Question Bank

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Quantitative Methods

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CHAPTER 1: ELEMENTARY MATHEMATICAL OPERATIONS

1.1 Exact value of $\sqrt{0.04}$ is:

(a) 0.1 (b) 0.12
(c) 0.21 (d) 0.2

1.2 Starting with the smallest, following numbers in order of size are:

$\frac{1}{3}$, 0.3^2, 0.32

(a) $0.3^2, 0.32, \frac{1}{3}$ (b) $0.32, 0.3^2, \frac{1}{3}$
(c) $\frac{1}{3}, 0.3^2, 0.32$ (d) $0.32, \frac{1}{3}, 0.3^2$

1.3 Simplified form of $\frac{12x^2y^3}{4x^3y}$ is:

(a) $\frac{3y^2}{x}$ (b) $\frac{3y}{x}$
(c) $\frac{3y^3}{x}$ (d) $\frac{3y^2}{x^2}$

1.4 Evaluation of $6^{\frac{2}{3}} \times 6^{\frac{2}{3}} \times 6^{\frac{2}{3}}$ is:

(a) 33 (b) 34
(c) 35 (d) 36

1.5 If 4 : a :: 5 : 8, then "a" is:

(a) 31/5 (b) 5/32
(c) 5/31 (d) 32/5

1.6 If x = 3 and y = 1/6, then x = ________.

(a) 2y (b) $\frac{1}{2y}$
(c) 2/y (d) y/2

1.7 An airliner has seats for 120 passengers. The number of passengers on board when 7/15 of the seats are occupied is:

(a) 56 (b) 57
(c) 58 (d) 59

1.8 165 metres as a percentage of 3 kilometres is:

(a) 5.4% (b) 5.3%
(c) 5.5% (d) 5.2%

1.9 Simplest form of the fraction which is exactly halfway between 13/17 and 14/17 is:

(a)	25/34	(b)	27/34
(c)	34/25	(d)	34/27

1.10 If $V = x^2H + AL$, then x in terms of V, H, A and L is:

(a)	$\sqrt{\frac{AL - V}{H}}$	(b)	$\sqrt{\frac{V + AL}{H}}$
(c)	$\sqrt{\frac{AL + H}{V}}$	(d)	$\sqrt{\frac{V - AL}{H}}$

1.11 The number of employees in 2012 was 5% higher than in 2011. The number in 2013 was 5% higher than in 2012. The total percentage increase in the number of employees from 2011 to 2013 is:

(a)	10.21%	(b)	10.25%
(c)	10.51%	(d)	10.52%

1.12 Factors of expression $ax^2 + bx^2 – ay^2 – by^2$ are:

(a)	(a + b)(x + y)(x – y)	(b)	(a + b)(x + y)(x + y)
(c)	(a – b)(x + y)(x – y)	(d)	None of these

1.13 Factors of expression $x^2 – 4x – 21$ are:

(a)	(x – 7)(x + 3)	(b)	(x + 7)(x + 3)
(c)	(x – 7)(x – 3)	(d)	None of these

1.14 Simplified form of $\left(\frac{x}{x-1} - 1\right) \div \left(1 + \frac{x}{1-x}\right)$ is:

(a)	1	(b)	–2
(c)	–1	(d)	2

1.15 Simplest form of fraction $\frac{2x^2 - 2x - 12}{2x^2 - 18}$ is:

(a)	$\frac{x-2}{x+3}$	(b)	$\frac{x-2}{x-3}$
(c)	$\frac{x+2}{x+3}$	(d)	None of these

1.16 A number lies between 90 and 100. When it is divided by 7 there is a remainder of 5. Then required number is:

(a)	98	(b)	96
(c)	94	(d)	92

1.17 Factors of expression $a^2b^2 + b^2 - 2ab^2 - 4$ are:

(a) $(ab - b - 2)(ab + b + 2)$ (b) $(ab + b - 2)(ab - b + 2)$
(c) $(ab + b - 2)(ab + b + 2)$ (d) $(ab - b - 2)(ab - b + 2)$

1.18 If $x^{2y} = \left(\sqrt{x}\right)^{2y^2+2}$, possible value of y is:

(a) 1 (b) ±1
(c) –1 (d) 2

1.19 Factors of $3x^2 - \frac{1}{3}y^2$ are:

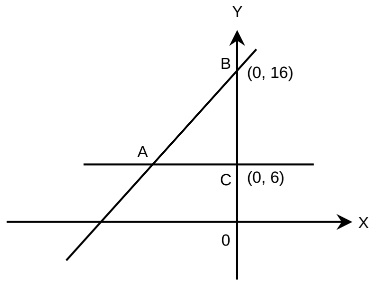
(a) $\frac{1}{3}(3x - y)(x + 3y)$ (b) $\frac{1}{3}(x - 3y)(3x + y)$
(c) $\frac{1}{3}(y - 3x)(3x + y)$ (d) $\frac{1}{3}(3x - y)(3x + y)$

1.20 If $\sqrt{y} = 64x^3$ then $\sqrt[3]{y}$ = ________.

(a) 16x (b) $16x^2$
(c) ±16x (d) $\pm 16x^2$

CHAPTER 2: COORDINATE SYSTEM AND EQUATION OF A STRAIGHT LINE

2.1 In the diagram, B is the point (0, 16) and C is the point (0, 6). The sloping line through B and the horizontal line through C meet at the point A. Then the equation of the line AC is:



(a) y = 6 (b) x = 6
(c) y = –6 (d) y = 0

2.2 A line passes through the point (0, 5) and has gradient –2. The equation of the line is:

(a) y = 5 + 2x (b) y = –5 – 2x
(c) y = 5 – 2x (d) y = –5 + 2x

2.3 The slope of the line perpendicular to the line 3x – 4y + 5 = 0 is:

(a) 3/4 (b) –3/4

(c) 4/3 (d) –4/3

2.4 Whether the pair of lines 3x = y + 7 and x + 3y = 7 are parallel, perpendicular or neither:

(a) Perpendicular (b) Parallel
(c) Neither (d) Not possible

2.5 Y-intercept and slope of the equation 3y = 9 – 12x are:

(a) y-intercept 4, slope –3 (b) y-intercept 3, slope 4
(c) y-intercept 3, slope –4 (d) y-intercept –3, slope –4

2.6 y = c is the equation of straight line parallel to:

(a) x-axis (b) y-axis
(c) x, y axis (d) None of these

2.7 A firm's fixed costs are Rs.50,000 per week and the variable cost is Rs.10 per unit. The total cost function for the firm is:

(a) C(x) = 10x + 50,000 (b) C(x) = 10x + 5,000
(c) C(x) = 10x – 50,000 (d) C(x) = 10x – 5,000

2.8 The slope of the straight line y = 2 – 3x is:

(a) 2 (b) –3
(c) 3 (d) –2

2.9 The total cost curve of the number of copies of a particular photograph is linear. The total cost of 5 and 8 copies of a photograph are Rs.80 and Rs.116 respectively. The total cost for 10 copies of the photograph will be:

(a) Rs.100 (b) Rs.120
(c) Rs.130 (d) Rs.140

2.10 A manufacturer produces 80 T.V. sets at a cost Rs.220000 and 125 T.V. sets at a cost of Rs.287500. Assuming the cost curve to be linear. The cost of 95 sets with the help of equation of the line is:

(a) Rs.242,600 (b) Rs.242,500
(c) Rs.245,500 (d) Rs.242,400

2.11 Pairs of coordinates (x, y) for which x and y are positive integers, such that 4x + 3y = 29 are:

(a) (2, 7) and (3, 5) (b) (7, 2) and (5, 3)
(c) (2, 7) and (5, –3) (d) (2, 7) and (5, 3)

2.12 Line has equation y = 3x + 7 and passes through the point (h, h + 15). Then the value of h is:

(a) ±4 (b) 4
(c) 3 (d) –4

2.13 The point (p, 2p) lies on the straight line x + 4y = 36. The value of p is:

(a)	4	(b)	–2
(c)	–4	(d)	2

2.14 For the profit function $P = -Q^2 + 17Q - 42$, break even points are:

(a)	13 and 4	(b)	12 and 5
(c)	14 and 6	(d)	14 and 3

2.15 The equation of line joining the point (3, 5) to the point of intersection of the lines 4x + y – 1 = 0 and 7x – 3y – 35 = 0 is:

(a)	2x – y = 1	(b)	3x + 2y = 19
(c)	12x – y – 31 = 0	(d)	None of these

2.16 The sum of the intercepts of a straight line on the axis is 5 and the product of the intercepts is 6. Then the equation of one of the line is:

(a)	3x + 2y – 6 = 0	(b)	2x + 3y + 6 = 0
(c)	x + 5y + 12 = 0	(d)	3x + 2y – 8 = 0

2.17 The equation of the line passing through the point of intersection of 2x + 3y – 5 = 0 and 7x – 5y – 2 = 0 and parallel to the line 2x – 3y + 14 = 0 is:

(a)	2x – 3y + 1 = 0	(b)	2x – 3y – 1 = 0
(c)	3x + 2y + 1 = 0	(d)	3x + 2y – 1 = 0

2.18 The cost of production of a product in rupees is: C = 15x + 9,750 where *x* is the number of items produced. If selling price of each item is Rs.30, the sales quantity at which there would be no profit or loss is:

(a)	560 units	(b)	600 units
(c)	650 units	(d)	500 units

2.19 A manufacturer sells a product at Rs.8 per unit. Fixed cost is Rs.5,000 and the variable cost is Rs.22/9 per unit. The total output at the break-even point is:

(a)	600 units	(b)	900 units
(c)	700 units	(d)	800 units

2.20 A firm is introducing a new washing detergent. The firm plans to sell the family size box for Rs.24. Production estimates have shown that the variable cost of producing one unit of the product is Rs.21.60. Fixed cost of production is Rs.36,000. It is assumed that both the total revenue and total cost functions are linear over the relevant sale quantity range. Then the break-even volume of sales is:

(a)	150,000 boxes	(b)	1,500 boxes
(c)	150 boxes	(d)	15,000 boxes

CHAPTER 3: SOLVING EQUATIONS

3.1 If the solution of a quadratic equation has two values 0 and 4, the equation is:

(a) $x^2 - 4 = 0$ (b) $x^2 + 16 = 0$
(c) $x^2 - 16 = 0$ (d) $x^2 - 4x = 0$

3.2 If $x^{-1} = 5^{-1} + 7^{-1}$; then x is:

(a) 12/5 (b) 35/12
(c) 5/35 (d) 12/35

3.3 Roots of the equation $(4y - 3)(2y + 5) = 0$ are:

(a) 3/4 or 5/2 (b) –3/4 or –5/2
(c) 3/4 or –5/2 (d) –3/4 or 5/2

3.4 If $7x - 5y = 13$; $2x - 7y = 26$; then $5x + 2y$ is:

(a) 11 (b) 13
(c) –11 (d) –13

3.5 $X \sqrt{0.25} = 5$; then x is:

(a) 10 (b) ±10
(c) –10 (d) None of these

3.6 If $\log_{10} 5 - \log_{10} 2 = \log_{10} x$; then x is:

(a) –5/2 (b) 2/5
(c) –1/2 (d) 5/2

3.7 If $\log_2 x = 5$, then x is:

(a) 32 (b) 25
(c) 10 (d) None of these

3.8 $\log x^3 \div \log x$ is:

(a) –3 (b) 3
(c) ±3 (d) 9

3.9 Value of x for the equation $x = \log_4 64$ is:

(a) ±3 (b) –3
(c) 2 (d) 3

3.10 $4y - x = 10$ and $3x = 2y$ then xy is:

(a) 2 (b) 3
(c) 6 (d) 12

3.11 The equation $x^2 + kx - 18 = 0$, where k is a constant, is satisfied by x = 2. Then the value of k is:

(a) –7 (b) 5
(c) ±7 (d) 7

3.12 Solution of the equation $(x + 5)^2 = 16$ is:

(a) 1 or 9 (b) –1 or –9
(c) –1 or 9 (d) 1 or –9

3.13 The number of colour T.V sets sold by a firm was three times the combined sale of C.D players and radios. If the sales included 72 T.V. sets and 8 radios, then the numbers of C.D. players sold are:

(a) 15 (b) 14
(c) 16 (d) 13

3.14 Given that $8x^2 - 2xy - 3y^2 = 0$; then 'y' in term of 'x' is:

(a) 4x/3 and 2x (b) 4x/3 and –2x
(c) –4x/3 and –2x (d) 4/3x and –2x

3.15 If $e^{4x} = 7$ & ln 7 = 1.95. Then x is:

(a) 0.3875 (b) 0.4876
(c) 0.4875 (d) 0.4865

3.16 Given $\log_x 2 + \log_x 4 + \log_x 64 = 9$. Then the value of x is:

(a) 2 (b) ±2
(c) –2 (d) None of these

3.17 Value of *x* if, $ln3 + 2lnx = ln(x + 2)$ is:

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

3.18 If log 2 = 0.3010, log 3 = 0.4771 and log 7 = 0.8451, then the values of $\log\sqrt{14}$ is:

(a) 0.57305 (b) 0.57035
(c) 0.67305 (d) 0.50375

3.19 Zain is x years old and his sister Ifrah is (5x – 12) years old. Given that Ifrah is twice as old as Zain, then the age of Ifrah is:

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

3.20 Solution set for the simultaneous equations 2x – 3y = 19 and 3x + 2y = –4 is:

(a) (2, 5) (b) (–2, –5)
(c) (–2, 5) (d) (2, –5)

3.21 Ten years ago the age of a father was four times of his son. Ten years hence the age of the father will be twice that of his son. The present ages of the father and the son are:

(a)	(50, 20)	(b)	(60, 20)
(c)	(55, 25)	(d)	None of these

3.22 Pick up the correct value x for which $\frac{x}{0.5}-\frac{1}{0.05}+\frac{x}{0.005}-\frac{1}{0.0005}=0$:

(a)	x = 0	(b)	x = 1
(c)	x = 10	(d)	None of these

3.23 Solution of the equations $\frac{4}{x}-\frac{5}{y}=\frac{x+y}{xy}+\frac{3}{10}$ and 3xy = 10 (y – x) is:

(a)	(5, 2)	(b)	(–2, –5)
(c)	(2, –5)	(d)	(2, 5)

3.24 Two numbers are such that twice the greater number exceeds twice the smaller one by 18 and 1/3 of the smaller and 1/5 of the greater numbers are together 21. The numbers are:

(a)	(66, 75)	(b)	(45, 36)
(c)	(50, 41)	(d)	(55, 46)

3.25 The solutions of the equation $\frac{6x}{x+1}+\frac{6(x+1)}{x}=13$ are:

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

3.26 A piece of iron rod costs Rs.60. If the rod was 2 metre shorter and each metre costs Re.1.00 more, the cost would remain unchanged. The length of the rod is:

(a)	13 metres	(b)	12 metres
(c)	14 metres	(d)	15 metres

3.27 There are two consecutive numbers such that the difference of their reciprocals is 1/240. The numbers are:

(a)	(15, 16)	(b)	(17, 18)
(c)	(13, 14)	(d)	(12, 13)

3.28 Three times the square of a number when added to seven times the number results in 26. The number is:

(a)	–2 or –13/3	(b)	2 or –13/3
(c)	–2 or 13/3	(d)	2 or 13/3

3.29 The product of four greater than a certain negative integer & sixteen less than four times the integer is equal to 36. The integer is:

(a) ±5 (b) 5
(c) –5 (d) 4

3.30 Roots of the equation $2 + 6\sqrt{2}y + 9y^2 = 0$ are:

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

3.31 Value of x such that $4^{x+1} = 2 - 7(2^x)$ is:

(a) 2 (b) –2
(c) ±2 (d) 3

3.32 Solution of the equation $\log_2 24 - \log_2 12 = \log_4 x$ is:

(a) 4 (b) ±4
(c) –4 (d) 5

CHAPTER 4: MATHEMATICAL PROGRESSION

4.1 7^{th} term of an A.P. 8, 5, 2, –1, –4… is:

(a) 9 (b) 10
(c) –9 (d) –10

4.2 (a – b), a, (a + b) are in ________ progression.

