LINEAR EQUATIONS

Q1. Solve for x , $\frac{5}{x+2} + \frac{8}{x^2-4} = \frac{3}{x-2}$

(a) 4 (b) 2 (c) -2 (d) both (b) & (c)

Q2. If $2x - 1 = y + 1 = n - 1 = 5$ and $\frac{4m-2}{n} + \frac{5x+3}{2y} = 5\frac{1}{4}$, find m:

(a) 3 (b) 4 (c) 5 (d) 6

Q3. Find a, if x = 0.5 is the solution of equation $ax^2 + (a-1)x + 3 = a$

(a) 0.5 (b) 5.5 (c) 7 (d) 10

Q4. Solve for x, $3 = \sqrt{x + \sqrt{x + \sqrt{x + \ldots.}}}\infty$:

(a) 9 (b) 12 (c) 6 (d) 3

Q5. Given $m = \frac{5x-4}{7}$, $n = \frac{2x-1}{3}$ and $2m - n - 3 = 0$, then m/n is:

(a) 1 (b) 3 (c) 5 (d) 7

Q6. If $\sqrt{\frac{p-x}{q-x}} = \frac{p}{q}$, then x is equal to:

(a) $\frac{pq}{p+q}$ (b) $\frac{pq}{p-q}$ (c) $\frac{p+q}{pq}$ (d) $\frac{p-q}{pq}$

Q7. Find the value of x, which makes the two expressions $(x+1)(x+2)$ and $x(x+7) - 6$ equals to each other

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

Q8. Solve for x & y, $14x - 3y = 54 , 21x - 8y = 95$

(a) (3, 4) (b) (-3, 4) (c) (3, -4) (d) (-3, -4)

Q9. If $4x + \frac{6}{y} = 15, 6x - \frac{8}{y} = 14$ and $y = ax - 2$. Find the value of a.

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

Q10. If $41x + 53y = 135$ & $53x + 41y = 147$, then $x - y$ is equal to:

(a) 1 (b) -1 (c) 3 (d) -3

Q11. If $\frac{34}{3x+4y} + \frac{15}{3x-2y} = 5$ & $\frac{50}{3x-2y} - \frac{17}{3x+4y} = 9$, find the value of $3x - 2y$

(a) 17 (b) 13 (c) 9 (d) 5

Q12. Solve for x & y ; $6x + 5y = 7x + 3y + 1 = 2(x + 6y - 1)$.

(a) (2, 3) (b) (3, 3) (c) (3, 2) (d) (2, 2)

Q13. If same value of x & y satisfy the system of equation $3x + 7y + 5 = 0$, $4x - 3y - 8 = 0$ & $px + y - 1 = 0$, find the value of p:

(a) 0 (b) 1 (c) $\frac{39}{47}$ (d) $\frac{81}{41}$

Q14. The value of expression $mx - ny$ is 3 when $x = 5$ & $y = 6$. And its value is 8 when $x = 6$ & $y = 5$. Find its value when $x = y = 6$

(a) 5 (b) 6 (c) 7 (d) 8

Q15. The lines representing the linear equations $2x - y = 3$ & $4x - y = 5$

(a) are parallel (b) are co-incident

(c) intersect at a point (d) intersect at 2 points

Q16. If $3x - 4y + 70z = 0, 2x + 3y - 10z = 0$ & $x + 2y + 3z = 13$, then $(x + y + z)$ is

(a) 0 (b) 1 (c) 11 (d) 21

Q17. If $\frac{x}{4} = \frac{y}{5} = \frac{z}{-1}$ & $7x - 2y - 3z = 63$ find x, y & z:

(a) (4, 5, -1) (b) (8, 10, -2) (c) (12, 15, -3) (d) can't be determined

Q18. If $x + y = 14$, $y + z = 6$ & $x + z = 4$, find the value of x , y & z.

(a) (8, 6, 2) (b) (2, -8, 6) (c) (-2, 8, 6) (d) (6, 8, -2)

Q19. Rs. 680 is divided among A, B and C such that A gets 2/3 of what B get and B gets 1/4 of what C get. Find A's share:

(a) Rs. 48 (b) Rs. 120 (c) Rs. 30 (d) Rs. 80

Q20. The highest score in an inning was $2/9^{th}$ of the total score and the next highest score was $2/9^{th}$ of remainder. These scores differ by 8 runs. The highest score is:

(a) 162 (b) 126 (c) 36 (d) 28

Q21. In a shooting competition, a man receives Rs. 50, if he hit the mark and pays Rs. 20, if he misses it. He tried 60 shots and has to pay Rs. 150. How many times, he missed the mark

(a) 15 (b) 45 (c) 10 (d) 50

Q22. A man sells 6 radios and 4 televisions for Rs. Rs. 18480. If 14 radios and 2 televisions are sold for the same amount. Find the price of a television

(a) Rs. 1848 (b) Rs. 3360 (c) Rs. 4350 (d) Rs. 8400

Q23. The difference between a two digit number and the number obtained by interchanging the digit is 54. What is the difference of the digits

(a) 3 (b) 4 (c) 5 (d) 6

Q24. A man starts his job with a certain monthly salary and earns a fixed increment every year. If his salary is Rs. 15,000 after 4 years of service and Rs. 18,000 after 10 years of service. Find his starting salary.

(a) Rs.10,500 (b) Rs. 12,500 (c) Rs. 13,000 (d) Rs. 14,000

Q25. In a 3 digit number, if the extreme digits are interchanged there is no difference in number. The sum of all three digits is 17 and the difference of first two digit is 4. Find the number.

(a) 656 (b) 494 (c) 515 (d) 737

QUADRATIC & CUBIC EQUATIONS

Q1. Solve for x: $3(x-2)^2 = 27$

(a) (-1, -5) (b) (-1, 5) (c) (3, 2) (d) (-3, -2)

Q2. Solving the equation $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$, we get x as

(a) (5, 5/2) (b) (2/5, 5/2) (c) (-2/5, -5/2) (d) (-5, -5/2)

Q3. Find x if $25x^2 + 30x + 7 = 0$.

(a) $\frac{-3 \pm \sqrt{2}}{6}$ (b) $\frac{3 \pm \sqrt{2}}{5}$ (c) $\frac{3 \pm \sqrt{3}}{5}$ (d) $\frac{-3 \pm \sqrt{2}}{5}$

Q4. If $6\left(\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}}\right) = 13$, find the value of x.

(a) (4/13, 9/13) (b) (-4/13, 9/13) (c) (-4/13, -9/13) (d) (4/13, -9/13)

Q5. Solve : $x^{2/3} + x^{1/3} = 2$

(a) (1, -2) (b) (-1, 8) (c) (1, -8) (d) (-1, 2)

Q6. Find the roots of equation $x^2 + x - (a+2)(a+1) = 0$.

(a) $(a+2, a+1)$ (b) $(a+1, a-2)$ (c) $(-a-2, -a-1)$ (d) $(-a-2, a+1)$

Q7. Evaluate : $\sqrt{3+\sqrt{3+\sqrt{3+\ \ldots.}}}\infty$:

(a) $\frac{1+\sqrt{13}}{2}$ (b) $\frac{1-\sqrt{13}}{2}$ (c) both (a) & (b) (d) $\frac{\sqrt{13} \pm 1}{2}$

Q8. Evaluate the continued fraction: $4 + \frac{1}{4+\frac{1}{4+\cdots\infty}}$

(a) $\frac{2+\sqrt{5}}{2}$ (b) $2 + \sqrt{5}$ (c) $2 - \sqrt{5}$ (d) both (b) & (c)

Q9. If $3x^2 - 8x + 4 = 0$, the roots of the equations are:

(a) irrational & unequal (b) no real root (c) rational & unequal (d) rational & equal

Q10. Find m, so that roots of the equation $(m+6)x^2 + (m+6)x + 2 = 0$ are real

(a) m = 2 or -6 (b) $-6 \le m \le 2$ (c) $m \ge 2$ or $m < -6$ (d) all real values

Q11. If α, β are the roots of the equation $x^2 = 7x + 4$ find $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

(a) – 57/4 (b) -7 (c) -4 (d) 57/4

Q12. If α, β be the roots of the equation $2x^2 - 4x - 1 = 0$, find the values of $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$

(a) 11 (b) -22 (c) -11/2 (d) 22

Q13. If the equation $x^2 - 4x + 1 = 0$, has roots α, β, then the value of $\alpha^2 - \beta^2$ is:

(a) $8\sqrt{3}$ (b) $-8\sqrt{3}$ (c) $\pm 8\sqrt{3}$ (d) $-2\sqrt{3}$

Q14. Find a, so that sum of the roots of the equation $ax^2 + 2x + 3a = 0$ may be equal to their product.

