

- a) 14400 b) 14200 c) 14280 d) 14520
12. $\frac{3y-3}{y} + \frac{7y-7}{3y^2}$ is
- a) $\frac{9y}{7}$ b) $\frac{9y^3}{21y-21}$ c) $\frac{21y^2-42y+21}{3y^3}$ d) $\frac{7(y^2-2y+1)}{y^2}$

13. If $\sin \theta = \cos \theta$, then $2\tan^2 \theta + 2\sin^2 \theta - 1$ is equal to

- a) $\frac{-3}{2}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{-2}{3}$

14. Two straight lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, where the coefficients are non-zero are perpendicular if

- a) $a_1b_2 - a_2b_1 = 0$ b) $a_1b_2 + a_2b_1 = 0$
 c) $a_1a_2 + b_1b_2 = 0$ d) $a_1a_2 - b_1b_2 = 0$

PART - B (MARKS 20)

II. Answer any ten questions. Question No.28 is compulsory. 10 X 2 =

20

15. Compute x, such that $10^4 \equiv x \pmod{19}$

16. Find the first term and common ratio of the G.P, whose 2nd term is $\sqrt{6}$ and 6th term is $9\sqrt{6}$.

17. The vertical stick of length 6m casts a shadow 400 cm long on the ground and at the same time

a lower casts a shadow 28 m long. Using similarity, find the height of the tower.

18. prove the identity $\frac{\cos \theta}{1 + \sin \theta} - \sec \theta - \tan \theta$

19. In ΔABC , D and E are points on the sides AB and AC respectively such that

DE \parallel BC if $\frac{AD}{DB} = \frac{3}{4}$ and AC = 15 cm Find AE.

20. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

21. Which term of an A.P 111, 108, 105, 102,is 3?

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

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

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

25. If $f(x) = 3x + 2$, $g(x) = 6x - k$ and if $f \circ g = g \circ f$, then find the value of k.

26. Subtract $\frac{1}{x^2+2}$ from $\frac{2x^3 + x^2 + 3}{(x^2+2)^2}$.

27. Let $x = \{3, 4, 6, 8\}$. Determine whether the relation $R = \{(x, f(x)) / x \in x, \}$.

28. Can you find the 4 digit pin number 'pqrs' of an ATM card such that $p^2 \times q^1 \times r^4 \times s^3 = 3,15,000$?

PART - III (MARKS 50)

Note : Answer any ten question of the following :

10 x 5 =

50

Question Number '42' is compulsory .

29. A person saved money every year , half as much as he could on the previous year. If he had totally saved ₹ 7875 in 6 years . Then how much did he save in the just year ?

30. Solve : $\frac{1}{2x} + \frac{1}{4y} - \frac{1}{3z} = \frac{1}{4}$; $\frac{1}{x} = \frac{1}{3y}$; $\frac{1}{x} - \frac{1}{5y} + \frac{4}{z} = 2\frac{2}{15}$

31. Find the sum of the all natural number between 100 and 1000 which are divisible by 11.

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

33. Let $A = \{x \in N / 1 < x < 4\}$ $B = \{x \in W / 0 \leq x \leq 3\}$ and $C = \{X \in N / X < 2\}$ then verify $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

34. Using slope concept , show that the point $(1, -4)$, $(2, -3)$ and $(4, -7)$ form a right angled triangle.

35. Find the sum to n terms of the series $0.4 + 0.44 + 0.444 + \dots$ to n terms.

36. If the function $f: R \rightarrow R$ is defined by

$$f(x) \begin{cases} 2x + 7 ; x < -2 \\ x^2 - 2 ; -2 \leq x < 3 \\ 3x - 2 ; x \geq 3 \end{cases} \text{ Then find the value of}$$

i) $f(4)$

ii) $f(-2)$

iii) $f(4) + 2f(1)$

iv) $\frac{f(1) - 3f(4)}{f(-3)}$

37. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$, Prove that $(f \circ g) \circ h = f \circ (g \circ h)$

38. If $A = \frac{2x+1}{2x-1}$, $B = \frac{2x-1}{2x+1}$ Find $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$

39. State and prove Angle Bisector theorem.

40. Find line joining the points $A(0,5)$ and $B(4,1)$ is a tangent to a circle whose centre C is at the point $(4,4)$. Find.

i) the equation of the line AB

ii) The equation of the line through C which is perpendicular to the line AB.

iii) The coordinates of the point of contrast of tangent line AB with the circle.

41. One hundred and fifty students are admitted to a school . They are distributed over three sections A , B , and C . If 6 students are shifted from section A to section C , the sections will have equal number of students. If 4 times of students of sections C exceeds the number of students of section A by the number of students in sections B , find the number of students

in

the three sections.

42. If $x = 1 + p + p^2 + \dots \infty$, $y = 1 + q + q^2 + \dots \infty$, and $|p| < 1$, $|q| < 1$ then show

$$\text{that } 1 + pq + p^2 q^2 + \dots \infty = \frac{xy}{x+y-1}$$

PART - IV (MARKS 16)

IV. Answer the following :

2 x 8 =

16

43. Draw ΔPQR such that $PQ = 6.8$ cm. Vertical angle is 50° and the bisector of the vertical angle

meets the base at D where $PD = 5.2$ cm.

Or

Draw a triangle ABC of base $BC = 8$ cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that $BD = 6$ cm .

44. Nishanth is the winner in a Marathon race of 12km distance. He ran at the uniform speed of 12 km/hr and reached the destination in 1 hour. He was followed by Aradhana Jeyanth ,Sathya and swetha with their respective speed of 6 km/hr ,4 km /hr , 3km/r and 2km/hr , and they covered the distance in 2hrs , 3hrs , 4hrs and 6 hrs respectively.

Draw the speed -time graph and use it to find the time taken to Kaushik with his speed of 2.4 km.hr.

Or

Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$