(a) Geometric (b) Arithmetic
(c) Harmonic (d) None of these

4.3 The sum of the series 1 + 2 + 3 ……… + n is:

(a) (n + 2)/2 (b) n(n – 1)/2
(c) n(n + 1)/2 (d) None of these

4.4 2 + 4 + 6 + ………. + 100 = ________.

(a) 2,500 (b) 2,550
(c) 2,575 (d) None of these

4.5 Which term of the AP $\frac{3}{\sqrt{7}}, \frac{4}{\sqrt{7}}, \frac{5}{\sqrt{7}}$ …… is $\frac{17}{\sqrt{7}}$?

(a) 15 (b) 17
(c) 16 (d) 18

4.6 The value of x such that 8x + 4, 6x – 2, 2x + 7 will form an AP is:

(a) 15 (b) 2
(c) 15/2 (d) None of these

4.7 The sum of a certain number of terms of an AP series –8, –6, –4, …… is 52. The number of terms is:

(a) 12 (b) 13
(c) 11 (d) None of these

4.8 The 7th term of the series 6, 12, 24…… is:

(a) 384 (b) 834
(c) 438 (d) None of these

4.9 The last term of the series x^2, x, 1,…… to 31 terms is:

(a) x^{28} (b) 1/x
(c) $1/x^{28}$ (d) None of these

4.10 If the terms 2x, (x + 10) and (3x + 2) be in A.P., the value of x is:

(a) 7 (b) 10
(c) 6 (d) None of these

4.11 The sum of all odd numbers between 200 and 300 is:

(a) 11,600 (b) 12,490
(c) 12,500 (d) 24,750

4.12 The sum of the series 1, $\frac{3}{5}, \frac{9}{25}, \frac{27}{125}$ …… to infinity is:

(a) 2/5 (b) 3/2
(c) –2/5 (d) 5/2

4.13 Sum of the series 6 + $\frac{3}{2} + \frac{3}{8}$ + ……… to infinity is:

(a) 6 (b) 8
(c) 7 (d) 9

4.14 The sum of the infinite Series 1 + 1/2 + 1/4 + …… is:

(a) 1.99999 (b) 2.00001
(c) 2 (d) 1.999

4.15 Sum of infinity of the following geometric progression

$\frac{1}{1.1} + \frac{1}{(1.1)^2} + \frac{1}{(1.1)^3} + \ldots\ldots$ is:

(a) 9 (b) –10
(c) 10 (d) –9

4.16 The first term of an A.P is 14 and the sum of the first five terms and the first ten terms are equal in magnitude but opposite in sign. The 3rd term of the AP is:

(a) $6\frac{4}{11}$ (b) 6
(c) $\frac{4}{11}$ (d) None of these

4.17 The first and the last term of an AP are –4 and 146. The sum of the terms is 7171. The number of terms is:

(a) 101 (b) 100
(c) 99 (d) None of these

4.18 If you save 1 paise today, 2 paise the next day 4 paise the succeeding day and so on, then your total savings in two weeks will be:

(a) Rs.163 (b) Rs.183
(c) Rs.163.83 (d) None of these

4.19 A person is employed in a company at Rs.3,000 per month and he would get an increase of Rs.100 per year. The total amounts which he receives in 25 years and the monthly salary in the last year are:

(a) Rs.5,400 and Rs.1,250,000 (b) Rs.540 and Rs.1,260,000
(c) Rs.5,500 and Rs.1,260,000 (d) Rs.5,400 and Rs.1,260,000

4.20 A person borrows Rs.8,000 at 2.76% simple interest per annum. The principal and the interest are to be paid in 10 monthly installments. If each installment is double the preceding one, the value of the first and the last installments are:

(a) Rs.8 and Rs.4,096 (b) Rs.8 and Rs.3,096
(c) Rs.7 and Rs.4,096 (d) Rs.8 and Rs.5,096

4.21 Three numbers are in AP and their sum is 21. If 1, 5, 15 are added to them respectively, they form a G.P. the numbers are:

(a) 5, 7, 9 (b) 9, 5, 7
(c) 7, 5, 9 (d) None of these

4.22 The sum of three numbers in G.P. is 70. If the two extremes by multiplied each by 4 and the geometric mean by 5, the products are in A.P. the numbers are:

(a) 12, 18, 40 (b) 10, 30, 90
(c) 40, 20, 10 (d) None of these

4.23 The sum of all natural numbers between 500 and 1000 which are divisible by 13 is:

(a) 28,405 (b) 24,805
(c) 28,540 (d) None of these

4.24 If unity is added to the sum of any number of terms of the A.P. 3, 5, 7, 9,…… the resulting sum is:

(a) 'a' perfect cube (b) 'a' perfect square
(c) both (a) and (b) (d) none of these

4.25 A person has to pay Rs.975 by monthly installments each less then the former by Rs.5. The first installment is Rs.100. The time by which the entire amount will be paid is:

(a) 10 months (b) 15 months
(c) 14 months (d) None of these

4.26 At 10% C.I. p.a., a sum of money accumulate to Rs.9,625 in 5 years. The sum invested initially is:

(a) Rs.5,976.37 (b) Rs.5,970
(c) Rs.5,975 (d) Rs.5,370.96

4.27 Divide 12.50 into five parts in A.P. such that the first part and the last part are in the ratio of 2:3.

(a) 2, 2.25, 2.5, 2.75, 3 (b) –2, –2.25, –2.5, –2.75, –3
(c) 4, 4.5, 5, 5.5, 6 (d) –4, –4.5, –5, –5.5, –6

4.28 The p^{th} term of an A.P. is 1/q and q^{th} term is 1/p. The sum of the pq^{th} term is:

(a) 1/2(pq + 1) (b) 1/2(pq – 1)
(c) pq + 1 (d) pq – 1

4.29 The least value of n for which the sum of n terms of the series $1 + 3 + 3^2 + \ldots\ldots$ is greater than 7,000 is:

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

4.30 If the sum of infinite terms in a G.P. is 2 and the sum of their squares is 4/3 the series is:

(a) 1, 1/2, 1/4…… (b) 1, –1/2, 1/4……
(c) –1, –1/2, –1/4…… (d) None of these

4.31 The infinite G.P. with first term 1/4 and sum 1/3 is:

(a) 1/4, 1/16, 1/64…… (b) 1/4, –1/16, 1/64……
(c) 1/4, 1/8, 1/16…… (d) None of these

4.32 The numbers x, 8, y are in G.P. and the numbers x, y, –8 are in A.P. The values of x, y are:

(a) 16, 4 (b) 4, 16
(c) Both (a) and (b) (d) None of these

4.33 How many terms are there in the sequence of 1/128, 1/64, 1/32….., 32, 64?

(a) 13 (b) 14
(c) 15 (d) 16

4.34 An auditorium has 20 seats in the front row, 25 seats in the second row, 30 seats in the third row and so on for 13 rows. Numbers of seats in the thirteenth row are:

(a) 70 (b) 80
(c) 82 (d) 90

4.35 Sum of the series 1, 1/3, 1/9, 1/27 ……… to infinity is:

(a) –3/2 (b) 2/3
(c) 1/3 (d) 3/2

4.36 The sum of the infinite series $2 + \sqrt{2} + 1 + \ldots\ldots\ldots$

(a) $2-4\sqrt{2}$ (b) $-2\left(1+\sqrt{2}\right)$
(c) $2+4\sqrt{2}$ (d) $4+2\sqrt{2}$

CHAPTER 5: FINANCIAL MATHEMATICS: COMPOUNDING

5.1 The formula for simple interest is:

(a) $\frac{P \times R \times T}{100}$ (b) $\frac{P \times R}{100 \times T}$
(c) $\frac{100\ \ P}{R \times T}$ (d) $\frac{100 \times R \times T}{P}$

5.2 x% of P is Y, then P is:

(a) 100x/y (b) x/100y
(c) 100y/x (d) y/100x

5.3 Future value of Rs.1,355/- invested @ 8% p.a. for 5 years is:

(a) Rs.1,897 (b) Rs.1,798
(c) Rs.1,987 (d) Rs.1,789

5.4 The present value of Rs.1,400 at 8 percent simple interest for 5 years is:

(a) Rs.2,000 (b) Rs.900
(c) Rs.3,000 (d) Rs.1,000

5.5 A bank charges mark-up @ Rs.0.39 per day per Rs.1,000/-, rate of mark-up as percent per annum is:

(a) 14.4% (b) 14.004%
(c) 14.24% (d) 14.0004%

5.6 A person borrowed Rs.20,000 from a bank at a simple interest rate of 12 percent per annum. In how many years will he owe interest of Rs.3,600?

(a)	1.5 years	(b)	1.55 years
(c)	1.6 years	(d)	1.45 years

5.7 How long will it take for a sum of money to double itself at 10% simple interest?

(a)	7 years	(b)	9 years
(c)	5 years	(d)	10 years

5.8 The sum required to earn a monthly interest of Rs.1200 at 18% per annum SI is:

(a)	Rs.50,000	(b)	Rs.60,000
(c)	Rs.80,000	(d)	None of these

5.9 In what time will Rs.1,800 yield simple interest of Rs.390 at the rate of 5% per annum?

(a)	5 years 2 months	(b)	4 years 4 months
(c)	4 years 5 months	(d)	None of these

5.10 An amount of Rs.20,000 is due in three months. The present value if it includes simple interest @8% is:

(a)	Rs.19,608.84	(b)	Rs.19,607.84
(c)	Rs.18,607.84	(d)	Rs.19,507.84

5.11 A sum of money would amount to Rs.6,200 in 2 years and Rs.7,400 in 3 years. The principal and rate of simple interest are:

(a)	Rs.3,800, 31.57%	(b)	Rs.3,000, 20%
(c)	Rs.3,500, 15%	(d)	None of these

5.12 A sum of money would double itself in 10 years. The number of years it would be four times is:

(a)	25 years	(b)	15 years
(c)	20 years	(d)	None of these

5.13 A total of Rs.14,000 is invested for a year, part at 5% and the rest at 6%. If Rs.740 is the total interest, amount invested at 5% is:

(a)	Rs.9,000	(b)	Rs.8,000
(c)	Rs.6,000	(d)	Rs.10,000

5.14 If the simple interest on a certain sum for 15 months at 7½% per annum exceeds the simple interest on the same sum for 8 months at 12½% per annum by Rs.32.50, then the sum (in Rs.) is:

(a)	Rs.3,000	(b)	Rs.3,060
(c)	Rs.3,120	(d)	Rs.3,250

5.15 A certain sum is invested for T years. It amounts to Rs.400 at 10% simple interest per annum. But when invested at 4% simple interest per annum, it amounts to Rs.200. Then time (T) is:

(a) 41 years (b) 39 years
(c) 50 years (d) None of these

5.16 A sum of Rs.7700 is to be divided among three brothers Zain, Zaid and Zoaib in such a way that simple interest on each part at 5% per annum after 1, 2 and 3 years, respectively remains equal. The share of Zain is more than that of Zoaib by:

(a) Rs.2,800 (b) Rs.2,500
(c) Rs.3,000 (d) None of these

5.17 A person borrowed Rs.500 @ 3% per annum S.I. and Rs.600 @ 4.5% per annum on the agreement that the whole sum will be returned only when the total interest becomes Rs.126. The number of years, after which the borrowed sum is to be returned, is:

(a) 2 (b) 3
(c) 4 (d) 5

5.18 A lends Rs.2,500 to B and a certain sum to C at the same time at 7% p.a. simple interest. If after 4 years, A altogether receives Rs.1,120 as interest from B and C, then the sum lent to C is:

(a) Rs.700 (b) Rs.1,500
(c) Rs.4,000 (d) Rs.6,500

5.19 An investor receives a total of Rs.5,700 per annum in interest from 3 stocks yielding 4%, 5% and 8% per annum respectively. The amount at 4% is Rs.20,000 more than the amount invested at 5%, and the interest from the 8% investment is 8 times the interest from the 5% investment. Amount of money invested in each stock is:

(a) Rs.10,000, 30,000 & 50,000 (b) Rs.10,000, 30,000 & 20,000
(c) Rs.20,000, 30,000 & 50,000 (d) Rs.10,000, 20,000 & 50,000

5.20 An individual has purchased Rs.275,000 worth of Savings Certificate. The Certificate expires in 25 years and a simple interest rate is computed quarterly at a rate of 3 percent per quarter. Interest cheques are mailed to Certificate holders every 3 months. The interest the individuals can expect to earn every three months is:

(a) Rs.8,450 (b) Rs.8,250
(c) Rs.8,150 (d) Rs.8,350

5.21 If P = Rs.1,000, i = 5% p.a, n = 4; amount and C.I. is:

(a) Rs.1,215.50, Rs.215.50 (b) Rs.1,125, Rs.125
(c) Rs.2,115, Rs.115 (d) None of these

5.22 The C.I on Rs.16,000 for 1½ years at 10% p.a. payable half-yearly is:

(a) Rs.2,222 (b) Rs.2,522
(c) Rs.2,500 (d) None of these

5.23 A person will receive Rs.5,000 six years from now. Present value at a compounded discount rate of 8 percent is:

(a) Rs.3,150.99 (b) Rs.3,170.99
(c) Rs.3,160.99 (d) Rs.3,180.99

5.24 At what rate of interest compounded semi-annually will Rs.6,000 amount to Rs.9,630 in 8 years?

(a) 5% (b) 6.1%
(c) 6% (d) 5.1%

5.25 The effective rate of interest corresponding to a nominal rate 3% p.a. payable half yearly is:

(a) 3.2% p.a (b) 3.25% p.a
(c) 3.0225% p.a (d) None of these

5.26 The population of a town increases every year by 2% of the population at the beginning of that year. The number of years by which the total increase of population be 40% is:

(a) 7 years (b) 10 years
(c) 17 years (app) (d) None of these

5.27 The effective rate of interest corresponding a nominal rate of 7% p.a. convertible quarterly is:

(a) 7% (b) 7.5%
(c) 5% (d) 7.18%

5.28 Osama invested Rs.8,000 for 3 years at 5% C.I in a post office. If the interest is compounded once in a year, what sum will he get after 3 years?