(a) 3/2 (b) -3/2 (c) 2/3 (d) -2/3

Q15. If one root of the equation $3x^2 + 7x - p = 0$ is reciprocal of the other. Find p

(a) -3 (b) 3 (c) ± 3 (d) 2

Q16. The roots of the equation $px^2 - 2(p+2)x + 3p = 0$ differ by 2. Find p:

(a) -2 (b) -2/3 (c) 2 (d) both (b) & (c)

Q17. If the roots of the equation $4x^2 - 7px - 16 = 0$ are numerically equal but opposite in sign, then value of p is:

(a) 1 (b) 7/4 (c) -7/4 (d) 0

Q18. From the equation, whose roots are 2 & -1/2

(a) $x^2 - 3x - 1 = 0$ (b) $2x^2 - 3x - 2 = 0$ (c) $2x^2 - 4x = 0$ (d) $2x^2 - 3x + 2 = 0$

Q19. Form the equation with rational coefficients, one of whose root is $\frac{1}{3+2\sqrt{2}}$

(a) $x^2 - x + 6 = 0$ (b) $x^2 - 6x + 1 = 0$ (c) $x^2 - 6x - 1 = 0$ (d) $x^2 + x + 1 = 0$

Q20. If α, β be the roots of the equation $2x^2 + 3x + 4 = 0$, form the equation whose roots are $\frac{1}{\alpha}$ & $\frac{1}{\beta}$.

(a) $4x^2 + 3x + 2 = 0$ (b) $2x^2 + 3x + 4 = 0$ (c) $3x^2 + 2x + 4 = 0$ (d) $4x^2 - 3x + 2 = 0$

Q21. If $p^2 = 5p - 3$ & $q^2 = 5q - 3$ where $p \neq q$. From the equation having roots $\frac{p}{q}$ and $\frac{q}{p}$.

(a) $x^2 - 19x + 3 = 0$ (b) $3x^2 - 19x - 3 = 0$ (*c*) $3x^2 - 19x + 3 = 0$ (d) $3x^2 + 19x + 3 = 0$

Q22. If the ratio of the roots of the equation $4x^2 - 6x + p = 0$ is 1:2, then find p.

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

Q23. Solve the following cubic equation $3x^3 + 5x^2 - 6x - 8 = 0$.

(a) -1, 2, -3 (b) $-1, -2, -4/3$ (c) $-2, -3, -3/2$ (d) $-1, -2, 4/3$

Q24. Find the values of x from the equation $3x^3 - 17x^2 + 18x + 8 = 0$.

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

Q25. If $x^3 - 7x^2 + 15x - 9 = 0$, the values of x are:

(a) (1, 1, 3) (b) (1, 3, 3) (c) (1, 3, 5) (d) (1, 1, 1)

Q26. Twice the square of a natural number increased by thrice the number is equals to 90. Find the number:

(a) -15/2 (b) 6 (c) either (a) or (b) (d) 1

Q27. An aeroplane travelled a distance of 400 km at an average speed of x km/hr. On the return journey, the speed was increased by 40 km/hr. If the return journey took 30 minutes less than the onward journey. Find x

(a) 210 (b) 120 (c) 160 (d) 200

Q28. In an auditorium, seats were arranged in rows & column. The number of rows was equal to the number of seats in each row. When the number of rows was doubled and number of seats in each row was reduced by 10, the total number of seats increased by 300. Find the original number of seats in the auditorium.

(a) 30 (b) 60 (c) 900 (d) 1200

Q29. A two digit number is such that the product of the digits is 24. On subtracting 18 from the number, the digits interchange their places. Find the sum of digits of that number:

(a) 83 (b) 46 (c) 64 (d) 10

RATIO & PROPORTION

Q1. The ratio of two quantities is 5 : 9. If antecedent is 18, find consequent

(a) 10 (b) 36 (c) $2\frac{1}{2}$ (d) $32\frac{2}{5}$

Q2. If $(4x + 4) : (9x - 10)$ is the triplicate ratio of 4 : 5, find the value of x

(a) 10 (b) 12 (c) 15 (d) 20

Q3. Find the ratio compounded of 3a : 4b and the sub-duplicate ratio of $\frac{4}{9a^2} : \frac{1}{16b^2}$

(a) 1 : 2 (b) 2 : 1 (c) 3 : 4 (d) 4 : 3

Q4. The ratio compounded of X : Y and its sub-duplicate ratio is:

(a) $2X : 3Y$ (b) $\sqrt{X} : \sqrt{Y}$ (c) $X^{1/3} : Y^{1/3}$ (d) $X^{3/2} : Y^{3/2}$

Q5. If the compounded ratio of 1 : 2, 1 : 3 and 4 : x is 2 : 15, find x :

(a) 4 (b) 5 (c) 15 (d) 2

Q6. What must be added to each term of the ratio 83 : 263 to make it 1 : 3

(a) 13 (b) 10 (c) 7 (d) None of these

Q7. What must be subtracted from each term of the ratio 17 : 27 to get 3 : 5.

(a) 1 (b) 2 (c) 3 (d) 4

Q8. If a : b = c : d = 3 : 5, find the value of ad : bc

(a) 3 : 5 (b) 9 : 25 (c) 1 : 1 (d) 1 : 2

Q9. If $(3x - 2y) : (7x + 2y) = 1 : 5$, find $(3x - 2y) : (x + 4y)$

(a) 0 (b) 11 : 5 (c) 5 : 11 (d) None of these

Q10. If p : q is the sub-duplicate ratio of $(p - x^2) : (q - x^2)$, then x^2 is equals to:

(a) $\frac{pq}{p+q}$ (b) $\frac{pq}{p-q}$ (c) $\frac{p+q}{p-q}$ (d) $\frac{p-q}{p+q}$

Q11. What must be added to each term of duplicate ratio of X : Y to make it X : Y

(a) 2X (b) XY (c) 2Y (d) X/Y

Q12. The ratio of two numbers is 7 : 8. If 3 is added to each of them,their ratio become 8 : 9. The numbers are

(a) (14, 16) (b) (24, 27) (c) (21, 27) (d) (21, 24)

Q13. The two number are in the ratio 5 : 6. If 3 is deducted from the 2nd and added to the 1st , they become in the ratio of 1 : 1. The numbers are:

(a) (25, 30) (b) (40, 48) (c) (30, 36) (d) (15, 18)

Q14. If $5x^2 + 7xy = 6y^2$, find $x : y$

(a) 2 : 1 (b) 3 : 5 (c) both a & b (d) none of these

Q15. If A : B = 3 : 5 & B : C = 3 : 5, then A : B : C is equals to:

(a) 9 : 15 : 25 (b) 3 : 5 : 3 (c) 1 : 1 : 1 (d) 1 : 2 : 3

Q16. If P : Q = 11 : 12 and P : R = 9 : 8, find Q : R

(a) 22 : 27 (b) 27 : 22 (c) 32 : 33 (d) 3 2

Q17. If $\frac{p}{7} = \frac{q}{6} = \frac{r}{11}$, then $\frac{p+q+r}{q}$ is:

(a) 8 (b) 5 (c) 4 (d) 24

Q18. Find the mean proportion of 5.25 and 8.9:

(a) 8.63 (b) 6.83 (c) 3.86 (d) 6.5

Q19. Find the third proportion of xy & x^2y^2

(a) x^3y^3 (b) x^4y^4 (c) x^5y^5 (d) none of these

Q20. The fourth proportion to xy, $5x^2y^2$, $7x^3y^3$ is:

(a) x^4y^4 (b) $5x^4y^4$ (c) $35x^4y^4$ (d) $35\,x^5y^5$

Q21. The numbers 24, 32, x & y are in proportion. The product of their means is 48. Find x and y:

(a) (2,1.5) (b) (3,2) (c) (1.5,2) (d) (48,64)

Q22. Find the bigger of two numbers, such that mean proportion between them is 18 and third proportion to them is 144.

(a) 9 (b) 24 (c) 36 (d) 48

Q23. What is added to each of the numbers 10, 18, 22 and 38 to make them in proportion.

