QUARTERLY COMMON EXAMINATION - 2022

10 - Std **MATHEMATICS** Reg. No. 1 0 2 3 2

Time : 2.30 hrs. Marks : 100

I Choose the best answer. 14 X 1 = 14

1. If there are 1024 relations from a set A = {1,2,3,4,5} to a set B, then number of elements in B is
   a) 3 b) 2 c) 8 d) 4
2. If $f(x) = x^2 - x$ then $f(x-1) - f(x+1) =$ a) 4x b) 2 - 2x c) 2 - 4x d) 4x - 2
3. The sum of the exponents of the prime factors in the prime factorization of 1729 is
   a) 1 b) 2 c) 3 d) 4
4. $7^{44} \equiv$ ..... (mod 100) a) 1^2 b) 2 c) 3 d) 4
5. $y^2 + \frac{1}{y^2}$ is not equal to
   a) $\frac{y^4+1}{y^2}$ b) $\left(y+\frac{1}{y}\right)^2$ c) $\left[y-\frac{1}{y}\right]^2+2$ d) $\left(y+\frac{1}{y}\right)^2-2$
6. $\frac{a^2}{a^2-b^2}+\frac{b^2}{b^2-a^2} =$ a) a - b b) a + b c) $a^2 - b^2$ d) 1
7. Graph of a linear polynomial is a
   a) straight line b) circle c) parabola d) hyperbola
8. In ΔLMN, $\angle L = 60^0$, $\angle M = 50^0$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
   a) 40^0 b) 70^0 c) 30^0 d) 110^0
9. If in ΔABC, DE||BC AB = 3.6cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is
   a) 1.4cm b) 1.8cm c) 1.2cm d) 1.05cm
10. The straight line given by the equation x = 11 is
    a) parallel to x axis b) parallel to y axis
    c) passing through the origin d) passing through the point (0,11)
11. If slope of the line PQ is $1/\sqrt{3}$, then, slope of the perpendicular bisector of PQ is
    a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $1/\sqrt{3}$ d) 0
12. The equation of a line passing through the origin and perpendicular to the line 7x - 3y + 4 = 0 is
    a) 7x - 3y + 4 = 0 b) 3x - 7y + 4 = 0 c) 3x + 7y = 0 d) 7x - 3y = 0
13. If $\sin\theta = \cos\theta$ then $2\tan^2\theta + \sin^2\theta - 1$ is equal to a) $-3/2$ b) $3/2$ c) $2/3$ d) $-2/3$
14. Variance of first 20 natural number is
    a) 32.25 b) 44.25 c) 33.25 d) 30

II Note : Answer any 10 questions. Question No. 28 is compulsory. 10 X 2 = 20

15. If A X B = {(3,2), (3, 4), (5, 2), (5,4)}, then find A and B.
16. If f(x) = 3x + 2, g(x) = 6x - k and if fog = gof, then find the value of k.
17. Find the least number that is divisible by the first ten natural numbers.
18. If $13824 = 2^a \times 3^b$ then find a and b.
19. Which term of an A.P 16, 11, 6, 1, ... is ..... 54?
20. Find the excluded values of the following expression $\frac{7p+2}{8p^2+13p+5}$.

21. Find the square root of $\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$.

22. In ΔABC - D and E are points on the sides AB and AC respectively such that DE || BC. If $AD/DB = 3/4$ and AC = 15cm, find AE.

23. Show that the points (-3, -4), (7, 2) and (12,5) are collinear.

24. Find the slope of a line joining the points $(5, \sqrt{5})$ with the origin. (0,0)

25. Find the equation of a straight line whose slope is $-5/4$ and it passes through (-1, 2).

26. Prove that : $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$.

27. Find the range and co-efficient of range of the data 63, 89, 98, 125, 79, 108, 117, 68.

28. If $P = \frac{a}{a+b}$, $Q = \frac{b}{a+b}$ then find $\frac{1}{P^2-Q^2}$

(35) Simplify: $\frac{x^2-16}{x+4} - \frac{x-4}{x+4}$

(36) 396, 504, 636 Find HCF.

(42) $5+55+555+\ldots\ldots+n$.

III Note : Answer any 10 questions. Question No. 42 is compulsory. 10 X 5 = 50

29. Let f:A→B be a function defined by $f(x) = x/2 - 1$ where A = {2,4,6,10,12}, B = {0,1,2,4,5,9} represent f by i) set of ordered pairs ii) as table iii) an arrow diagram iv) a graph.

30. If f(x) = 2x + 3, g(x) = 1 - 2x and h (x) = 3x. Prove that fo (goh) = (fog) oh.

31. Find the sum of the all natural number between 100 and 1000 which are divisible by 11. $108+119+130+\ldots$

32. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm ..... 24cm. How much area can be decorated with these colour papers? 990

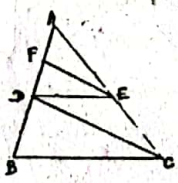
33. Solve : x + y + z = 5, 2x - y + z = 9, x - 2y + 3z - 16 = 0.

34. If $36x^4 - 60x^3 + 61x^2 - mx + n$ is a perfect square, find the values of m and n.

35. Solve : $pqx^2 - (p + q)x + (p + q)^2 = 0$ by formula method.

36. State and prove Angle Bisector theorem.

37. In figure DE || BC and CD || EF prove that $AD^2 = AB \times AF$.



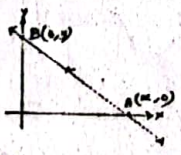
38. Find the area of the quadrilateral formed by the points (8,6), (5,11), (-5,12) and (-4,3).

39. Find the equation of the perpendicular bisector of the line joining the points A(-4,2) and B (6,4).

40. Prove that : $\left(\frac{\cos^3 A - \sin^3 A}{\cos A - \sin A}\right) - \left(\frac{\cos^3 A + \sin^3 A}{\cos A + \sin A}\right) = 2\sin A \cos A$.

41. The scores of a Cricketer in 7 matches are 70,80,60,50,40,90,95. Find the standard deviation.

42. A straight line cuts the co-ordinate axes at A and B. If the mid point of AB is (2,3) find the equation of AB.



IV Note : Answer the following questions. 2 X 8 = 16

43. a) construct a triangle similar to a given triangle ABC with its sides equal to 6/5 of the corresponding sides of the triangle ABC. (Scale factor 6/5) ***(OR)***
b) Construct a ΔPQR which the base PQ = 4.5cm, ∠R = 35° and the median from R to RG is 6cm.

44. a) A bus is travelling at a uniform speed 50km/hr. Draw the distance - time graph and hence find i) the constant of variation. ii) how far will it travel in 1½ hour. iii) the time required to cover a distance of 300km from the graph. ***(OR)***
Draw the graph of xy = 24, x,y>0. Using the graph find, i) y when x = 3, ii) x when y = 12.