(a) Rs.9,261 (b) Rs.8,265
(c) Rs.9,365 (d) None of these

5.29 The compound interest on Rs.1,000 at 6% compounded semi-annually for 6 years is:

(a) Rs.425.76 (b) Rs.450.76
(c) Rs.475.76 (d) Rs.325.76

5.30 A sum of money invested at compound interest amounts to Rs.4,624 in 2 years and to Rs.4,913 in 3 years. The sum of money is:

(a) Rs.4,096 (b) Rs.4,260
(c) Rs.4,335 (d) Rs.4,360

5.31 The population of a country increases at the rate of 3% per annum. How many years will it take to double itself?

(a)	21.45 years	(b)	22.45 years
(c)	23 years	(d)	23.45 years

5.32 The number of fishes in a lake is expected to increase at a rate of 8% per year. How many fishes will be in the lake in 5 years if 10,000 fishes are placed in the lake today?

(a)	14,693 fishes	(b)	14,683 fishes
(c)	15,693 fishes	(d)	14,583 fishes

5.33 Compute effective rate of interest where nominal rate is 8% compounded quarterly?

(a)	7.24%	(b)	8.0%
(c)	8.42%	(d)	8.24%

5.34 An investor can earn 9.1% interest compounded semi-annually or 9% interest compounded monthly. Determine which option he should prefer?

(a)	Option I	(b)	Option II
(c)	Both (a) and (b)	(d)	None of these

5.35 The population of a city was 8 million on January 1, 2010. The population is growing at the exponential rate of 2 percent per year. What will the population be on January 1, 2015?

(a)	8.74 million	(b)	8.84 million
(c)	8.64 million	(d)	7.84 million

5.36 A trust fund for a child's education is being set up by a single payment so that at the end of 10 years there will be Rs.240,000. If the fund earns at the rate of 8% compounded semi-annually, amount of money should be paid into the fund initially is:

(a)	Rs.108,533	(b)	Rs.109,533
(c)	Rs.109,433	(d)	Rs.100,533

5.37 If Rs.110,000 is to grow to Rs.250,000 in ten years period, at what annual interest rate must it be invested, given that interest is compounded semi annually?

(a)	8.05%	(b)	8.25%
(c)	8.15%	(d)	8.38%

5.38 The nominal interest rate on an investment is 12 percent per year. Determine the effective annual interest rate if interest is compounded quarterly.

(a)	11.55%	(b)	12.05%
(c)	12.55%	(d)	11.55%

5.39 The nominal interest rate on an investment is 16 percent per annum. Determine the effective annual interest rate if interest is compounded quarterly.

(a)	16%	(b)	16.98%
(c)	15%	(d)	15.98%

5.40 Find out the effective rate of interest equivalent to the nominal rate of 10 percent compounded semi-annually.

(a)	10.25%	(b)	10.45%
(c)	10.35%	(d)	10.15%

5.41 A car was moving at a speed of 135 km per hour. When brakes were applied, the speed of the car reduced to 43.2 km per hour in five seconds. Find the rate of decline in the speed of the car per second, if the percentage decrease after each second was the same.

(a)	20.37%	(b)	20.74%
(c)	20.73%	(d)	20.47%

5.42 Find the effective rate of interest equivalent to nominal rate of 8% compounded monthly?

(a)	8.29%	(b)	8.20%
(c)	8.19%	(d)	8.39%

5.43 The difference between C.I and S.I on a certain sum of money invested for 3 years at 6% p.a. is Rs.110.16. The sum is:

(a)	Rs.3,000	(b)	Rs.3,700
(c)	Rs.12,000	(d)	Rs.10,000

5.44 What will be the difference in the compound interest on Rs.50,000 at 12% for one year, when the interest is paid yearly and half-yearly?

(a)	Rs.500	(b)	Rs.600
(c)	Rs.180	(d)	Rs.360

5.45 A sum of money lent at compound interest for 2 years at 20% per annum would fetch Rs.482 more, if the interest was payable half-yearly than if it was payable annually. The sum is:

(a)	Rs.10,000	(b)	Rs.20,000
(c)	Rs.40,000	(d)	Rs.50,000

5.46 The compound interest on a certain sum for 2 years at 10% per annum is Rs.525. The simple interest on the same sum for double the time at half the rate percent per annum is:

(a)	Rs.400	(b)	Rs.500
(c)	Rs.600	(d)	Rs.800

5.47 A shopkeeper sold goods worth Rs.3.0 million during 2008. If he is able to increase his sale by 15% annually, in which year he would achieve annual sale of Rs.25 million?

(a) Year 2023 (b) Year 2024
(c) Year 2021 (d) Year 2000

5.48 How much should an individual deposit now to yield Rs.600,000 at the end of five years at 9% compounded half yearly?

(a) Rs.379,965 (b) Rs.389,864
(c) Rs.386,357 (d) Rs.387,964

5.49 A person deposited Rs.100,000 in a bank for three years. The bank paid interest at the rate of 8% per annum compounded half yearly during the first year and at the rate of 12% per annum compounded quarterly during the last two years. His balance after three years is:

(a) Rs.137,013.85 (b) Rs.136,013.85
(c) Rs.147,013.85 (d) Rs.157,013.85

5.50 Mr. Rashid invested Rs.60,000 in a company but found that his investment was losing 6% of its value per annum. After two years, he decided to pull out what was left of the investment and place at 4% interest compounded twice a year. He would recover his original investment in the :

(a) 4^{th} year (b) 3^{rd} year
(c) 2^{nd} year (d) 5^{th} year

5.51 Rashid wants to obtain a bank loan. Bank A offers a nominal rate of 14% compounded monthly; Bank B a nominal rate of 14.5% compounded quarterly and bank C offers an effective rate of 14.75%. Which option he should prefer, if all other terms are same?

(a) Bank A (b) Bank B
(c) Bank C (d) Cannot be determined

5.52 A firm’s labour force is growing at the rate of 2 percent per annum. The firm now employs 500 people. How many employees is it expected to hire during the next five years?

(a) 52 employees (b) 550 employees
(c) 552 employees (d) 50 employees

5.53 The population of a country is growing exponentially at a constant rate of 2 percent per year. How much time this population will take to double itself?

(a) 31.65 years (b) 32.65 years
(c) 30.65 years (d) 34.65 years

5.54 The capital of a business grows @ 12% per annum compounded quarterly. If present capital is Rs.300,000 the capital after 12 years would be:

(a)	Rs.2,159,019	(b)	Rs.7,656,784
(c)	Rs.1,158,792	(d)	Rs.1,239,676

5.55 If annual interest rate falls from 12 to 8 percent per annum, how much more be deposited in an account to have Rs.600,000 in 5 years, if both rates are compounded semi annually?

(a)	Rs.70,000	(b)	Rs.70,300
(c)	Rs.70,600	(d)	Rs.70,900

5.56 Bank A offers 12.25% interest compounded semi-annually, on its saving accounts, while Bank B offers 12% interest compounded monthly. Which Bank offers the higher effective rate?

(a)	Bank B	(b)	Bank A
(c)	Both rates are same effectively	(d)	Cannot be determined

5.57 Find the future value of an annuity of Rs.500 for 7 years at interest rate of 14% compounded annually.

(a)	Rs.5,465.35	(b)	Rs.5,565.35
(c)	Rs.5,365.35	(d)	Rs.5,665.35

5.58 Rs.200 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of this annuity after 10th payment?

(a)	Rs.2,400	(b)	Rs.2,044
(c)	Rs.2,404	(d)	Rs.2,004

5.59 Z invests Rs.10,000 every year starting from today for next 10 years. Suppose interest rate is 8% per annum compounded annually. Future value of the annuity is:

(a)	Rs.156,654.87	(b)	Rs.157,454.87
(c)	Rs.156,555.87	(d)	Rs.156,454.87

5.60 Rs.5,000 is paid every year for ten years to pay off a loan. What is the loan amount if interest rate is 14% per annum compounded annually?

(a)	Rs.27,080.55	(b)	Rs.25,080.55
(c)	Rs.26,080.55	(d)	Rs.24,080.55

5.61 The present value of an annuity of Rs.3,000 for 15 years at 4.5% p.a. C.I. is:

(a)	Rs.23,809.41	(b)	Rs.32,218.63
(c)	Rs.32,908.41	(d)	None of these

5.62 What is the present value of Rs.15,000 received at the end of the current year & next four years if the applicable rate is 7% per annum?

(a)	Rs.61,502.96	(b)	Rs.64,502.96
(c)	Rs.62,502.96	(d)	Rs.63,502.96

5.63 M/s. ABC Limited is expected to pay Rs.18 every year on a share of its stock. What is the present value of a share if money worth is 9% compounded annually?

(a)	Rs.300	(b)	Rs.200
(c)	Rs.400	(d)	Rs.100

5.64 'A' borrows Rs.500,000 to buy a house. If he pays equal installments for 20 years and 10% interest on outstanding balance what will be the equal annual installment?

(a)	Rs.58,729.84	(b)	Rs.53,729.84
(c)	Rs.56,729.84	(d)	Rs.54,729.84

5.65 'Y' bought a TV costing Rs.13,000 by making a down payment of Rs.3,000 and agreeing to make equal annual payment for four years. How much would each payment be if the interest on unpaid amount is 14% compounded annually?

(a)	Rs.3,232.05	(b)	Rs.3,332.05
(c)	Rs.3,132.05	(d)	Rs.3,432.05

5.66 How much amount is required to be invested every year so as to accumulate Rs.300,000 at the end of 10 years if interest is compounded annually at 10%?

(a)	Rs.18,823.62	(b)	Rs.18,523.62
(c)	Rs.18,723.62	(d)	Rs.18,623.62

5.67 ABC Ltd. Wants to lease out an asset costing Rs.360,000 for a five years period. It has fixed a rental of Rs.105,000 per annum payable annually starting from the end of first year. This agreement would be favourable to the company if the interest rate which the company earns on its investments is:

(a)	Less than 14%	(b)	15%
(c)	At least 15%	(d)	14%

5.68 A loan of Rs.10,000 is to be paid back in 30 equal annual installments. The amount of each installment to cover the principal and 4% p.a. C.I. is:

(a)	Rs.587.87	(b)	Rs.597.87
(c)	Rs.578.31	(d)	None of these

5.69 A person desires to create a fund to be invested at 10% C.I. per annum to provide for a prize of Rs.300 every year. The amount he should invest is:

(a)	Rs.2,000	(b)	Rs.2,500
(c)	Rs.3,000	(d)	None of these

5.70 A firm wants to establish a library maintenance fund for a university. The firm would provide Rs.25,000 every 6 months. The fund yields a 10 percent annual rate of interest compounded semi annually. What is the initial deposit required to establish a perpetual stream of payments from the interest every 6 months after making the first payment from the principal?

(a)	Rs.525,000	(b)	Rs.526,000
(c)	Rs.525,500	(d)	Rs.525,800

5.71 A person has borrowed Rs.19,000 for a small business. The loan is for five years at an annual interest rate of 8 percent compounded quarterly. What is the amount of quarterly payments to pay back the loan?

(a)	Rs.1,361.97	(b)	Rs.1,261.97
(c)	Rs.1,461.97	(d)	Rs.1,161.97

5.72 A person deposits Rs.30,000 every six months into a retirement account. The account pays an annual interest rate of 12 percent compounded semi-annually. The value of account after 15 years would be:

(a)	Rs.2,341,746	(b)	Rs.2,371,746
(c)	Rs.2,331,746	(d)	Rs.2,351,746

5.73 A firm has set up a contingency fund yielding 16 percent interest per year compounded quarterly. The firm will be able to deposit Rs.1,000 into the fund at the end of each quarter. The value of the contingency fund at the end of 3 years is:

(a)	Rs.15,225.80	(b)	Rs.15,025.80
(c)	Rs.15,325.80	(d)	Rs.15,125.80

5.74 A Rs.680,000 loan calls for payment to be made in 10 annual installments. If the interest rate is 14% compounded annually. Annual payment to be made is:

(a)	Rs.125,365.20	(b)	Rs.130,365.20
(c)	Rs.133,365.20	(d)	Rs.135,365.20

5.75 Monthly payment necessary to pay off a loan of Rs.8,000 at 18% per annum compounded monthly in two years is:

(a)	Rs.419.40	(b)	Rs.409.40
(c)	Rs.399.40	(d)	Rs.389.40

5.76 A man agrees to pay Rs.4,500 per month for 30 months to pay off a car loan. If the interest of 18% per annum is charged monthly, the present value of car is:

(a)	Rs.108,271.27	(b)	Rs.108,171.27
(c)	Rs.108,671.27	(d)	Rs.108,071.27

5.77 A company is considering proposal of purchasing a machine either by making full payment of Rs.4,000 or by leasing it for four years requiring annual payment of Rs.1,250 or by paying Rs. 4,800 at the end of 2^{nd} year. Which course of action is preferable if the company can borrow money at 14% compounded annually?