(a) 1 (b) 2 (c) 3 (d) 4

Q24. What must be subtracted from each of the numbers 8, 14 & 26, so that they become in proportion.

(a) 3 (b) 5 (c) 7 (d) 2

Q25. Solve for x : $\frac{\sqrt{x}-\sqrt{x-9}}{\sqrt{x}+\sqrt{x-9}} = \frac{1}{9}$

(a) 9 (b) 16 (c) 25 (d) 36

Q26. Solve for x: $\frac{8x^2-7x+8}{8x^2+7x-8} = \frac{10\,x^2-9x+5}{10\,x^2+9x-5}$.

(a) 20 (b) -20 (c) ± 20 (d) none of these

Q27. If $\frac{a}{2a+2b-c} = \frac{b}{2b+2c-a} = \frac{c}{2c+2a-b}$, then each ratio is equals to:

(a) 1/2 (b) 2/3 (c) 1/3 (d) none of these

Q28. In what ratio should tea worth Rs. 100 per kg is mixed with tea worth Rs. 140 per kg so that the average price of the mixture becomes Rs. 110 per kg

(a) 5 : 7 (b) 3 : 1 (c) 3 : 2 (d) 4 : 3

Q29. The ratio between speeds of two trains is 7:8. If second train travels certain distance in $3\frac{1}{2}$ hours, then same distance is covered by 1st train in

(a) 3 hrs (b) $3\frac{1}{16}$hrs (c) $3\frac{1}{2}$hrs (d) 4 hrs

Q30. An alloy is to contain copper and zinc in the ratio 9 : 4. The zinc required to melt with 24 kgs of copper is:

(a) $10\frac{2}{3}$kg (b) $10\frac{1}{3}$ kg (c) 54 kgs (d) 56 kg

Q31. The work done by $(x+3)$ labourers in $(x-2)$ days and the work done by $(x-2)$ labourers in $(x+5)$ days is in the ratio of 4 : 5, find x.

(a) 3 (b) 2 (c) 7 (d) 5

Q32. Rs. 407 is divided among A, B & C in the ratio of $\frac{1}{4}:\frac{1}{5}:\frac{1}{6}$. find B's share.

(a) Rs. 110 (b) Rs. 165 (c) Rs. 132 (d) none of these

Q33. 8 people plan to share equally the cost of a rental car. If 2 people withdraw from the arrangement and others share equally the entire cost, then share of each person is increased by:

(a) 1/24 (b) 1/6 (c) 1/4 (d) 1/3

Q34. A bag contain Rs. 187 in the form of Rs. 1 coin, 50 paise coin & 10 paise coin in the ratio of 3 : 4 : 5. The number of coins are:

(a) 408 (b) 405 (c) 187 (d) 120

Q35. Ratio of earnings of A & B is 4 : 7. If A's earning is increased by 50% and B's earning is decreased by 25%, the new ratio becomes 8 : 7. What is A's earning.

(a) Rs.21,000 (b) Rs. 26,000 (c) Rs. 28,000 (d)data inadequate

Q36. The incomes of A & B are in the ratio of 3 : 2 and expenses in the ratio of 5 : 3. If each of them saves Rs. 1,500. Find B's income

(a) Rs. 4,500 (b) Rs. 6,000 (c) Rs. 3,000 (d) Rs. 7,500

INDICES

Q1. The value of $\left(-\frac{8}{27}\right)^{1/3}$ is:

(a) 2/3 (b) 3/2 (c) -2/3 (d) -3/2

Q2. $\left(\frac{\sqrt{3}}{9}\right)^{5/2} . \left(\frac{9}{3\sqrt{3}}\right)^{7/2} . 9$ is equal to:

(a) 1 (b) $\sqrt{3}$ (c) $3\sqrt{3}$ (d) $\frac{1}{3\sqrt{3}}$

Q3. The values of $3^3 \times (243)^{-2/3} \times (9)^{-1/3}$ is:

(a) 3 (b) 1 (c) 1/3 (d) 0

Q4. Evaluate: $\left(\frac{27}{8}\right)^{2/3} - \left(\frac{1}{4}\right)^{-2} + 5^0$:

(a) $17\frac{1}{4}$ (b) $-12\frac{3}{4}$ (c) $-17\frac{1}{4}$ (d) None of these

Q5. $\sqrt{\frac{1}{4}} + (0.01)^{-1/2} - (27)^{2/3}$ is equal to:

(a) -3/2 (b) -2/3 (c) 3/2 (d) 2/3

Q6. Find the value of $x^{m+3n} . x^{4m-9n} \div (x^6)^{m-n}$:

(a) x^{-m} (b) $\frac{1}{x^m}$ (c) both (a) & (b) (d) 0

Q7. The value of $\frac{3^{n+1}}{3^{n(n-1)}} \div \frac{9^{n+1}}{(3^{n-1})^{n+1}}$ is:

(a) 1 (b) 9 (c) 1/9 (d) either (b) or (c)

Q8. Simplify: $\frac{3^n - 2^3 . 3^{n-2}}{3^n - 3^{n-1}}$:

(a) 1 (b) 1/6 (c) 1/3 (d) 3^n

Q9. Find the value of $\left(\frac{x^b}{x^c}\right)^{1/bc} . \left(\frac{x^c}{x^a}\right)^{1/ca} . \left(\frac{x^a}{x^b}\right)^{1/ab}$:

(a) 0 (b) 1 (c) x^{a+b+c} (d) x^{b-c-a}

Q10. The value of $(\sqrt{x} - \sqrt{y})(x + \sqrt{xy} + y)$is:

(a) $x^3 - y^3$ (b) $x^{1/3} - y^{1/3}$ (c) $x^{3/2} + y^{3/2}$ (d) $x^{3/2} - y^{3/2}$

Q11. The value of $\left(a^{\frac{1}{8}} + a^{-\frac{1}{8}}\right)\left(a^{\frac{1}{8}} - a^{-\frac{1}{8}}\right)\left(a^{\frac{1}{4}} + a^{-\frac{1}{4}}\right)(a^{\frac{1}{2}} + a^{-\frac{1}{2}})$ is:

(a) $a + \frac{1}{a}$ (b) $a - \frac{1}{a}$ (c) $a^2 + \frac{1}{a^2}$ (d) $a^2 - \frac{1}{a^2}$

Q12. If $a = 2^{1/2} + 2^{-1/2}$, which of the following is correct:

(a) $a^2 = 9$ (b) $3a^2 = 7$ (c) $5a^2 + 9 = 0$ (d) $2a^2 - 9 = 0$

Q13. If $a^{1/3} + b^{1/3} + c^{1/3} = 0$, then value of $(a + b + c)^3$ is:

(a) 9abc (b) $3a^{1/3}b^{1/3}c^{1/3}$ (c) $27\, a^3b^3c^3$ (d) 27 abc

Q14. If $a^x = b, b^y = c, c^z = a$, then xyz is equals to:

(a) 0 (b) 1 (c) 8 (d) 9

Q15. If $2^{2x} = 5^y = 20^z$, then z is equals to:

(a) xy (b) $\frac{1}{xy}$ (c) $\frac{(x+y)}{xy}$ (d) $\frac{xy}{(x+y)}$

Q16. Find the value of $\frac{1}{1+a^{x-y}} + \frac{1}{1+a^{y-x}}$:

(a) 0 (b) $\frac{a^x}{a^y}$ (c) 1 (d) a^{x+y}

Q17. If $a^x = b^y = c^z$ and $b^2 = ac$, then y is equals to:

(a) $\frac{x+z}{2xz}$ (b) $\frac{2xz}{x+z}$ (c) $\frac{x+z}{xz}$ (d) $\frac{xz}{x+z}$

Q18. If $a = x^{m+n}.y^{l}, b = x^{n+l}y^{m}$ & $c = x^{l+m}.y^{n}$, then value of $a^{m-n}.b^{n-l}.c^{l-m}$ is:

(a) 1 (b) xy (c) $(xy)^{m+n+l}$ (d) 0

Q19. Find the value of $\left(\frac{x^a}{x^{-b}}\right)^{a^2-ab+b^2} \times \left(\frac{x^b}{x^{-c}}\right)^{b^2-bc+c^2} \times \left(\frac{x^c}{x^{-a}}\right)^{c^2-ca+a^2}$:

