decorated with these colour papers ?
35. If $x = \frac{a^2+3a-4}{3a^2-3}$ and $y = \frac{a^2+2a-8}{2a^2-2a-4}$ then find the value of x^2y^2
36. Find the square root of $64x^4-16x^3+17x^2-2x+1$
37. If α, β are the roots of $2x^2-7x+5=0$. Find the value of 1) $\frac{1}{\alpha} + \frac{1}{\beta}$ 2) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$
38. State and prove basic Proportionality theorem.
39. Find the area of the Quadrilateral formed by the points (8,6), (5,11), (-5,12) and (-4,3)
40. A(-3,0) B(10,-2), C(12,3) are the vertices of ΔABC. Find the equation of the Altitude through A and B
41. Prove that $\frac{\text{Sin A}}{1+\text{Cos A}} + \frac{\text{Sin A}}{1-\text{Cos A}} = 2\,\text{Cosec A}$
42. Solve : x+y+z=5; 2x-y+z=9; x-2y+3z = 16.

IV. Answer any one from given two questions (EACH) 2x8=16

43. (a) Construct a Triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR [Scale factor $\frac{3}{5}$ <1] (or)
    (b) Construct a Triangle Smilar to a given Triangle PQR with its sides equal to $\frac{6}{5}$ of the correspoding sides of the Triangle PQR [scale facter $\frac{6}{5}$ >1]
44. (a) A bus is travelling at a uniform speed of 50 km/hm draw distance - time graph and find
    1. How far will it go in 90 minutes ?
    2. Time required to cover the distance of 300 km. (or)
    (b) Draw the graph of xy = 24, x,y>0, Using the graph find
    i) y When x=3 and (ii) x When y=6