(a)	Leasing	(b)	Full payment
(c)	Rs. 4,800 after 2 years	(d)	Either (a) or (c)

5.78 A machine with useful life of seven years costs Rs.10,000 while another machine with useful life of five years costs Rs.8,000.The first machine saves labour expenses of Rs.1,900 annually and the second one saves labour expenses of Rs.2,200 annually. Determine the preferred course of action. Assume cost of borrowing as 10% compounded per annum.

(a)	First Machine	(b)	Second Machine
(c)	Both are same	(d)	Cannot be determined

5.79 A company borrows Rs.10,000 on condition to repay it with compound interest at 5% p.a. by annual installments of Rs.1,000 each. The number of years by which the debt will be clear is:

(a)	14.2 years	(b)	10 years
(c)	12 years	(d)	11 years

5.80 Mr. X borrowed Rs.5,120 at 12½% p.a. C.I. At the end of 3 years, the money was repaid along with the interest accrued. The amount of interest paid by him is:

(a)	Rs.2,100	(b)	Rs.2,170
(c)	Rs.2,000	(d)	None of these

5.81 Mr. Dawood borrows Rs.20,000 on condition to repay it with C.I. at 5% p.a. in annual installments of Rs.2,000 each. The number of years for the debt to be paid off is:

(a)	10 years	(b)	12 years
(c)	11 years	(d)	None of these

5.82 A person invests Rs.500 at the end of each year with a bank which pays interest at 10% p.a. C.I. The amount standing to his credit one year after he has made his yearly investment for the 12^{th} time would be:

(a)	Rs.11,764	(b)	Rs.10,000
(c)	Rs.12,000	(d)	None of these

5.83 Shiraz acquired a new car worth Rs.850,000 through a leasing company. He made a down payment of Rs.200,000 and has agreed to pay the remaining amount in 10 equal semi-annual installments. The leasing company will charge interest @ 19% per annum, over the lease term. Amount of semi-annual installment and total amount of interest is:

(a)	Rs.103,623 and Rs.386,230	(b)	Rs.103,533 and Rs. 386,000
(c)	Rs.103,523 and Rs.385,230	(d)	Rs.103,554 and Rs. 385,830

5.84 Ashraf purchased a new car and made a down payment of Rs.50,000. He is further required to pay Rs.30,000 at the end of each quarter for five years. The cash purchase price of the car, if the quarterly payments include 12% interest compounded quarterly, is:

(a)	Rs.498,324.25	(b)	Rs.496,324.25
(c)	Rs.499,324.25	(d)	Rs.497,324.25

5.85 Shahab has an opportunity to invest in a fund which earns 6% profit compounded annually. How much should he invest now if he wants to receive Rs.6,000 (including principal) from the fund, at the end of each year for the next 10 years? How much interest he would earn over the period of 10 year?

(a)	Rs.44,560.52 and Rs.15,939.48	(b)	Rs.44,260.52 and Rs.15,739.48
(c)	Rs.44,760.52 and Rs.15,239.48	(d)	Rs.44,160.52 and Rs.15,839.48

5.86 A firm wants to deposit enough in an account to provide for insurance payments over the next 5 years. Payment of Rs.27,500 must be made each quarter. The account yields an 8% annual rate compounded quarterly. How much be deposited to pay all the insurance payments?

(a)	Rs.448,664.41	(b)	Rs.447,664.41
(c)	Rs.449,664.41	(d)	Rs.446,664.41

5.87 How much money must be invested in an account at the end of each quarter if the objective is to have Rs.225,000 after 10 years. The account can earn an interest rate of 9 percent per year compounded quarterly. How much interest will be earned over the period?

(a)	Rs.3,547.87 and Rs.83,895.03	(b)	Rs.3,527.87 and Rs.83,885.03
(c)	Rs.3,557.87 and Rs.83,875.03	(d)	Rs.3,537.87 and Rs.83,845.03

5.88 A home buyer made a down payment of Rs.200,000 and will make payments of Rs.75,000 each 6 months, for 15 years. The cost of fund is 10% compounded semi-annually. What would have been equivalent cash price for the house? How much will the buyer actually pay for the house?

(a) Rs.1,360,933.8 and Rs.2,440,000
(b) Rs.1,362,933.8 and Rs.2,455,000
(c) Rs.1,352,933.8 and Rs.2,450,000
(d) Rs.1,372,933.8 and Rs.2,456,000

5.89 An individual plans to borrow Rs.400,000 to buy a new car. The loan will be for 3 years at a 12 percent annual rate compounded monthly. He can pay Rs.12,500 per month during the first year. What amount would he be required to pay during the next two years in order to repay the loan?

(a)	Rs. 13,755	(b)	Rs. 13,705
(c)	Rs. 13,655	(d)	Rs. 13,605

5.90 A person calculated that by depositing Rs.12,500 each year, starting from the end of the first year, he shall be able to accumulate Rs.150,000 at the time of nth deposit if the rate of interest is 4%. The number of years in which he can accumulate the required amount is:

(a) 9 years (b) 10 years
(c) 12 years (d) 11 years

5.91 A food distributor has borrowed Rs.950,000 to buy a warehouse. The loan is for 10 years at an annual interest rate of 12 percent compounded quarterly. The amount of quarterly payments which he must make to pay back the loan and the interest he would pay is:

(a) Rs.41,199.26 & Rs.693,971.36
(b) Rs.41,299.26 & Rs.693,972.36
(c) Rs.41,099.26 & Rs.693,970.36
(d) Rs.41,399.26 & Rs.693,973.36

5.92 A firm will need Rs.300,000 at the end of 3 years to repay a loan. The firm decided that it would deposit Rs.20,000 at the start of each quarter during these 3 years into an account. The account would yield 12 percent per annum compounded quarterly during the first year. What rate of interest should it earn in the remaining 2 years to accumulate enough amount in this account to pay the loan at the end of 3 years?

(a) 13.4% (b) 13.8%
(c) 14.2% (d) 14.6%

5.93 A machine costs a company Rs.1,000,000 & its effective life is estimated to be 20 years. If the scrap is expected to realize Rs.50,000 only. The sum to be invested every year at 13.25% compounded annually for 20 years to replace the machine which would cost 30% more than its present value is:

(a) Rs.14,797.07 (b) Rs.14,897.07
(c) Rs.14,697.07 (d) Rs.14,997.07

5.94 To clear a debt, a person agrees to pay Rs.1,000 now, another Rs.1,000 a year from now and another Rs.1,000 in two years. If the future payments are discounted at 8% compounded quarterly, what is the present value of these payments?

(a) Rs.2,777.41 (b) Rs.2,760.41
(c) Rs.2,767.41 (d) Rs.2,762.41

5.95 An equipment is bought for Rs.2,000 as down payment & a monthly installment of Rs.400 each for one year. If money worth 12% compounded monthly, what is the cash price of the equipment?

(a) Rs.6,602.03 (b) Rs.6,502.03
(c) Rs.6,402.03 (d) Rs.6,302.03

CHAPTER 6: FINANCIAL MATHEMATICS: DISCOUNTING

Problems 6.1–6.2: Dawood has to repay a loan along with interest, three years from now. The amount payable after three years is Rs. 428,000. The amount of loan presently if interest rate is 8 % compounded:

6.1 semi-annually is:

(a) Rs. 345,161 (b) Rs. 339,760
(c) Rs. 338,254 (d) Rs. 336,421

6.2 quarterly is:

(a) Rs. 329,760 (b) Rs.337,475
(c) Rs. 341,475 (d) Rs.335,475

6.3 The banker's interest to the nearest paisa's. Principal: Rs.2500; Rate: 9%; Time 180 days: Interest is:

(a) Rs.104.32 (b) Rs.109.75
(c) Rs.112.50 (d) Rs.110.96

6.4 The maturity value of a loan of Rs.2,800 after three years. The loan carries a simple interest rate of 7.5% per year is:

(a) Rs.3,429 (b) Rs.3,430
(c) Rs.3,431 (d) Rs.3,440

6.5 To increase present value, the discount rate should be adjusted:

(a) Upward (b) Downward
(c) Not relevant (d) Will depend on time period

6.6 A borrower has agreed to pay Rs.10,000 in 9 months at 10% simple interest. How much did this borrower receive?

(a) Rs.9,090 (b) Rs.9,250
(c) Rs.9,500 (d) Rs.9,302

6.7 Bashir owes Rs.50,000 to Arshad due to a court decision. The money must be paid in 10 months with no interest. Suppose Bashir wishes to pay the money now. What amount should Arshad be willing to accept? Assume simple interest of 8% per annum.

(a) Rs.45,875 (b) Rs.47,875
(c) Rs.46,875 (d) Rs.46,575

6.8 Mr. Junaid received Rs.48,750 in cash as the proceeds of a 90 day loan from a bank which charges 10% simple interest. The amount he will have to pay on the maturity date is:

(a) Rs.49,969 (b) Rs.50,000
(c) Rs.47,548 (d) Rs.53,625

6.9 Zain has purchased a motor cycle worth Rs. 40,000 from his friend who has given him the following options:

(a) Pay Rs. 52,000 at the end of four years
(b) Pay Rs.12,000 annually at the end of next 4 years
(c) Pay Rs. 16,000 annually at the end of next 3 years
(d) Pay the full amount now

Select the best option if Zain's cost of funds is 10%.

6.10 Saleem has purchased an investment certificate having a face value of Rs. 50,000. It carries interest at the rate of 12% payable annually and would mature after 4 years. For how much can Saleem sell this investment to a person whose required rate of return is 10%.

(a) Rs. 44,643 (b) Rs. 60,000
(c) Rs. 53,170 (d) Rs. 50,543

CHAPTER 7: LINEAR PROGRAMMING

7.1 (i) An employer recruits experienced (x) and fresh workmen (y) for his firm under the condition that he cannot employ more than 9 people, x and y can be related by the inequality:

(a) $x + y \neq 9$
(b) $x + y \leq 9,\ x \geq 0,\ y \geq 0$
(c) $x + y \geq 9,\ x \geq 0,\ y \geq 0$
(d) None of these

7.1 (ii) On the average, an experienced person does 5 units of work while a fresh recruit does 3 units of work daily and the employer has to maintain an output of at least 30 units of work per day. This situation can be expressed as:

(a) $5x + 3y \leq 30$
(b) $5x + 3y > 30$
(c) $5x + 3y \geq 30,\ x \geq 0,\ y \geq 0$
(d) None of these

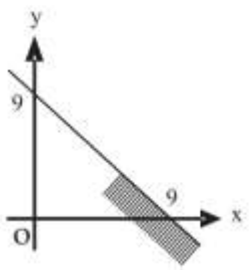
7.1 (iii) The rules and regulations demand that the employer should employ not more than 5 experienced hands to 1 fresh one. This fact can be expressed as:

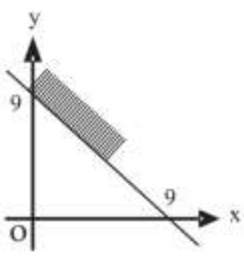
(a) $y \geq x/5$
(b) $5y \leq x$
(c) $x > 5y$
(d) None of these

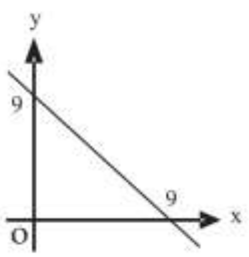
7.1 (iv) The union however forbids him to employ less than 2 experienced person to each fresh person. This situation can be expressed as:

(a) $x \leq y/2$
(b) $y \leq x/2$
(c) $y \geq x/2$
(d) $x > 2y$

7.2 The graph to express the inequality $x + y \leq 9$ is:

(a) 

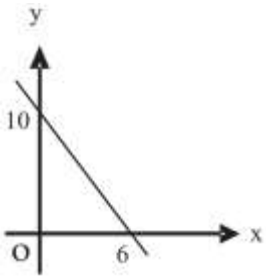
(b) 

(c) 

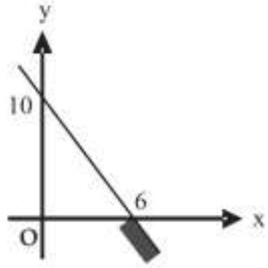
(d) None of these

7.3 The graph to express the inequality $5x + 3y \geq 30$ is:

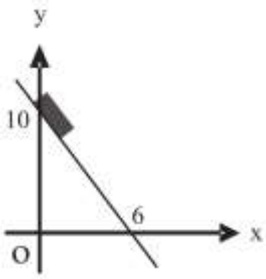
(a)



(b)



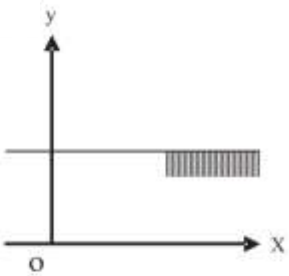
(c)



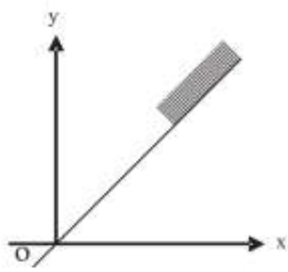
(d) None of these

7.4 The graph to express the inequality $y \leq \left(\frac{1}{2}\right)$ x is indicated by:

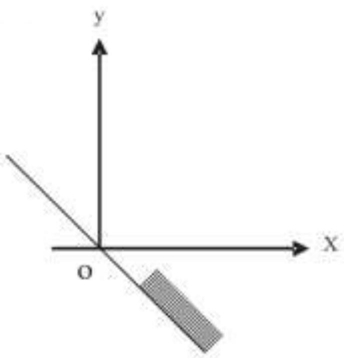
(a)