(a) 1 (b) $x^{a^3+b^3+c^3}$ (c) $x^{2\,(a^3+b^3+c^3)}$ (d) 0

Q20. Simplify: $[1-\{1-(1-n)^{-1}\}^{-1}]^{-1}$:

(a) 1 (b) 1/n (c) -1/n (d) n

Q21. If a = 49, find the value of $a^{11/16}\left[a\{a(a^{1/2})^{1/2}\}^{1/2}\right]^{1/2}$:

(a) 1 (b) 343 (c) 49 (d) 7

Q22. Evaluate: $(a^{-1}+b^{-1}) \div (a^{-2}-b^{-2})$:

(a) $\frac{a-b}{ab}$ (b) $\frac{b-a}{ab}$ (c) $\frac{ab}{b-a}$ (d) $\frac{ab}{a-b}$

Q23. Find x, if $(\sqrt{3})^{x+7} = (3\sqrt{3})^{2x+5}$:

(a) $6\frac{1}{5}$ (b) $4\frac{2}{3}$ (c) $-\frac{3}{5}$ (d) $-\frac{8}{5}$

Q24. Find p, if $(\sqrt{4})^{-6}.(\sqrt{2})^{-4} = 2^{p}$

(a) 16 (b) 8 (c) -8 (d) 4

Q25. If $2^{x}-2^{x-1}=4$, then value of x^{x} is;

(a) 2 (b) 1 (c) 64 (d) 27

Q26. If $4^{x+2}+2^{2x+3}=96$, find x:

(a) 0 (b) -1 (c) 1 (d) ± 1

Q27. Find the value of m & n, if $4^{2m} = (\sqrt[3]{16})^{-6/n} = (\sqrt{8})^{2}$:

(a) -3/8, 3/4 (b) 3/4, 3/4 (c) 3/4, 8/3 (d) 3/4, -8/3

Q28. If $3^{x}.9^{y/2}=27$ & $4^{x}.32^{y}=4096$, find the value of 3^{3x-4y} :

(a) -5 (b) 5 (c) 1/243 (d) -243

Q29. If $4^{1+x}+4^{1-x}=10$, find x :

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

Q30. If $3^{x}+3^{-x}=2$, then value of x is:

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

Q31. Find x, if $3^{2x}-10\times 3^{x}+9=0$:

(a) (0, 8) (b) (0, 2) (c) (0, -2) (d) (-2, -8)

Q32. If $2^{x^2} : 2^{x} = 8 : 1$, find x :

(a) $(0, 2\sqrt{2})$ (b) $\left(0, \frac{3}{2}\right)$ (c) $(-1+\sqrt{13})$ (d) $\frac{1\pm\sqrt{13}}{2}$

LOGARITHMS

Q1. Find the value of $\log_3(27)^3$:

(a) 3 (b) 9 (c) 27 (d) 81

Q2. Find the value of $\log_{1.5}3.375$:

(a) 2 (b) 3 (c) 3/2 (d) 5/2

Q3. Log 144 is equals to:

(a) $2\log 4 + 4\log 3$ (b) $3\log 2 + 2\log 3$ (c) $4\log 2 + 2\log 3$ (d) $6\log 2$

Q4. $\log_9 243$ is equal to:

(a) 3 (b) 3/2 (c) 5 (d) 5/2

Q5. Simplify : $\log\frac{26}{51} - \log\frac{91}{119}$:

(a) log 2 (b) log 3 (c) log 2 – log 3 (d) log 2 + log 3

Q6. Solve: $2\log\frac{15}{18} - \log\frac{25}{162} + \log\frac{4}{9}$

(a) 1 (b) log 2 (c) log 3 (d) log 6

Q7. What is the value of $\frac{\log_{10}125}{\log_{10}25}$:

(a) 5 (b) 2 (c) 5/2 (d) 3/2

Q8. Find the value of $1 - 2\log 5 + 3\log 2$:

(a) 16/5 (b) $\log\frac{3}{2}$ (c) $\log 3 - \log 2$ (d) $\log 3.2$

Q9. If $\log_x \sqrt[3]{2} = \frac{1}{15}$, then x is equals to:

(a) 8 (b) 32 (c) 16 (d) 64

Q10. The value of $\frac{\log_3 8}{\log_9 16.\log_4 10}$:

(a) $3\log_{10}8$ (b) $4\log_{10}3$ (c) $3\log_{10}2$ (d) $\log 16$

Q11. The value of $\frac{1}{\log_a ab} + \log_{ab} b$ is:

(a) 9/5 (b) 3/2 (c) 9/4 (d) 1

Q12. The value of $3^{2-\log_3 6}$ is:

(a) 9/5 (b) 3/2 (c) 9/4 (d) 1

Q13. If $\log_e 2.\log_x 625 = \log_{10}16.\log_e 10$, then find the value of x :

(a) 7 (b) 8 (c) 5 (d) e

Q14. If $\log_e x.\log_5 e = 3$, then x is equal to:

(a) $5e^2$ (b) e^5 (c) 5 (d) 125

Q15. Find x, if $\log_2 x + \log_4 x = 6$

(a) 16 (b) 32 (c) 48 (d) 128

Q16. If $2\log x = 4\log 3$, find the value of $\log_x 3$:

(a) 9 (b) 81 (c) 1/2 (d) 1/9

Q17. Find the value of x, if $\log_4 x + \log_4 1/6 = \frac{1}{2}$:

(a) 0 (b) 2 (c) 12 (d) 16

Q18. If $\log_4(x^2 + x) - \log_4(x + 1) = 2$, find x :

(a) 2 (b) 4 (c) 5 (d) 16

Q19. The value of expression $a^{\log_a b.\log_b c.\log_c d.\log_d t}$ is:

(a) 0 (b) 1 (c) t (d) abcdt

Q20. The value of $\log_2[\log_2\{\log_3(\log_3 27^3)\}]$ is equals to :

(a) 0 (b) 1 (c) 2 (d) 3

Q21. If $\log_2[\log_3(\log_2 x)] = 1$, then x is equals to:

(a) 128 (b) 256 (c) 512 (d) 1

Q22. If $\log\left(\frac{a+b}{4}\right) = \frac{1}{2}(\log a + \log b)$, find the value of $\frac{a}{b} + \frac{b}{a}$:

(a) 12 (b) 14 (c) 16 (d) 18

Q23. If $a \log_2 x = b \log_4 x$, then which of the following relation is true:

(a) $a = 2b$ (b) $a^2 = b$ (c) $2a = b$ (d) $a = b^2$

Q24. If $\log(2a - 3b) = \log a - \log b$, then a is equals to:

(a) $\frac{3b^2}{2b-1}$ (b) $\frac{3b}{2b-1}$ (c) $\frac{b^2}{2b+1}$ (d) $\frac{3b^2}{2b+1}$

Q25. If $\frac{\log x}{2} = \frac{\log y}{3} = \frac{\log z}{5}$, then yz is equals to:

(a) x (b) x^2 (c) x^3 (d) x^4

Q26. If log 2 = 0.3010, log 3 = 0.4771, then log 15 is equals to:

(a) 1.7781 (b) 1.1761 (c) 0.7781 (d) 0.1761

Q27. If log 8 = 0.9030, find the value of log 0.125.

(a) 0.9030 (b) 0.0970 (c) $\overline{1}.9030$ (d) $\overline{1}.0970$

Q28. If log 2 = 0.3010, then how many digits are three in 2^{25}:

(a) 5 (b) 6 (c) 7 (d) 8

Q29. If log 12.45 = 1.0952 and log 3.79 = 0.5786, then $\log 124.5 \times 397$ is:

(a) 5.6738 (b) 6.6738 (c) 4.4152 (d) 4.6738

Q30. If log 3 = 0.48 and log 7 = 0.84, then $\log \frac{0.03}{0.7}$ is:

(a) $\overline{2}.32$ (b) $\overline{2}.64$ (c) $\overline{3}.64$ (d) $\overline{3}.74$

SIMPLE INTEREST

Q1. Find the rate% , if the amount owed after 6 months is Rs.1,050, borrowed amount being Rs. 1000.

(a) 5% (b) 10 % (c) 15% (d) 20%

Q2. Rahul invested Rs. 70,000 in a bank @ 6.5 % p.a SI. He receives Rs. 85,925 after the end of the term. Find out the time for which sum was invested.