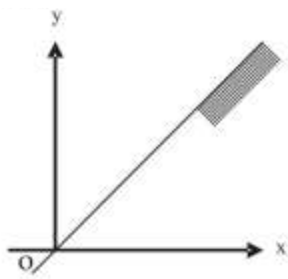
(b)



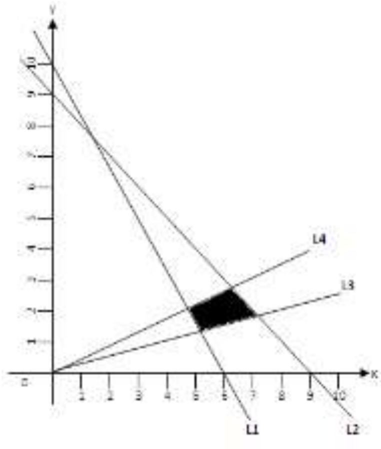
(c)



(d)



7.5



L1: $5x + 3y = 30$, L2: $x + y = 9$, L3: $y = x/3$, L4: $y = x/2$

The common region (shaded part) shown in the diagram refers to:

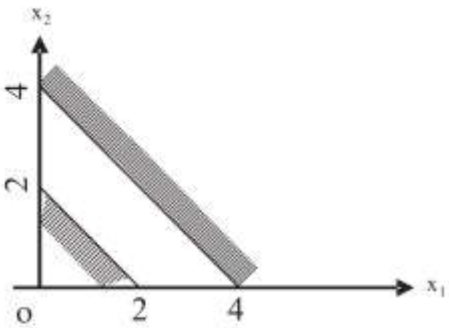
(a) $5x + 3y \leq 30$
$x + y \leq 9$
$y \leq 1/5x$
$y \leq x/2$

(b) $5x + 3y \geq 30$
$x + y \leq 9$
$y \geq x/3$
$y \leq x/2$
$x \geq 0, y \geq 0$

(c) $5x + 3y \geq 30$
$x + y \geq 9$
$y \leq x/3$
$y \geq x/2$
$x \geq 0, y \geq 0$

(d) None of these

7.6 The region indicated by the shading in the graph is expressed by inequalities:



(a) $x_1 + x_2 \leq 2$
$2x_1 + 2x_2 \geq 8$
$x_1 \geq 0, x_2 \geq 0$

(b) $x_1 + x_2 \leq 2$
$x_2x_1 + x_2 \leq 4$

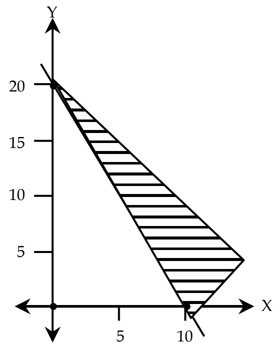
(c) $x_1 + x_2 \geq 2$
$2x_1 + 2x_2 \geq 8$

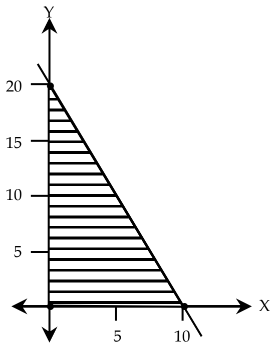
(d) $x_1 + x_2 \leq 2$
$2x_1 + 2x_2 > 8$

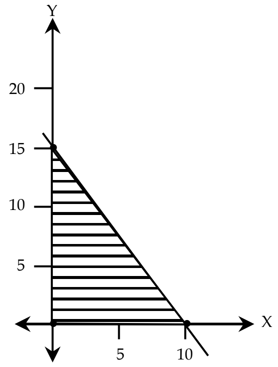
7.7 If A is the number of batsmen and B is the number of bowlers, the inequality constraint that the number of batsmen must be no more than 50% of the total players is:

(a) $A \geq B$ (b) $A \leq B$ (c) $B \leq A$ (d) $A < B$

7.8 A firm manufactures two products. The products must be processed through one department. Product A requires 6 hours per unit, and product B requires 3 hours per unit. Total production time available for the coming week is 60 hours. There is a restriction in planning the production schedule, as total hours used in producing the two products cannot exceed 60 hours. This situation can be expressed as:

(a)


(b)


(c)


(d) None of these

7.9 A manufacturer produce two products P and Q which must pass through the same processes in departments A and B having weekly production capacities of 240 hours and 100 hours respectively. Product P needs 4 hours in department A and 2 hours in department B. Product Q requires 3 hours and 1 hour respectively, in department A and B. Profit yields for product P is Rs.700 and for Q is Rs.500. The manufacturer wants to maximize the profit with the given set of inequalities. The objective function and all the constraints are:

(a) $Z = 700x + 500y$
$2x + 3y \leq 240$
$2x + y \leq 100$
$x, y \geq 0$

(b) $Z = 700x + 500y$
$4x + 3y \leq 240$
$2x + y \leq 100$
$x, y \geq 0$

(c) $Z = 700x + 500y$
$4x + 3y \leq 240$
$2x + y \leq 100$

(d) None of these

7.10 A dietician wishes to mix together two kinds of food so that the vitamin content of the mixture is at least 9 units of vitamin A, 7 units of vitamin B, 10 units of vitamin C and 12 units of vitamin D. The vitamin content per Kg. of each food is shown below:

	A	**B**	**C**	**D**
Food I:	2	1	1	2
Food II:	1	1	2	3

Assuming x units of food I is to be mixed with y units of food II the situation can be expressed as:

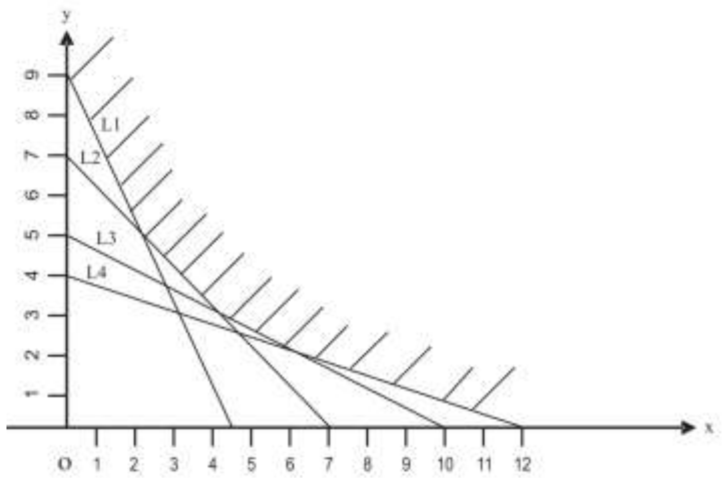
(a) $2x + y \le 9$
$x + y \le 7$
$x + 2y \le 10$
$2x + 3y \le 12$
$x > 0, y > 0$

(b) $2x + y \ge 30$
$x + y \le 7$
$x + 2y \ge 10$
$x + 3y \ge 12$

(c) $2x + y \ge 9$
$x + y \ge 7$
$x + y \le 10$
$x + 3y \ge 12$

(d) None of these

7.11 Graphs of four equations are drawn below:



L1: $2x + y = 9$, L2: $x + y = 7$, L3: $x + 2y = 10$, L4: $x + 3y = 12$

The common region (shaded part) indicated on the diagram is expressed by the set of inequalities.

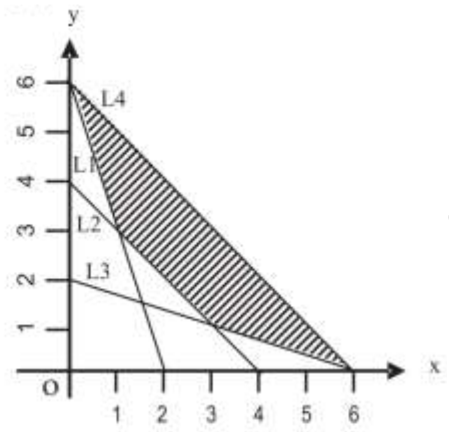
(a) $2x + y \le 9$
$x + y \ge 7$
$x + 2y \ge 10$
$x + 3y \ge 12$

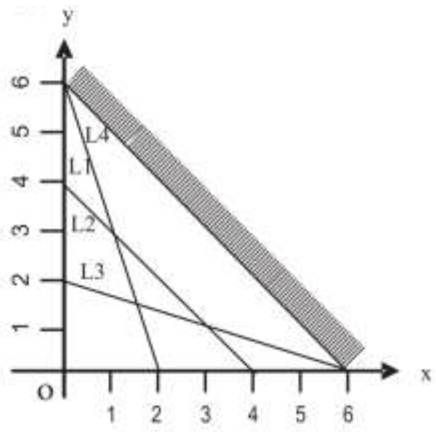
(b) $2x + y \ge 9$
$x + y \le 7$
$x + 2y \ge 10$
$x + 3y \ge 12$

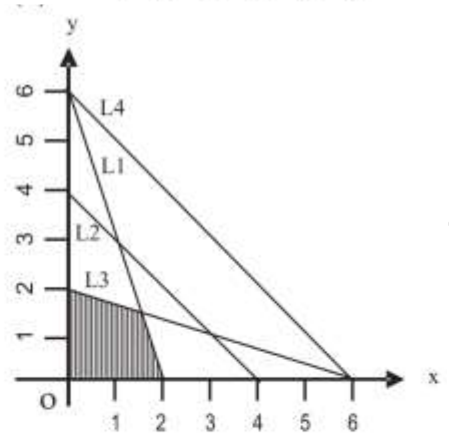
(c) $2x + y \le 9$
$x + y \ge 7$
$x + 2y \ge 10$
$x + 3y \ge 12$
$x \ge 0, y \ge 0$

(d) None of these

7.12 The common region satisfied by the inequalities L1: $3x + y \geq 6$, L2: $x + y \geq 4$, L3: $x + 3y \geq 6$ and L4: $x + y \leq 6$ is indicated by:

(a) 

(b) 

(c) 

(d) None of these

7.13 A firm makes two types of products: Type A and Type B. The profit on product A is Rs.20 each and that on product B is Rs.30 each. Both types are processed on three machines M1, M2 and M3. The time required in hours by each product and total time available in hours per week on each machine are as follow:

Machine	Product A	Product B	Available Time
M1	3	3	36
M2	5	2	50
M3	2	6	60

The constraints can be formulated taking x_1 = number of units A and x_2 = number of unit of B as:

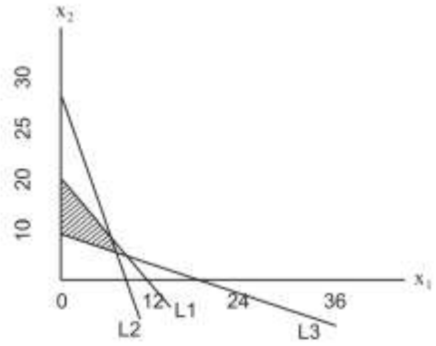
(a) $x_1 + x_2 \leq 12$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \leq 60$

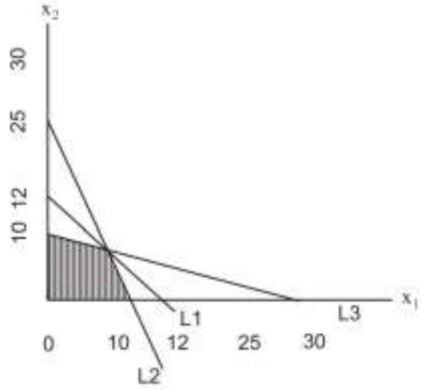
(b) $3x_1 + 3x_2 \geq 36$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \geq 60$
$x_1 \geq 0, x_2 \geq 0$

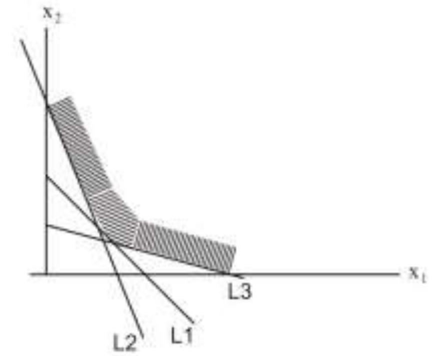
(c) $3x_1 + 3x_2 \leq 36$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \leq 60$
$x_1 \geq 0, x_2 \geq 0$

(d) None of these

7.14 The set of inequalities L1: $x_1 + x_2 \leq 12$, L2: $5x_1 + 2x_2 \leq 50$, L3: $x_1 + 3x_2 \leq 30$, $x_1 \geq 0$ and $x_2 \geq 0$ is represented by:

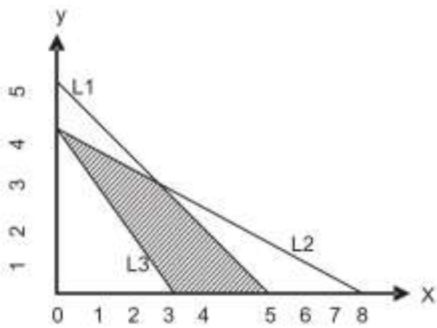
(a)


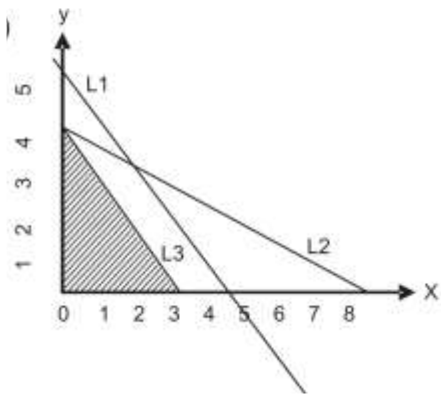
(b)


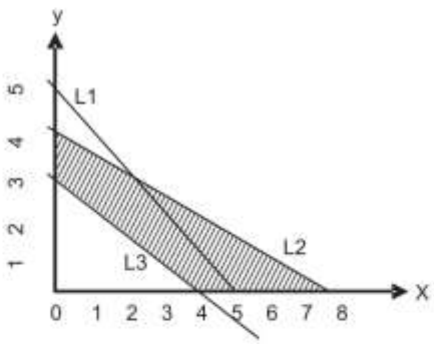
(c)