(a) 3 years (b) 3 years 5months (c) 3 years 6 months (d) 4 years

Q3. Kapil invested some amount in a bank for $7\frac{1}{2}$ years at 6% p.a. SI. He received Rs. 1,01,500 at the end of the term. Compute the initial deposit of Kapil.

(a) Rs. 70,000 (b) Rs. 75,000 (c) Rs.1,00,000 (d) Rs. 1,47,175

Q4. What sum will produce Rs. 28,600 as interest in 3 years 3 months at 2.5 % p.a:

(a) Rs. 2.5 Lacs (b) Rs. 3.2 Lacs (c) Rs. 3.5 Lacs (d) Rs. 3.52 Lacs

Q5. How much investment is required to yield a monthly income of Rs.2,100 at 7% p.a S.I.:

(a) Rs. 4.2 Lacs (b) Rs. 2.8 Lacs (c) Rs. 3.6 Lacs (d) Rs. 30,000

Q6. In how many years will a sum of money treble itself at 12% p.a. SI.

(a) 8 years 4 months (b) 10 years (c) 16 years 6 months (d) 16 years 8 months

Q7. In what time would the simple interest on a certain sum be 0.125 times the principle at 10% p.a.

(a) 1 year 2 months (b) 1 year 2.5 months (c) 1 year 3 months (d) 1year 4months

Q8. A sum of money doubles itself in 8 years at SI. In how many years would it trepled itself.

(a) 12 years (b) 14 years (c) 16 years (d) 18 years

Q9. A sum of money treble itself in 12 years. In how many years will it quadruple itself at S.I.

(a) 16 years (b) 18 years (c) 20 years (d) 24 years

Q10. A sum of money double itself in 10 years. In how many years will it quadruple itself at S.I

(a) 20 years (b) 25 years (c) 30 years (d) 40 years

Q11. Rs. 8,000 becomes Rs. 10,000 in two years at S.I. The amount that will become Rs. 6,875 in 3 years at the same rate is:

(a) Rs. 4,850 (b) Rs. 5,000 (c) Rs. 5,500 (d) Rs. 5,275

Q12. A sum of money at S.I. amounts to Rs. 2,800 in 2 years and Rs. 3,250 in 5 years. Find the rate and the sum.

(a) 8%, Rs. 2,500 (b) 6 %, Rs. 2,400 (c) 6%, Rs2,500 (d) 8%, Rs.2,400

Q13. A certain sum amounts to Rs.2,500 in 2 years and Rs.3,000 in 4 years at S.I. Find rate of interest:

(a) 11% (b) 11.75 % (c) 12 % (d) 12.5 %

Q14. A certain sum amounts to Rs. 6,300 in 2 years and Rs. 7875 in 3 years & 9 months at S.I. Find the rate of interest per annum.

(a) 10% (b) 15 % (c) 20% (d) 18%

Q15. A sum of money at S.I amounts to Rs. 3000 in 3 years and Rs. 3500 in 5 years. Find the sum

(a) Rs. 2,500 (b) Rs. 2,750 (c) Rs. 2000 (d) Rs.2,250

Q16. If the interest on Rs. 1,200 for 3 years is less than interest on Rs.1,500 for same period by Rs. 60. Find the rate of interest.

(a) 5% (b) 6 % (c) $6\frac{2}{3}\%$ (d) $7\frac{2}{3}\%$

Q17. Harish invested two equal sums at $3\frac{1}{4}\%$ and at $1\frac{3}{4}\%$ respectively at S.I. At the end of 18 months, he received Rs. 510 as interest. What sum did he invest?

(a) Rs. 6,800 (b) Rs. 7,200 (c) Rs. 13,600 (d) Rs. 14,400

Q18. Two equal sums of money were lent at S.I. at 11% p.a. for 3 ½ years & 4 ½ years. If difference in interest for two periods was Rs. 412.50, then total sum lent was

(a) Rs. 3,500 (b) Rs. 3,750 (c) Rs. 6,750 (d) Rs. 7,500

Q19. A person borrows Rs.5,000 for 2 years at 4% pa S.I. He immediately lends this amount to another person at $6\frac{1}{4}\%$ pa S.I. for 2 years. Find his gain in the transaction per year.

(a) Rs. 225 (b) Rs. 112.50 (c) Rs. 125 (d) Rs. 167

Q20. The interest on a sum of money at 6% p.a S.I for 7 years is twice the interest on another sum of money at 5% p.a S.I for 9 years. Find the ratio of two sums.

(a) 1 : 1 (b) 7 : 15 (c) 2 : 3 (d) 15 : 7

Q21. The rate of S.I. on a sum of money is 6% p.a. for first 3 years, 8% p.a. for next 5 years and 10 % p.a. thereafter. If S.I on a sum for 10 years is Rs. 1,560. Find the sum.

(a) Rs 1,500 (b) Rs. 2,000 (c) Rs. 1,750 (d) Rs. 2,250

Q22. Rs. 1,000 in invested at interest rate of 5% and interest is added to the principle every 10 years, then the number of years in which it will amount to Rs. 2,000 is:

(a) $2\frac{2}{3}$ years (b) $6\frac{1}{4}$ years (c) 16 years (d) $16\frac{2}{3}$ years

COMPOUND INTEREST

Q1. Calculate the compound interest on Rs. 3,125 for 2 ½ years at 4% p.a.
(a) Rs. 322.60 (b) Rs. 325.25 (c) Rs. 3,447.60 (d) Rs. 3,450.25

Q2. Calculate C.I. on Rs. 6,950 at 12% pa for 1 year 9 months, if interest is paid quarterly.
(a) Rs. 1534.66 (b) Rs. 1768.08 (c) Rs. 1597 (d) Rs. 1593

Q3. Calculate the C.I on Rs. 5,000 for 3 years at the successive rate of 4%, 5% and 6%.
(a) Rs. 2,250 (b) Rs. 1,125.45 (c) Rs. 787.60 (d) Rs. 750

Q4. A person borrowed Rs.5000 for 10 years at C.I. The rate of interest was 4% p.a. for first 3 years,5% p.a. for next 4 years and 6% p.a. for subsequent years. Find the amount he has to pay after 10 years
(a) Rs. 8241 (b) Rs. 8142 (c) Rs. 8412 (d) none of these

Q5. A person deposited Rs 5,000 in a bank which pays interest @ 6% p.a. payable quarterly for first 5 years and 8% p.a. payable semi-annually afterwards. The amount he will receive after 13 years is:
(a) Rs. 12613 (b) Rs. 12,633 (c) Rs. 13,613 (d) none of these

Q6. On what sum of money will the C.I at 5% p.a. for 2 years be Rs. 1,640
(a) Rs. 8,200 (b) Rs. 16,000 (c) Rs. 16,400 (d) Rs. 16,325

Q7. In how many years, a sum of Rs. 1,000 amounts to Rs. 1,331 @ 10% p.a C.I :
(a) 3.31 years (b) Rs. 2 years (c) 2 ½ years (d) 3 years

Q8. In what time will Rs. 8,000 amounts to Rs. 8,820 at 10% p.a. compounded semi-annually.
(a) 1 year (b) 1 ½ years (c) 1 ¾ years (d) 2 years

Q9. How long will Rs.12,000 take to become Rs.14,000 at 5% p.a. C.I.
Given [log 2=0.3010, log 3=0.4771, log 7 = 0.8451]
(a) 3 years (b) 3.1 years (c) 3.16 years (d) None of these

Q10. How long will Rs.24,000 take to become Rs.28,000 at 5%p.a. payable quarterly. Given [log2=0.3010, log 3 = 0.4771, log 7 =0.8451]
(a) 12.4 years (b) 13.5 years (c) 3.1 years (d) 3 years

Q11. In how many years, a sum will double at 5% p.a. C.I.
Given [log 2 = 0.3010, log 2.1 = 0.3222]
(a) 14.1 years (b) 14.2 years (c) 14.3 years (d) 14 ½ years

Q12. Rs.3,90,625 amounts to Rs.4,56,976 in 2 years at C.I. compounded semi-annually. Find the rate %.
(a) 4 % (b) 6 % (c) 8% (d) 10 %

Q13. At what rate of interest p.a. C.I. an investment doubles itself in 7 years.[Given $2^{1/7} = 1.104090$]
(a) 10% (b) 5.21% (c) 10.5 % (d) 10.41 %

Q14. At what rate % C.I. will a sum becomes 16 times of itself in 4 years
(a) 60% (b) 75 % (c) 90 % (d) 100 %

Q15. The effective rate of interest corresponding to nominal rate of 8% p.a. payable half yearly.
(a) 4% (b) 8.1 % (c) 8.16 % (d) 9 %

Q16. Find the effective rate of interest, if the bank pays 8% p.a payable quarterly.
(a) 8.09 % (b) 8.14 & (c) 8.24 % (d) 8.2%

Q17. Find the interest rate equivalent to the nominal rate of 6% p.a. compounded monthly.
(a) 0.5 % (b) 6.17 % (c) 6.25 % (d) 6.07 %

Q18. Which is a better investment? (I) 3% p.a. compounded monthly or (II) 3.1% p.a. S.I.
(a) I (b) II (c) both equivalent (d) None of these

Q19. A sum of money doubles itself in 10 years at C.I. Find the time in which it becomes 8 times of itself at same rate of C.I.
(a) 20 years (b) 30 years (c) 35 years (d) 40 years

Q20. A sum of money doubles itself in 5 years at C.I. Find the time in which it becomes 16 times of itself at same rate:
(a) 15 years (b) 20 years (c) 25 years (d) 30 years

Q21. The difference between C.I & S.I on a certain sum for 3 years @ 5% p.a is Rs.228.75. Find the sum.
(a) Rs. 22,875 (b) Rs. 25,000 (c) Rs. 30,000 (d) Rs. 28,000

Q22. The difference between C.I. & S.I on a certain sum for 3 years @ 5% p.a. is Rs.15.25. Find the sum:
(a) Rs. 2,200 (b) Rs. 2,100 (c) Rs. 2,000 (d) Rs. 1,800

Q23. Mr. X invested Rs.1 Lakh for 5 years in post office @10% p.a. C.I. While calculating his interest,the clerk mistakenly followed S.I. instead of C.I.Find the loss incurred to Mr. X because of this
(a) Rs. 10,000 (b) Rs. 11,000 (c) Rs. 11,500 (d) Rs. 11051

Q24. A sum of money borrowed at 10% p.a S.I. and lent out at 10% p.a payable half yearly.If the profit earned in one year is Rs. 180. Find the sum
(a) Rs. 72,000 (b) Rs. 90,000 (c) Rs. 18,000 (d) Rs. 1,08,000

Q25. Raj borrowed a sum of money at 20% p.a payable annually for 2 years and lent out the same at 20% p.a. payable half yearly. If his gain after 2 years was Rs.241.How much money did he borrow:
(a) Rs. 20,000 (b) Rs 15,000 (c) Rs. 10,000 (d) Rs. 25,000

Q26. The compound interest on a certain sum of money @ 5%p.a. for 1 year is Rs 25 . The S.I. on the same sum at same rate% for 2 years is:
(a) Rs 50 (b) Rs. 52.50 (c) Rs.25 (d) Rs.52.75.

Q27. If the S.I. on a sum of money @ 12% p.a. for 2 years is Rs 3600 . The C.I. on the same sum for same period at the same rate % is ?
(a) Rs 3600 (b) Rs 2016 (c) Rs 2425 (d) Rs.3816.

Q28. Population of a town increases at 5% per year. If current population of that town is 8,000. In how many years the population will reach 9261.
(a) 3.15 years (b) 3.5 years (c) 3 years 9 months (d) 3 years

Q29. The value of machine depreciates every year by 10%. If the value of machine in 2002 was Rs. 90,000.Find its value in 2001.
(a) Rs. 99,000 (b) Rs. 1,00,000 (c) Rs. 81,000 (d) Rs.1,01,500

Q30. The value of machine depreciate every year by 10% of the value at the beginning of the year. If its value is Rs. 90,000 in 2002. Find its value in 2003
(a) Rs. 99,000 (b) Rs. 1,00,000 (c) Rs. 81,000 (d) Rs 1,01,500

Q31. The cost of a machine is Rs. 1,25,000.If its useful life is estimated to be 20 years and rate of depreciation of its cost is 10% p.a. Then its scrap value is:

(a) Rs.15,187 (b) Rs.15,200 (c) Rs.15,157 (d) Rs.10,000

ANNUITIES

Q1. The present value of an annuity of Rs. 3,000 for 15 years at 4.5 % p.a CI is:
(a) Rs. 32,000 (b) Rs. 32,218 (c) Rs. 32,918 (d) Rs. 33,000

Q2. The present value of immediate annuity of Rs. 3,000 for 15 years at 4.5 % p.a. C.I is:
(a) Rs. 32,218 (b) Rs. 32,328 (c) Rs. 33,456 (d) Rs. 33,668

Q3. Find the present value of Rs. 10,000 to be received after 5 years @ 9% p.a C.I
(a) Rs. 36,500 (b) Rs. 39,785 (c) Rs. 4,576 (d) Rs. 6,500

Q4. Ali borrows Rs. 6 Lakhs at 6% p.a. repayable in 20 annual instalments commencing at the end of first year. How much is to be paid every year.
(a) Rs. 52,310 (b) Rs. 52,420 (c) Rs. 55,430 (d) Rs. 54,650

Q5. Anuj retires at 60 years and receives pension of Rs. 1200 p.m. for the rest of his life. He reckon his life expectation to be 20 years and interest rate prevailing is 12% p.a. What single sum is equivalent to his pension.
(a) Rs. 96,035 (b) Rs. 1,00,000 (c) Rs. 1,07,560 (d) Rs. 1,37,555

Q6. A person retires at the age of 60 and receives a pension of Rs. 14,400 a year paid in half yearly instalments for the rest of his life. After reckoning his life expectation to be 13 years and interest rate is 4% p.a. payable half yearly, find the single sum equivalent to his pension
(a) Rs. 1,44,850 (b) Rs. 1,44,870 (c) Rs. 1,44,900 (d) Rs.1,45,000

Q7. A person bought a house paying Rs. 20,000 now and Rs. 4,000 at the end of each year for 25 years at 5% pa. C.I. The cash down price of house is:
(a) Rs. 56,375 (b) Rs. 76,375 (c) Rs. 36,375 (d) Rs. 50,000

Q8. A man purchased a house worth Rs. 3,00,000. He paid Rs. 2,00,000 at the time of purchase and agrees to pay the balance with interest at 12% p.a. compounded half yearly in 20 equal half yearly instalments.The amount of each instalment is:
(a) Rs. 7893 (b) Rs. 8769 (c) Rs. 8,226 (d) Rs. 8720

Q9. Vipul purchases a car for Rs. 5,50,000. He gets a loan of Rs. 5 Lakhs at 15% p.a. payable monthly from a bank and balance Rs. 50,000, he pays in cash. He has to pay the loan in 12 equal monthly instalments. Find the amount of monthly instalment
(a) Rs. 45,330 (b) Rs. 45,230 (c) Rs. 45,130 (d) none of these

Q10. Amit invests Rs. 3000 every year for 3 years @ 10% p.a starting from today. What amount will be receive after 3 years:
(a) Rs. 10,923 (b) Rs. 9,930 (c) Rs. 11,700 (d) Rs. 12,300

Q11. Sumit invests Rs. 10,000 every year for next 10 years @ 8% p.a. Find the amount he will receive after 12 years:
(a) Rs. 1,44,865 (b) Rs. 1,56,455 (c) Rs. 1,68,970 (d) Rs. 1,70,000

Q12. A person invests Rs. 500 at the end of each year @ 10% p.a. C.I. The amount standing to his credit one year after he has made his investment for 12^{th} time is:
(a) Rs. 11,000 (b) Rs. 11,761 (c) Rs. 11,776 (d) Rs. 11,671

Q13. Raj aged 30 wishes to have Rs. 40 Lakhs at his retirement at 60. He starts making equal annual payments commencing now at 8% p.a. C.I. How much should he invest annually:
(a) Rs. 34,678 (b) Rs. 32,694 (c) Rs. 35,310 (d) Rs. 35,000

Q14. A sinking fund is created for redeeming debentures worth Rs. 5 Lakhs at the end of 25 years. How much provision needs to be made out of profit each year provided sinking fund can earn @ 4% p.a. C.I

(a) Rs. 12,000 (b) Rs. 12,050 (c) Rs. 12,100 (d) Rs. 12,950

Q15. A machine costs Rs.5,20,000 with an estimated life of 25 years. A sinking find is created to replace it by a new model at 25% higher cost after 25 years with a scrap value realization of Rs.25,000. Find the amount required to be set aside every year, if sinking fund accumulate at 3.5 % C.I. p.a.