(d) None of these

7.15 The common region satisfying the set of inequalities $x \geq 0$, $y \geq 0$, L1: $x + y \leq 5$, L2: $x + 2y \leq 8$ and L3: $4x + 3y \geq 12$ is indicated by:

(a)


(b)


(c)


(d) None of these

7.16 A manufacturer produces two products X_1 and X_2. Resources available for the production of these two items are restricted to 200 support staff hours, 320 machine hours and 280 labour hours. X_1 requires for its production 1 support staff hour, 1 machine hour and 2 labour hours. X_2 requires 1 support staff hour, 2 machine hours and 0.8 labour hour. X_1 yields Rs.300 profit per unit and X_2 yields Rs.200 profit per unit. The manufacturer wants to determine the profit maximizing weekly output of each product while operating within the set of resource limitations. Situation of the above data in the form of equations and inequalities is:

(a) $Z = 300x + 200y$
$x + y \leq 200$
$x + 2y \leq 320$
$2x + 0.8y \leq 280$
$x \geq 0,\ y \geq 0$

(b) $Z = 300x + 200y$
$x + y \leq 200$
$3x + 2y \leq 320$
$2x + 0.8y \leq 280$
$x \geq 0,\ y \geq 0$

(c) $Z = 300x + 200y$
$x + y \leq 200$
$x + 2y \leq 320$
$2x + 0.8y \leq 280$

(d) None of these

7.17 A factory is planning to buy some machine to produce boxes and has a choice of B-1 or B-9 machines. Rs.9.6 million has been budgeted for the purchase of machines. B-1 machines costing Rs.0.3 million each require 25 hours of maintenance and produce 1,500 units a week. B-9 machines costing Rs.0.6 million each require 10 hour of maintenance and produce 2,000 units a week. Each machine needs 50 square meters of floor area. Floor area of 1,000 square meters and maintenance time of 400 hours are available each week. Since all production can be sold, the factory management wishes to maximize out put. Situation of above data in the form of objective function and constraints is:

(a) $Z = 1500x + 2000y$
$0.3x + 0.6y \geq 9.6$
$25x + 10y \leq 400$
$50x + 50y \leq 1000$
$x \geq 0,\ y \geq 0$

(b) $Z = 1500x + 2000y$
$0.3x + 0.6y \geq 9.6$
$25x + 10y \leq 400$
$50x + 50y \geq 1000$
$x \geq 0,\ y \geq 0$

(c) $Z = 1500x + 2000y$
$0.3x + 0.6y \leq 9.6$
$25x + 10y \leq 400$
$50x + 50y \leq 1000$
$x \geq 0,\ y \geq 0$

(d) $Z = 1500x + 2000y$
$0.3x + 0.6y \leq 9.6$
$25x + 10y \geq 400$
$50x + 50y \leq 1000$
$x \geq 0,\ y \geq 0$

CHAPTER 8: CALCULUS: DIFFERENTIATION

8.1 If $f(x) = e^{ax^2+bx+c}$ then $f'(x)$ is:

(a) e^{ax^2+bx+c}
(b) $e^{ax^2+bx+c}(2ax+b)$
(c) $2ax + b$
(d) None of these

8.2 If $y = \frac{1}{\sqrt{x}}$ then $\frac{dy}{dx}$ is equal to:

(a) $\frac{1}{2x\sqrt{x}}$
(b) $\frac{-1}{x\sqrt{x}}$
(c) $-\frac{1}{2x\sqrt{x}}$
(d) None of these

8.3 The differential coefficients of $(x^2 + 1)/x$ is:

(a) $1 + 1/x^2$
(b) $1 – 1/x^2$
(c) $1/x^2$
(d) None of these

8.4 If $y = e^{\sqrt{2x}}$ then $\frac{dy}{dx}$ is equal to:

(a) $\frac{e^{\sqrt{2x}}}{\sqrt{2x}}$
(b) $e^{\sqrt{2x}}$
(c) $\frac{e^{\sqrt{2x}}}{2\sqrt{x}}$
(d) None of these

8.5 Derivative of $y = \frac{1}{x + 3}$ is:

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

8.6 The gradient of the curve $y = 2x^3 – 3x^2 – 12x + 8$ at $x = 0$ is:

(a) –12
(b) 12
(c) 0
(d) None of these

8.7 The derivative of $y = \sqrt{x+1}$ is:

(a) $1/\sqrt{x+1}$
(b) $-1/\sqrt{x+1}$
(c) $1/2\sqrt{x+1}$
(d) None of these

8.8 If $f(x) = \dfrac{x^2+1}{x^2-1}$ then $f'(x)$ is:

(a) $-4x/(x^2-1)^2$ (b) $4x/(x^2-1)^2$
(c) $x/(x^2-1)^2$ (d) None of these

8.9 The derivative of $\dfrac{3-5x}{3+5x}$ is:

(a) $30/(3 + 5x)^2$ (b) $1/(3 + 5x)^2$
(c) $-30/(3 + 5x)^2$ (d) None of these

8.10 If $y = \dfrac{e^x+1}{e^x-1}$ then $\dfrac{dy}{dx}$ is equal to:

(a) $\dfrac{-2e^x}{(e^x-1)^2}$ (b) $\dfrac{2e^x}{(e^x-1)^2}$
(c) $\dfrac{-2}{(e^x-1)^2}$ (d) None of these

8.11 $f(x) = x^2/e^x$ then $f'(1)$ is equal to:

(a) $-1/e$ (b) $1/e$
(c) e (d) None of these

8.12 If $rt = 3 + t^2$, then dr/dt = ________.

(a) $2t$ (b) $3 + 2t$
(c) $2t - 3t - 2$ (d) None of these

8.13 If $y = \dfrac{U}{U+1}$ and $U = 3x^2 - 1$ then $\dfrac{dy}{dx}$ at $x = 1$ is:

(a) 3/2 (b) –2/3
(c) 2/3 (d) –3/2

8.14 If $y = x(x - 1)(x - 2)$ then $\dfrac{dy}{dx}$ is:

(a) $3x^2 - 6x + 2$ (b) $-6x + 2$
(c) $3x^2 + 2$ (d) None of these

8.15 Given $x = at^2$, $y = 2at$; $\dfrac{dy}{dx}$ is calculated as:

(a) t (b) $-1/t$
(c) $1/t$ (d) None of these

8.16 If $y = \dfrac{e^{3x} - e^{2x}}{e^{3x} + e^{2x}}$, then $\dfrac{dy}{dx}$ is equal to:

(a) $2e^{5x}$
(b) $1/(e^{5x} + e^{2x})^2$
(c) $e^{5x}/(e^{5x} + e^{2x})$
(d) None of these

8.17 Let $f(x) = \left(\sqrt{x} + \dfrac{1}{\sqrt{x}}\right)^2$ then $f'(2)$ is equal to:

(a) 3/4
(b) 1/2
(c) 0
(d) None of these

8.18 If f(x) = x^2 – 6x + 8 then $f'(5) - f'(8)$ is equal to:

(a) $f'(2)$
(b) $3f'(2)$
(c) $2f'(2)$
(d) None of these

8.19 If $f(x) = \dfrac{4-2x}{2+3x+3x^2}$ then the values of x for which $f'(x) = 0$ is:

(a) $2\left(1 \pm \sqrt{\dfrac{5}{3}}\right)$
(b) $(1 \pm \sqrt{3})$
(c) 2
(d) None of these

8.20 If f(x) = $\sqrt{x} + \dfrac{1}{\sqrt{x}}$, the expression $\dfrac{x-1}{2x\sqrt{x}} - f'(x)$ is equal to:

(a) 0
(b) –1
(c) 1
(d) 2

8.21 For the function y = x^2, the average rate of change as x change from 5 to 10 is:

(a) 15
(b) 14
(c) 30
(d) 20

8.22 If the function $y = \dfrac{2}{3x^2} - \dfrac{x}{3} + \dfrac{4}{5} + \dfrac{x+1}{x}$ then dy/dx is:

(a) $-\dfrac{4}{3x^3} + \dfrac{1}{3} - \dfrac{1}{x^2}$
(b) $-\dfrac{4}{3x^3} - \dfrac{1}{3} - \dfrac{1}{x^2}$
(c) $-\dfrac{4}{3x^3} - \dfrac{1}{3} + \dfrac{1}{x^2}$
(d) $\dfrac{4}{3x^3} - \dfrac{1}{3} - \dfrac{1}{x^2}$

8.23 For the following function y = $\dfrac{7x^2}{x-1}$, the second derivative $\left[\dfrac{d^2y}{dx^2}\right]$ at x = 3 is:

(a) 7/4
(b) –4/35
(c) 4/35
(d) –35/4

8.24 If y = xe^y, then dy/dx is:

(a) $\frac{-y}{x(1-y)}$ (b) $\frac{y}{x(1-y)}$

(c) $\frac{y}{x(1-x)}$ (d) $\frac{y}{x(1+y)}$

8.25 If $y = xe^x \ln x$, then dy/dx is:

(a) $y + e^x(1 - \ln x)$ (b) $y - e^x(1 + \ln x)$

(c) $y + e^x(1 + \ln x)$ (d) $y - e^x(1 - \ln x)$

CHAPTER 9: CALCULUS: TURNING POINTS, MAXIMA, MINIMA AND POINTS OF INFLECTION

9.1 The total cost function of a product is defined by:

TC = $\frac{Q^3}{3}$ – $8Q^2$ + 120 Q + 10,000, the marginal cost function is:

(a) MC = Q^2 + 16Q + 120 (b) MC = Q^2 – 16Q – 120

(c) MC = Q^2 – 16Q + 120 (d) MC = Q^2 – 16Q + 130

9.2 The marginal cost of production (in Rs.) is $3 + \frac{x}{3000} + e^{-0.03x}$, where x denotes the number of units. The cost of producing 100th unit is:

(a) Rs. 3.12 (b) Rs. 3.08

(c) Rs. 3.04 (d) Rs. 3.00

9.3 A company produces x units of output at a total cost of 1/3 x^3 – $18x^2$ + 160x. Output at which average cost is equal to marginal cost is:

(a) 24 (b) 26

(c) 28 (d) 27

9.4 Indicate the correct answer for the function. If f(x) = x^3 – $3x^2$ + 3x + 7, then f(x) is:

(a) Maximum (b) Minimum

(c) Neither maximum nor minimum (d) Not possible

9.5 Average production cost per unit for a firm is AC = $0.02Q^2$ – 60Q, where Q is quantity produced. The rate of change of AC at the production point Q = 1,200 is:

(a) 0 (b) 12

(c) –13 (d) –12

9.6 Given total cost functions: TC = 31 + 24Q – 5.5 Q^2 + $\frac{Q^3}{3}$. The relative minimum or maximum for the function is:

(a) 2 units (b) 3 units
(c) 5 units (d) 4 units

9.7 The cost function for manufacturing a product is given as:

C(x) = 150,000 + 20x – $\frac{x^2}{10,000}$, the marginal cost of producing 50,001st unit is:

(a) Rs.9.99 (b) Rs.10.99
(c) Rs.8.99 (d) Rs.7.99

9.8 A firm has found from past experience that its profit in terms of number of units x produced is given by $P(x) = \frac{-x^3}{3} + 729 - 25{,}000$. The value of x that maximizes the profit is:

(a) 25 units (b) 26 units
(c) 28 units (d) 27 units

9.9 A company determines that the marginal cost of producing x units of a particular commodity during a one-day operation is 16x – 1,591, where the production cost is in rupees. The selling price of a commodity is fixed at Rs.9 per unit and the fixed cost is Rs.1,800 per day. The maximum profit that can be obtained in a one-day operation is:

(a) Rs.78,200 (b) Rs.78,300
(c) Rs.78,400 (d) Rs.78,500

9.10 The total cost C(x) of a firm is C(x) = $0.0005x^3 - 0.7x^2 - 30x + 3{,}000$, where x is the output. The value of x; for which MVC = AVC is: (where VC denotes the variable cost, MVC denotes marginal variable cost and AVC denotes average variable cost)

(a) Rs.750 (b) Rs.800
(c) Rs.700 (d) Rs.850

9.11 Maximum or minimum values of the function f(x) = $(1 – x)^2 e^x$ is:

(a) Minimum value at x = –1; maximum value x = 1
(b) Minimum value at x = 1; maximum value x = –2
(c) Minimum value at x = 1; maximum value x = –1
(d) None of these

9.12 The cost of producing x units of balloons is given by C(x) =140 + 0.125x + $0.0005x^2$. If the revenue function is determined by R(x) = 3x, maximum profit is:

(a) Rs.3,892.81 (b) Rs.3,792.81
(c) Rs.3,992.81 (d) Rs.3,692.81

9.13 For a particular process, the average cost is given by C = 80 – 12x + x^2, where C is the average cost (per unit) and x the number of units produced. The minimum value of the average cost and the number of units to be produced are:

(a) 6 and 43 (b) 5 and 44
(c) 6 and 44 (d) 4 and 44

9.14 A computer software company wishes to start the production of floppy disks. It was observed that the company had to spend Rs.2 lakhs for the technical information. The cost of setting up the machine is Rs.88,000 and the cost of producing each unit is Rs.30, while each floppy could be sold at Rs.45. The total cost function for producing x floppies is:

(a) C(x) = –30x + 288,000 (b) C(x) = 30x – 288,000
(c) C(x) = –30x – 288,000 (d) C(x) = 30x + 288,000

9.15 The cost function of a company is given by $C(x) = 100x - 8x^2 + \frac{x^3}{3}$, where x denotes the output. The level of output at which marginal cost is minimum is:

(a) x = 7 (b) x = 8
(c) x = 6 (d) x = 9

9.16 For f(x) = $-2x^3 + 9x^2 + 20x + 50$, the point of inflexion is:

(a) $\left(\frac{3}{2}, 92.5\right)$ (b) $\left(\frac{3}{2}, 93.5\right)$
(c) $\left(\frac{5}{2}, 93.5\right)$ (d) $\left(\frac{1}{2}, 93.5\right)$

9.17 M/s. ABC Technologies know that the relationship between their weekly sales quantity Q and weekly profit PR is expressed by the following function PR = $-0.002Q^2 + 10Q - 4000$, the profit maximizing quantity is:

(a) 2,500 units (b) 25 units
(c) 250 units (d) 25,000 units

9.18 The co-ordinates of the relative minima and/or maxima of the following function $y = e^{2x} + 2e^x - 4x$ is:

(a) (–3, 0) minimum (b) (3, 0) minimum
(c) (0, –3) minimum (d) (0, 3) minimum

9.19 The demand for the product of a company varies with the prices that the company charges for the product. The firm estimates that annual total revenue R (in thousand Rupees) is a function of the price P (in Rupees).Specifically, $R = f(p) = -50p^2 + 500p$. The price that should be charged in order to maximize total revenue is:

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

9.20 A Company has introduced a new product whose annual demand will depend on price charged. The demand of the product is represented by the function q = 100,000 – 200p, (where p = price and q = quantity demanded annually). Studies indicate that total cost of producing q unit is represented by TC = 150,000 + 100q + 0.003 q^2 quantity to be produced to maximize profit is:

(a) 25 units
(b) 25,000 units
(c) 2,500 units
(d) 250 units

CHAPTER 10: MATRICES AND DETERMINANTS

10.1 Order of $\begin{bmatrix} \sqrt{3}+2 \\ \sqrt{5}+7 \end{bmatrix}$ is:

(a) 2×2
(b) 2×1
(c) 1×1
(d) 1×2

10.2 $\begin{bmatrix} 5 & 0 \\ 0 & 7 \end{bmatrix}$ is a ________ matrix.