(a) Rs. 16,000 (b) Rs. 16,500 (c) Rs. 16,050 (d) Rs. 16,005

Q16. A person desires to create a fund to provide for a prize of Rs. 300 every year. What investment is required to be made at 10% p.a. C.I

(a) Rs. 3,500 (b) Rs. 3,200 (c) Rs. 3,000 (d) Rs. 2,500

Q17. A trust provide annual scholarship to financially weak students. It started with an investment of Rs. 1.62 Lakhs @ 8% p.a. How much scholarship can be provided every year.

(a) Rs. 12,690 (b) Rs. 12,960 (c) Rs. 16,200 (d) None of these

Q18. A company may obtain a machine either by leasing it for 5 years at an annual rent of Rs. 2,000 or by purchasing it for Rs.8,100. If the money worth at 18% p.a. Which alternative is preferable.

(a) Leasing (b) Purchasing (c) either (a) or (b) (d) None of these

Q19. A machine can be purchased for Rs. 50,000 and it will contribute Rs. 12,000 per year for next 5 years borrowing cost is 10% p.a. What is preferable

(a) It should be purchased (b) Should not be purchased

(c) Can't say (d) None of these

PERMUTATION & COMBINATION

Q1. Among 36 teachers, one principle and one vice principle are to be appointed. In how many ways this can be done

(a) 1360 (b) 1260 (c) 1060 (d) 1160

Q2. A teacher wants to set 1 Question from each of the two exercises. If there are 15 & 12 questions in two exercises respectively. Then in how many ways can 2 questions be selected

(a) 160 (b) 140 (c) 180 (d) 120

Q3. There are 3 different rings to be worn in 4 fingers with at most one in each finger. In how many ways can this be done

(a) 36 (b) 28 (c) 24 (d) 32

Q4. How many numbers greater than 2000 can be formed by using the digits 0, 1, 2, 3, 4. Repetition not allowed.

(a) 72 (b) 120 (c) 168 (d) 360

Q5. How many numbers lying between 1000 and 10,000, can be formed by using the digits 1, 3, 5, 6, 7, 8, 9, no digits being repeated

(a) 940 (b) 640 (c) 840 (d) 740

Q6. The number of 3 digit numbers of distinct digits that can be formed from digits 2, 3, 4, 5, 7, 9 which are less than 400.

(a) 20 (b) 40 (c) 80 (d) 120

Q7. Find the number of 3 digit even numbers of different digits that can be formed with 0, 1, 2, 3

(a) 10 (b) 15 (c) 20 (d) none of these

Q8. In a set of 5 true-false questions, no student has written all correct answers and no 2 students have given the same sequence. Find the number of students

(a) 32 (b) 31 (c) 10 (d) 21

Q9. If ${}^{56}P_{r+6} : {}^{54}P_{r+3} = 30800 : 1$, then the value of r is:

(a) 42 (b) 41 (c) 45 (d) none of these

Q10. A code word contain 2 distinct English alphabets followed by two distinct nonzero digits. How many codes words are possible

(a) 415800 (b) 67600 (c) 46800 (d) 41080

Q11. There are 5 letters and 5 directed envelopes. Find number of ways in which the letters can be put in envelopes so that all are not put in directed envelopes

(a) 129 (b) 119 (c) 120 (d) none of these

Q12. A person forgot his 4 digit ATM PIN. He remembers that code consists of 3, 5, 6 & 9. Find the largest number of trials

(a) 12 (b) 24 (c) 36 (d) 48

Q13. How many 6 digit telephone numbers can be formed by using distinct digits. First digit cannot be 0 or 1

(a) ${}^{10}P_6$ (b) $9\ {}^{9}P_5$ (c) $8\ {}^{9}P_5$ (d) none of these

Q14. 5 men and 4 women are to sit in a row such that women occupy the even places. How many arrangements are possible.

(a) 2880 (b) 2480 (c) 3680 (d) 3280

Q15. 6 boys and 5 girls are to be seated in a row, such that no two girls and no two boys sit together. Find the number of ways in which this can be done

(a) 86,400 (b) 85,000 (c) 85,400 (d) none of these

Q16. The number of ways in which n different books can be arranged in an almirah, so that two particular books are always together

(a) $n! \times 2!$ (b) $(n-1)! \times 2!$ (c) $(n-2)!$ (d) none of these

Q17. There are 6 students of whom 2 are Indian,2 American & 2 Russian. They have to stand in a row so that person of same nationality are together. Find the number of ways in which they can do so.

(a) 6! (b) 8 (c) 48 (d) 6

Q18. How many words can be formed with letters of the word "ORIENTAL", so that A & E always occupy odd places

(a) 6450 (b) 8460 (c) 8640 (d) 540

Q19. In how many ways can the letters of the word " DIRECTOR" be arranged so that the three vowels are never together.

(a) 180 (b) 18,000 (c) 18,002 (d) none of these

Q20. The number of permutations of the word "BANANA"

(a) 720 (b) 120 (c) 60 (d) 360

Q21. How many words can be formed with the letters of the word BHARAT in which B & H are never together.

(a) 180 (b) 240 (c) 200 (d) 260

Q22. In how many permutations of the letters in MISSISSIPPI, do the four I's come together

(a) 34650 (b) 33180 (c) 840 (d) 480

Q23. In how many ways can the letters of the word "ALGEBRA" be arranged without changing the relative order of the vowels

(a) 82 (b) 70 (c) 72 (d) none of these

Q24. How many words can be formed with the letters of the word "UNIVERSITY", the vowels always remain together

(a) 60,482 (b) 60,480 (c) 60,000 (d) none of these

Q25. How many words can be formed with the letters of the word "PARALLEL" so that all 'L' do not come together.

(a) 2000 (b) 3,000 (c) 4,000 (d) none of these

Q26. How many numbers greater than 1 million can be formed by using the digits 1, 2, 0, 2, 4, 2, 4

(a) 360 (b) 420 (c) 60 (d) both b & c

Q27. There are 3 copies each of two books and 2 copies each of 5 books. In how many ways can these 16 books be arranged in a shelf so that the copies of the same book are never separated

(a) $\frac{16!}{(3!)^2(2!)^5}$ (b) $\frac{7!}{(3!)^2(2!)^5}$ (c) 7! (d) $(3!)^2(2!)^5 7!$

Q28. In how many different ways can 17 billiard balls be arranged ,if 7 are black,6 red and 4 white

(a) (17!)/(7!)(6!)(4!)(3!) (b) (17!)/(7!)(6!)(4!) (c) (7!)(6!)(4!) (d) none of these

Q29. The number of ways in which 5 boys and 5 girls can sit in a ring are
(a) 10! (b) 9! (c) 5!4! (d) $(5!)^2$

Q30. 12 persons are to be arranged round the table. If two particular persons among them are not to be side by side, the total number of arrangements is
(a) 2 (10!) (b) 9 (10!) (c) 10 (11!) (d) 11!

Q31. 7 men and 7 women are to sit round a circular table, such that there is a man on either side of every women. The number of arrangements is:
(a) $(7!)^2$ (b) 2×6! (c) 6! 7! (d) 13!

Q32. In how many can 3 men and 3 women be seated around the table,if each women is to sit between two men
(a) 5! (b) (4!)(2!) (c) (3!)(3!) (d) (2!)(3!)