(a) Square
(b) Rectangle
(c) Diagonal
(d) None of these

10.3 In $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ the element of 1st row and 2nd column is:

(a) d
(b) c
(c) b
(d) a

10.4 A null matrix is always a square matrix.

(a) Not necessarily
(b) Always
(c) No
(d) None of these

10.5 If A = $(-5 \quad 2)$ and 2A + 3B = $(-7 \quad 4)$ then B is equal to:

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

10.6 The value of 'a' if the following matrix is singular: $\begin{bmatrix} -4 & 2 \\ -6 & a \end{bmatrix}$

(a) 3
(b) 1/3
(c) –1/3
(d) –3

10.7 The co-factor, A_{23} of the matrix $A = \begin{bmatrix} 5 & -2 & 7 \\ 6 & 1 & -9 \\ 4 & -3 & 8 \end{bmatrix}$ is:

(a) 23 (b) 7
(c) –23 (d) –7

10.8 Which of the following determinants is not 0?

(a) $\begin{vmatrix} 1 & 2 & 3 \\ 3 & 6 & 9 \\ 3 & 2 & 1 \end{vmatrix}$ (b) $\begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{vmatrix}$

(c) $\begin{vmatrix} 1 & 0 & 3 \\ -1 & 0 & 1 \\ 2 & 0 & 8 \end{vmatrix}$ (d) $\begin{vmatrix} 1 & 2 & 2 \\ 2 & 2 & 1 \\ 5 & 8 & 7 \end{vmatrix}$

10.9 If $A = \begin{pmatrix} -2 & 3 \\ -2 & 4 \end{pmatrix}$, which of the following is false?

(a) $A^2 = \begin{pmatrix} -2 & 6 \\ -4 & 10 \end{pmatrix}$ (b) $A^{-1} = \begin{pmatrix} -2 & 3/2 \\ -1 & 1 \end{pmatrix}$

(c) $|A| = -2$ (d) None of these

10.10 If the order of matrix A is $m \times p$. And the order of B is $p \times n$. Then the order of AB is:

(a) $n \times p$ (b) $m \times p$
(c) $m \times n$ (d) $n \times m$

10.11 If A and B are matrices, then which from the following is true?

(a) $A + B \neq B + A$ (b) $(A^t)^t \neq A$
(c) $AB \neq BA$ (d) all are true

10.12 $(AB)^t = ?$

(a) B^tA^t (b) A^tB^t
(c) AB (d) BA

10.13 The matrix $A = \begin{bmatrix} 9 & 0 \\ 0 & 9 \end{bmatrix}$ is a:

(a) Scalar matrix (b) Identity matrix
(c) Even matrix (d) Odd matrix

10.14 The transpose of the matrix $A=\begin{bmatrix}3 & 1\\ 2 & -7\\ 6 & -4\end{bmatrix}$ is:

(a) $\begin{bmatrix}3 & 2 & 6\\ 1 & -7 & -4\end{bmatrix}$ (b) $\begin{bmatrix}1 & -7 & -4\\ 3 & 2 & 6\end{bmatrix}$

(c) $\begin{bmatrix}2 & 3 & 6\\ 1 & -7 & -4\end{bmatrix}$ (d) $\begin{bmatrix}1 & -7 & -4\\ 2 & 3 & 6\end{bmatrix}$

10.15 An "Identity Matrix" containing four Columns and four Rows is:

(a) $\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{bmatrix}$

(c) $\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 0\end{bmatrix}$ (d) $\begin{bmatrix}0 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{bmatrix}$

10.16 If A, B and C are matrices with orders 3×3, 2×3 and 4×2 respectively, how many of the following matrix calculations are possible?

4B, A + B, $3B^T$ + C, AB, B^TA, $(CB)^T$, CBA

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

10.17 If $A=\begin{bmatrix}3 & -1 & 4\\ 0 & 2 & 1\end{bmatrix}$ and $B=\begin{bmatrix}4 & 0 & 7\\ 2 & 5 & 1\end{bmatrix}$, the matrix X which satisfies the matrix equation $2A + X^T = 3B$ is:

(a) $\begin{bmatrix}18 & -2 & 29\\ 6 & 19 & 5\end{bmatrix}$ (b) $\begin{bmatrix}6 & 6\\ 2 & 11\\ 13 & 1\end{bmatrix}$

(c) $\begin{bmatrix}6 & 2 & 13\\ 6 & 11 & 1\end{bmatrix}$ (d) $\begin{bmatrix}18 & 6\\ -2 & 19\\ 29 & 5\end{bmatrix}$

10.18 Which one of the following matrices has an inverse which is not listed?

$A=\begin{bmatrix}1 & 1\\ 1 & 0\end{bmatrix}$, $B=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, $C=\begin{bmatrix}0 & 1\\ 1 & -1\end{bmatrix}$, $D=\begin{bmatrix}1 & -1\\ 1 & 0\end{bmatrix}$, $E=\begin{bmatrix}-1 & 0\\ 0 & 1\end{bmatrix}$

(a) B (b) E
(c) A (d) D

10.19 If $A = \begin{bmatrix} 10 & 3 & -4 \\ -1 & -4 & 9 \end{bmatrix}$, $B = \begin{bmatrix} -8 & 1 & -5 \\ 1 & 4 & 9 \end{bmatrix}$ then A + B is:

(a) $\begin{bmatrix} 11 & -5 & 5 \\ 3 & -3 & 4 \end{bmatrix}$

(b) $\begin{bmatrix} 10 & 3 & -4 \\ -1 & -4 & 9 \\ -8 & 1 & -5 \\ 1 & 4 & 9 \end{bmatrix}$

(c) $\begin{bmatrix} 2 & 4 & -9 \\ 0 & 0 & 18 \end{bmatrix}$

(d) $\begin{bmatrix} -8 & 1 & -5 \\ 1 & 4 & 9 \\ 10 & 3 & -4 \\ -1 & -4 & 9 \end{bmatrix}$

10.20 If $A = \begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$ and $AB = \begin{pmatrix} 1 & 3 & 2 \\ 1 & 1 & 1 \end{pmatrix}$, then:

(a) $B = \begin{pmatrix} -1 & 1 \\ 2 & 0 \end{pmatrix}$

(b) $B = \begin{pmatrix} -1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix}$

(c) $B = \begin{pmatrix} -1 & 2 \\ 1 & 0 \\ 0 & 1 \end{pmatrix}$

(d) B is not determined

10.21 The following two matrices are equal. The values of p, q, r and n are:

$A = \begin{bmatrix} p & q \\ 1 & r \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 \\ n & 0 \end{bmatrix}$

(a) p = 2, q = 3, n = 1, r = 0

(b) p = 1, q = 4, n = 1, r = 0

(c) p = 2, q = 4, n = 1, r = 0

(d) p = 2, q = 4, n = 1, r = 1

10.22 A clothing store discounts sale price of all its shirts, trousers and jackets by 20%. If V_1 is the sale value of stock in its 3 branches before the discount, the value V_2 after the discount, when:

$$V_1 = \begin{bmatrix} 50,000 & 45,000 & 60,000 \\ 100,000 & 120,000 & 75,000 \\ 80,000 & 90,000 & 10,000 \end{bmatrix}$$

(a) $\begin{bmatrix} 40,000 & 36,000 & 48,000 \\ 80,000 & 96,000 & 60,000 \\ 72,000 & 64,000 & 8,000 \end{bmatrix}$

(b) $\begin{bmatrix} 48,000 & 36,000 & 40,000 \\ 80,000 & 96,000 & 60,000 \\ 64,000 & 72,000 & 8,000 \end{bmatrix}$

(c) $\begin{bmatrix} 40,000 & 36,000 & 48,000 \\ 80,000 & 96,000 & 60,000 \\ 64,000 & 72,000 & 8,000 \end{bmatrix}$

(d) $\begin{bmatrix} 40,000 & 36,000 & 48,000 \\ 80,000 & 60,000 & 96,000 \\ 64,000 & 72,000 & 8,000 \end{bmatrix}$

10.23 If $\begin{bmatrix} 5 \\ 2 \end{bmatrix} = [x]\begin{bmatrix} 15 \\ y \end{bmatrix}$ then x and y are:

(a) x = 2/3, y = 6
(b) x = 1/3, y = 6
(c) x = 1/3, y = 4
(d) x = 6, y = 1/3

10.24 The determinant of the matrix $\begin{bmatrix} 5 & -2 & 3 \\ 4 & -1 & -5 \\ 6 & 7 & 9 \end{bmatrix}$ is:

(a) 340
(b) 364
(c) 76
(d) 100

10.25 Given that $M = \begin{bmatrix} -19 & -10 \\ -29 & -20 \end{bmatrix}$ then M^{-1}, if it exists is:

(a) $\begin{bmatrix} -\frac{2}{9} & \frac{1}{9} \\ \frac{29}{90} & -\frac{19}{90} \end{bmatrix}$

(b) $\begin{bmatrix} -\frac{2}{9} & -\frac{1}{9} \\ -\frac{29}{90} & -\frac{19}{90} \end{bmatrix}$

(c) $\begin{bmatrix} -\frac{1}{20} & \frac{1}{10} \\ \frac{1}{19} & -\frac{1}{19} \end{bmatrix}$

(d) No inverse possible

10.26 Given that $M = \begin{bmatrix} 1 & 10 & 0 \\ 2 & 10 & 4 \\ -4 & 0 & -8 \end{bmatrix}$ then M^{-1}, if it exists is:

(a) $\begin{bmatrix} 1 & 1/2 & -1/4 \\ 1/10 & 1/10 & 0 \\ 0 & 1/4 & 1/40 \end{bmatrix}$

(b) $\begin{bmatrix} 1 & -1 & -1/2 \\ 0 & 1/10 & 1/20 \\ -1/2 & 1/2 & 1/8 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 0 & -1/2 \\ -1 & 1/10 & 1/2 \\ -1/2 & 1/20 & -1/40 \end{bmatrix}$

(d) No solution possible

10.27 For the system of equations $\begin{bmatrix} -13 & -3 \\ -16 & -6 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -11 \\ 7 \end{bmatrix}$ x_1 & x_2 are:

(a) $x_1 = \frac{25}{6}$, $x_2 = -\frac{18}{13}$
(b) $x_1 = \frac{29}{10}$, $x_2 = -\frac{89}{10}$
(c) $x_1 = -\frac{58}{39}$, $x_2 = \frac{25}{6}$
(d) No solution possible

10.28 For the system of equations $\begin{bmatrix} 1 & 5 & 0 \\ 1 & 5 & 2 \\ -2 & 0 & -4 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 12 \\ -15 \end{bmatrix}$ x_1, x_2 and x_3 are:

(a) $x_1 = \frac{17}{2}, x_2 = -\frac{61}{10}, x_3 = \frac{7}{10}$

(b) $x_1 = -\frac{7}{2}, x_2 = \frac{9}{10}, x_3 = \frac{11}{2}$

(c) $x_1 = \frac{41}{2}, x_2 = \frac{13}{5}, x_3 = \frac{39}{4}$

(d) $x_1 = \frac{17}{5}, x_2 = -\frac{41}{10}, x_3 = \frac{13}{4}$

10.29 If $A = \begin{bmatrix} 5 & 3 & 2 \\ 0 & 4 & 1 \\ 0 & 0 & 3 \end{bmatrix}$ then $|A| = ?$

(a) 30
(b) 40
(c) 50
(d) 60

10.30 X Limited has the following sales position of its products A and B at its two centres P and Q at the end of the year:

$$Y = \begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 50 & 45 \\ 60 & 70 \end{bmatrix} \end{array}$$

If the sale for the first three months is given as:

$$Q = \begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 30 & 15 \\ 20 & 20 \end{bmatrix} \end{array}$$

The sales position for the last nine months is:

(a) $\begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 20 & 30 \\ 40 & 50 \end{bmatrix} \end{array}$

(b) $\begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 40 & 30 \\ 20 & 50 \end{bmatrix} \end{array}$

(c) $\begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 30 & 20 \\ 40 & 50 \end{bmatrix} \end{array}$

(d) $\begin{array}{c c} & \begin{array}{cc} P & Q \end{array} \\ \begin{array}{c} A \\ B \end{array} & \begin{bmatrix} 20 & 30 \\ 50 & 40 \end{bmatrix} \end{array}$