Q33. A man invites 6 of his friends to a party. In how many different arrangements they, along with the wife of host can sit at a round table for dinner, if the host and his wife always sit side by side
(a) 1440 (b) 144 (c) 1445 (d) none of these

Q34. The total number of permutations of 4 letters that can be made out of letters of the word "EXAMINATION"
(a) 2454 (b) 2436 (c) 2545 (d) none of these

Q35. Find the number of words of 3 letters that can be formed with the letters of the word "CALCUTTA"
(a) 90 (b) 96 (c) 98 (d) 102

Q36. If ${}^nP_r = 720\ {}^nC_r$, then the value of r is:
(a) 6 (b) 5 (c) 4 (d) 7

Q37. If ${}^{12}C_5 + 2\ {}^{12}C_4 + {}^{12}C_3 = {}^{14}C_x$, then the value of x is
(a) 9 (b) 6 (c) 5 (d) both (a) & (c)

Q38. How many lines can be drawn through 21 points on a circle
(a) 310 (b) 210 (c) 410 (d) 570

Q39. A polygon has 44 diagonals. How many sides are there in the polygon.
(a) 9 (b) 10 (c) 11 (d) 12

Q40. If 7 points out of 12 points are in the same straight line, then the number of triangles formed is:
(a) 19 (b) 158 (c) 185 (d) 201

Q41. In how many ways a committee of six members can be formed from a group of 7 boys and 4 girls having at least two girls
(a) 731 (b) 371 (c) 137 (d) 351

Q42. There are 7 men and 3 Ladies. Find the number of ways in which a committee of 6 can be formed , if each committee is to include at least two ladies
(a) 140 (b) 105 (c) 35 (d) none of these

Q43. 3 men & 3 ladies are candidates for two posts. A voter has to cast 2 votes for 2 candidates. In how many ways can one cast his vote
(a) 10 (b) 12 (c) 15 (d) none of these

Q44. In a competition, there are 6 teams each in Group A & B each team has to play one cricket match with the remaining teams of the same Group. Find the total number of matches played.
(a) 15 (b) 20 (c) 30 (d) 36

Q45. How many different triangles can be formed by joining the angular points of a polygon of m sides

(a) ${}^{m}P_3$ (b) ${}^{m}C_3$ (c) $\frac{m(m-1)(m-2)}{6}$ (d) both (b) & (c)

Q46. Mr. X has 8 children of which he takes 3 at a time to the circus. Find how many times a particular child can go to the circus

(a) 20 (b) 30 (c) 21 (d) none of these

Q47. We have to select 6 persons from group of 8, but if A is chosen,B must be chosen too. In how many ways can the selection be made

(a) 22 (b) 16 (c) 24 (d) 32

Q48. How many different cricket teams of 11 players can be selected from 14 players of which two can play as wicket keeper. Given each team must have exactly one wicket keeper

(a) 130 (b) 132 (c) 140 (d) none of these

Q49. Out of 6 members belonging to party A and 4 to party B, In how many ways a committee of 5 can be selected so that members of party A are in majority.

(a) 180 (b) 184 (c) 185 (d) 186

Q50. The total number of words which can be formed out of letters a, b, c, d, e, f taken 3 at a time such that each word contain at least one vowel.

(a) 72 (b) 48 (c) 96 (d) none of these

ARITHMATIC PROGRESSION

Q1. What is the next term of the series $\sqrt{8}, \sqrt{18}, \sqrt{32}$:
(a) $\sqrt{40}$ (b) $\sqrt{48}$ (c) $\sqrt{50}$ (d) $\sqrt{54}$

Q2. Which term of the series 27, 24, 21, ... is -81 :
(a) 35^{th} (b) 36^{th} (c) 37^{th} (d) 38^{th}

Q3. Which term of the series 40, 35, 30, ... is the first negative term:
(a) 8^{th} term (b) 7^{th} term (c) 9^{th} term (d)10^{th} term

Q4. The 10^{th} term from the end of series 7, 10, 13, ...,184 is:
(a) 157 (b) 111 (c) 34 (d) 0

Q5. The 5^{th} & 13^{th} term of an A.P are 5 and -3 respectively. The 24^{th} term of A.P. is:
(a) 14 (b) -14 (c) -8 (d) -11

Q6. How many numbers are there between 102 and 750 divisible by 8
(a) 75 (b) 78 (c) 81 (d) 84

Q7. Find the number of terms between 100 & 1000 which are divisible by 6 or 8:
(a) 244 (b) 225 (c) 194 (d) 150

Q8. How many numbers from 1000 to 1800 which are divisible by 6 & 9 both.
(a) 15 (b) 45 (c) 178 (d) 208

Q9. In an A.P, if m times the m^{th} term is equals to n times the n^{th} term. Find its $(m+n)^{th}$ term:
(a) mn (b) $m + n$ (c) m/n (d) zero

Q10. If p^{th} term of an AP is q & q^{th} term is p. Find r^{th} term.
(a) $r - p - q$ (b) $p - q - r$ (c) $p + r - q$ (d) $p + q - r$

Q11. Find nth term of the series log a, log (ab), log (ab^2).....
(a) $(n-1)\log ab$ (b) $(\log a + \log b)^{n-1}$ (c) $\log(ab)^{n-1}$ (d) $\log(ab^{n-1})$

Q12. If the ratio of 6^{th} & 9^{th} term of an A.P. is 7 : 9. Then ratio of 7^{th} & 14^{th} term is:
(a) 4 : 7 (b) 37 : 39 (c) 23 : 39 (d) 23 : 37

Q13. If 29^{th} term of an A.P is twice the 19^{th} term. Find its 9^{th} term.
(a) -8 (b) -1 (c) 0 (d) cann't be determined

Q14. Find the sum 25 + 28 + 31 + ... + 100
(a) 1545 (b) 1585 (c) 1625 (d) 1525

Q15. If 26 + 21 + 16 + ... + x = 11, then x is equals to:
(a) 4 (b) -14 (c) 24 (d) -24

Q16. How many terms of the A.P. -5, -9/2 , -4 will give the sum 0.
(a) 18 (b) 21 (c) 23 (d) 16

Q17. If nth term of an A.P is $5 - 3n$, find the sum of its n terms
(a) $7n - 3n^2$ (b) $\frac{7n-3n^2}{2}$ (c) $3n^2 - 7n$ (d) $\frac{3n^2-7n}{2}$

Q18. The sum of n terms of an A.P is $3n^2 + 4n$, its r^{th} term is:
(a) $6r + 1$ (b) $6r - 1$ (c) $1 - 6r$ (d) $r - 6$

Q19. 1^{st} & 5^{th} term of an A.P are -14 & 2 respectively. Find the sum of its10 terms:
(a) 20 (b) 30 (c) 40 (d) 50

Q20. Find the sum of 3 digits numbers divisible by 5.
(a) 95,850 (b) 96950 (c) 98550 (d) 97,650

Q21. The sum of first 15 terms of an AP is 105 and the sum of next 15 terms is 780. Find the sum of its 40 terms:

(a) 990 (b) 1160 (c) 1690 (d) 1780

Q22. If first term of an A.P. is 2 and the sum of first 5 terms is equals to $1/4^{th}$ of the sum of next five terms. Find its 20^{th} term

(a) -56 (b) -112 (c) -168 (d) 0

Q23. If the sum of first m terms of an A.P. is same as sum of its first n terms. Then the sum of its (m + n) terms is:

(a) 0 (b) 1 (c) 2 (m + n) (d) m + n + 1

Q24. If S_1, S_2, S_3 be the sum of n terms, 2n terms and 3n terms of an A.P. respectively and $S_2 - S_1 = K S_3$, find K

(a) 1/2 (b) 1/3 (c) 2 (d) 3

Q25. If 3/4 , a, 2 are in A.P. Find a:

(a) 3/8 (b) 5/8 (c) 7/8 (d) 11/8

Q26. If $(k-1), (2k+1)$ & $(6k+3)$ are in A.P. Find k:

(a) 4/7 (b) 1 (c) 0 (d) -1

Q27. Three numbers are in A.P, such that their sum is 24 and there product is 440. The largest number is:

(a) 8 (b) 11 (c) 12 (d) 13

Q28. The interior angles of a polygon are in A.P. The smallest angle is 120^0 and common difference is 5^0. Find the number of sides of the polygon.

(a) 7 (b) 8 (c) 9 (d)10

Q29. 6 Arithmatic Means are inserted between 15 and -13. Then 4^{th} A.M. is:

(a) -1 (b) -3 (c) -5 (d) -9

Q30. N Arithmatic Means between 7 & 71 are inserted, such that 5^{th}A.M. is27.
Find the value of N.

(a) 13 (b) 15 (c) 16 (d) 19

Q31. A man starts repaying a loan as first instalment of Rs. 100, thereby increasing it by Rs. 5 every month. Find the value of 30^{th} instalment.

(a) Rs. 265 (b) Rs. 260 (c) Rs. 250 (d) Rs. 245

Q32. A man saves Rs. 32 during the first year and then increase his saving by Rs. 4 every year. What will be his saving in 10 years.

(a) Rs. 68 (b) Rs. 72 (c) Rs. 64 (d) Rs. 500

Q33. If $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ is the arithmetic mean of a & b, find the value of n.

(a) 0 (b) 1 (c) 2 (d) 4