10.31 Zaid, Hamza and Talha purchased biscuits of different brands P, Q and R. Zaid purchased 10 packets of P, 7 packets of Q and 3 packets of R. Hamza purchased 4 pockets of P, 8 packets of Q and 10 packets of R. Talha purchased 4 packets of P, 7 packets of Q and 8 packets of R. If brand P costs Rs.4, Q costs Rs.5 and R costs Rs.6 each, then using matrix operation, the amount of money spent by these persons individually are:

(a) Rs.99, Rs.116 and Rs.99
(b) Rs.100, Rs.115 and Rs.99
(c) Rs.99, Rs.116 and Rs.100
(d) Rs.95, Rs.100 and Rs.99

10.32 Mr. X invested a part of his investment in 10% bond A and a part in 15% bond B. His interest income during the first year is Rs.4,000. If he invests 20% more in10% bond A and 10 % more in 15% bond B, his income during the second year increases by Rs.500. His initial investment and the new investment in bonds A and B are:

(a) x = Rs.10,000, y = Rs.20,000 and Rs.12,000, Rs.22,000
(b) x = Rs.20,000, y = Rs.10,000 and Rs.12,000, Rs.22,000
(c) x = Rs.10,000, y = Rs.10,000 and Rs.12,000, Rs.22,000
(d) x = Rs.10,000, y = Rs.20,000 and Rs.22,000, Rs.12,000

10.33 A company produces three products everyday. Their total production on a certain day is 45 tons. It is found that the production of the third product exceeds the production of the first product by 8 tons while the total combined production of the first and third product is twice that of the second product. The production level of each product is:

(a) 12, 16 and 18 tons (b) 11, 16 and 18 tons
(c) 11, 15 and 19 tons (d) 12, 15 and 20 tons

10.34 If matrix A has x rows and x + 5 columns, matrix B has y rows and 11 – y columns and both AB and BA are defined for product then x and y are:

(a) x = 5, y = 8 (b) x = 3, y = 8
(c) x = 3, y = 5 (d) x = 8, y = 3

10.35 If $X+Y=\begin{bmatrix}5 & 2\\0 & 9\end{bmatrix}$ and $X-Y=\begin{bmatrix}3 & 9\\0 & -1\end{bmatrix}$, then X and Y are:

(a) $X=\begin{bmatrix}4 & 11/2\\0 & 4\end{bmatrix}, Y=\begin{bmatrix}1 & 7/2\\0 & 5\end{bmatrix}$ (b) $X=\begin{bmatrix}4 & 11/2\\0 & 4\end{bmatrix}, Y=\begin{bmatrix}1 & -7/2\\0 & 5\end{bmatrix}$

(c) $X=\begin{bmatrix}4 & 11/2\\0 & 5\end{bmatrix}, Y=\begin{bmatrix}1 & -7/2\\0 & 5\end{bmatrix}$ (d) $X=\begin{bmatrix}1 & -7/2\\0 & 5\end{bmatrix}, Y=\begin{bmatrix}4 & 11/2\\0 & 4\end{bmatrix}$

CHAPTER 11: COLLECTION, TABULATION AND PRESENTATION OF DATA

11.1 Primary data can be collected:

(a) From newspapers (b) From State Bank
(c) By carrying out surveys (d) All of these

11.2 Any recording of information, whether it be quantitative or qualitative is called:

(a) Observation (b) Data
(c) Sample space (d) None of these

11.3 The branch of statistics devoted to the summarization and description of data is called:

(a) Statistical inference (b) Non-parametric statistics
(c) Descriptive statistics (d) None of these

11.4 Method concerned with the analysis of a subset of data leading to predictions or inferences about the entire set of data is known as:

(a) Classification of data (b) Presentation of data
(c) Inferential statistics (d) None of these

11.5 The generalisation associated with statistical inferences are always subject to:
(a) accuracy (b) Certainty
(c) uncertainty (d) None of these

11.6 The statistician is primarily concerned with:

(a) Qualitative data (b) Quantitative data
(c) Hypothesis (d) Abnormal data

11.7 The totality of the observations with which an statistician is concerned is known as:

(a) Data (b) Sampling distribution
(c) Population (d) Sample

11.8 In the field of statistical inference the statistician is interested in arriving at conclusion concerning a:

(a) Sample (b) Population
(c) Hypothesis (d) None of these

11.9 Any sampling procedure that produces inferences that consistently over estimate or consistently under estimate some characteristics is said to be:

(a) Simple random sampling (b) Systematic sampling
(c) Biased (d) None of these

11.10 In simple random sampling each unit of the population has ___________ chance of selection:

(a) equal (b) Unequal
(c) maximum (d) None of these

11.11 Statistics deals with the behaviour of:

(a) Individuals (b) Aggregates
(c) particular individual (d) None of these

11.12 A discrete variable is that which can assume:

(a) Only integral values
(b) Only fractional values
(c) Whole number as well as fraction
(d) None of these

11.13 A continuous variable is that which can assume:

(a) Only integral values
(b) Only fractional values
(c) Whole number as well as fraction
(d) None of these

11.14 Raw data, or unprocessed data or originally collected data are known as:

(a) Sample data (b) Primary data
(c) Secondary data (d) None of these

11.15 Processed or published data is known as:

(a) Sample data (b) Primary data
(c) Secondary data (d) None of these

11.16 An inquiry form comprising of a number of pertinent questions is knows as:

(a) Inquiry form (b) Data collection form
(c) Questionnaire (d) None of these

11.17 The arrangement of data according to magnitude of data is known as:

(a) Classification (b) Tabulation
(c) Array (d) None of these

11.18 The process of arranging data in groups or classes according to their resemblance or affinities is known as:

(a) Classification (b) Frequency distribution
(c) Tabulation (d) None of these

11.19 The purpose of classification and tabulation is to present data in:

(a)	Visual form	(b)	Easy to understand form
(c)	Frequency distribution	(d)	None of these

11.20 We can extract some information at a glance from:

(a)	Raw data	(b)	Frequency distribution
(c)	Primary data	(d)	None of these

11.21 Statistical measures which define the centre of a set of data are called:

(a)	Median	(b)	Measures of data
(c)	Measures of central tendency	(d)	None of these

11.22 Statistical measures which provide a measure of variability among the observations are called:

(a)	Quartiles	(b)	Measures of dispersion
(c)	Co-efficient of variation	(d)	None of these

11.23 Any numerical value describing a characteristic of a population is called:

(a)	Parameter	(b)	Sample
(c)	Statistic	(d)	None of these

CHAPTER 12: STATISTICAL MEASURES OF DATA

12.1 Any numerical value describing a characteristic of a sample is called:

(a)	Sample mean	(b)	Sample variance
(c)	Statistic	(d)	None of these

12.2 The value of a statistic is used to estimate the:

(a)	Size of the population	(b)	Probability
(c)	Population parameter	(d)	None of these

12.3 If each observation is decreased by 2, the mean of new set of observations will:

(a)	Increase by 2	(b)	Decrease by 2
(c)	Remain unchanged	(d)	None of these

12.4 If each observation is increased by 5, the mean of new set of observations will:

(a)	Increase by 5	(b)	Decease by 5
(c)	Remain unchanged	(d)	None of these

12.5 If each observation is multiplied by 5, the mean of new set of observations will:

(a) Increase by 5 times (b) Divided by 5 times
(c) Remain unaltered (d) None of these

12.6 If each observation is divided by 10, the mean of new set of observations will:

(a) Decrease by 10 times (b) increase by 10 times
(c) Remain unchanged (d) None of these

12.7 The middle most value of arranged set of observations is known as:

(a) Mode (b) Median
(c) Mean (d) None of these

12.8 "As a result of recent nuclear bomb explosion, we can expect that prices of all commodities will go up." The above statement is:

(a) Descriptive statistics (b) Inferential statistics
(c) Not a statistical statement (d) None of these

12.9 "At least 10% of firing incidents reported by the police were fictitious." The above statement is:

(a) Descriptive statistics (b) Inferential statistics
(c) Not a statistical statement (d) None of these

12.10 "Of all patients who received this particular type of drug at a local clinic, 60% later developed significant side effects." The above statement is:

(a) Descriptive statistics (b) Inferential statistics
(c) Not a statistical statement (d) None of these

12.11 "As a result of a recent conflict, most people are in favour of producing nuclear weapons." The above statement is:

(a) Descriptive statistics (b) Inferential statistics
(c) Not a statistical statement (d) None of these

12.12 "The survey of consumers indicate that more than 50% consumers use brand A detergent." The above statement is:

(a) Descriptive statistics (b) Inferential statistics
(c) Not a statistical statement (d) None of these

12.13 The unit of measurement of coefficient of variation of speed of balls bowled by a bowler is:

(a) Feet per second (b) Yards per second
(c) Neither (a) nor (b) (d) Both (a) as well as (b)

12.14 A family travels 500 kms each day for 3 days. The family averages 80 kms per hour the first day, 93 kms per hour the second day, 87 kms per hour the third day. The average speed for the entire trip is:

(a)	87 kms \Hr	(b)	85 kms \Hr
(c)	86.7 kms \Hr	(d)	None of these

12.15 The average preferred, to such data as rates of change in ratios, economic index numbers, population sizes over consecutive time periods, is:

(a)	Arithmetic mean	(b)	Geometric mean
(c)	Harmonic mean	(d)	None of these

12.16 Over a period of 4 years, an employee's salary has increased in the ratios, 1.072, 1.086, 1.069 and 1.098. The average of these ratios and hence the average percent increase are:

(a)	1.08125 and 8.125%	(b)	1.086 and 8.6%
(c)	1.08119 and 8.6%	(d)	None of these

12.17 Median of 82, 86, 93, 92, 79 is:

(a)	86	(b)	93
(c)	$\frac{93+92}{2}$	(d)	None of these

12.18 Median of 2.5, 3.6, 3.1, 4.3, 2.9, 2.3 is:

(a)	Does no exist	(b)	2.9
(c)	3	(d)	None of these

12.19 The value which occurs most or the value with the greatest frequency is called:

(a)	Mode	(b)	Q_3
(c)	Q_1	(d)	None of these

12.20 Mode of 2.5, 3.6, 3.1, 4.3, 2.9, 2.3 is:

(a)	4.3	(b)	$\frac{3.1+4.3}{2}$
(c)	Does not exist	(d)	None of these

12.21 The real _____________ of the mean is that it may be affected by extreme values.

(a)	Advantage	(b)	Disadvantage
(c)	Choice	(d)	None of these

12.22 The median is _______ by extreme values and gives a truer average.

(a)	Not influenced	(b)	Influenced
(c)	Affected	(d)	None of these

12.23 It is the only average that can be used for qualitative as well as quantitative data:

(a) Mean (b) Mode
(c) Median (d) None of these

12.24 A car averages 20 kilometres per litre on the highway. How many litres are required to complete 300 kilometre trip?

(a) 60 (b) 25
(c) 15 (d) None of these

12.25 A person invests Rs. 5,000/= at 10.5% interest, Rs. 6,300/= at 10.8% and Rs. 4,500 at 11%. What is the average percentage return to the saving?

(a) 10.762% (b) 10.8%
(c) 10.766% (d) 10.666%

12.26 What is the average for a student who received grades of 85, 76 and 82 on 3 mid term tests and a 79 on the final examination, if the final examination counts 3 times as much as each of the three tests?

(a) 81 (b) 80
(c) 80.5 (d) None of these

12.27 Three sections of a statistics class containing 28, 32 and 35 students averaged 83, 80 and 76 respectively. What is the average of all 3 sections?

(a) 79.41 (b) 79.67
(c) 80 (d) None of these

12.28 The sum of deviations from a mean is always:

(a) Zero (b) Less than mean
(c) Greater than mean (d) None of these

12.29 If $\sum(x-7)=0$, then $\bar{x}$ = __________ .

(a) 8 (b) 7
(c) 5 (d) None of these

12.30 The sum of square of deviations from mean is always:

(a) More than zero (b) Zero
(c) Less than zero (d) Less than Mean

12.31 The average daily sale and the related standard deviation of Ali, Atif, Ahmed and Azeem in thousands of Rupees are 41 & 4.3, 36 & 3.2, 26 & 2.9 and 24 & 2.5 respectively, then the most inconsistent among them is:

(a) Ali (b) Atif
(c) Ahmed (d) Azeem

12.32 If for two observations, deviations from mean are -3 and +3 respectively, then the variance is:

(a)	0	(b)	Does not exist
(c)	9	(d)	None of these

12.33 The positive square root of variance is called:

(a)	Mean deviation	(b)	Standard deviation
(c)	Mean deviation from mean	(d)	None of these

12.34 The co-efficient of variation of 3 numbers i.e. x, x+4 and x+11 is y. If x is increased, the value of y would:

(a)	Decrease	(b)	Increase with the same amount
(c)	Increase in the same ratio	(d)	Remain the same

12.35 t-distribution is used when:

(a)	Size of sample is less than 40	(b)	Size of sample is less than 30
(c)	Mean is less than 40	(d)	Mean is less than 30

12.36 A z-score measures how many standard deviations an observation is:

(a)	Above the mean	(b)	Below the mean
(c)	Above or below the mean	(d)	None of these

12.37 If z=-2 then it is correct to say that:

(a) Observation is less than mean
(b) Observation is less than standard deviation
(c) Observation is more than standard deviation
(d) None of these

12.38 If z= -2, μ = 17 and σ^2 = 64 then x =________:

(a)	+1	(b)	- 17
(c)	+17	(d)	None of these

12.39 It is possible to compare two observations measured in completely different units by z-score because:

(a)	z-score has its own units	(b)	z-score is a unit less quantity
(c)	z-score is a standard score	(d)	None of these

12.40 The quantity which expresses the standard deviation as a percentage of mean is called:

(a)	z-score	(b)	Co-efficient of variation
(c)	Co-efficient of dispersion	(d)	None of these

12.41 A distribution that lacks symmetry with respect to a vertical axis is said to be:

(a) Normal (b) Probability distribution
(c) Skewed (d) None of these

12.42 In a given distribution if mean is less than median, the distribution is said to be:

(a) Symmetrical (b) Positively skewed
(c) Negatively skewed (d) None of these

12.43 In a given distribution if mean is greater than median, the distribution is said to be:

(a) Symmetrical (b) Positively skewed
(c) Negatively skewed (d) None of these

12.44 For the observations 7, 7, 7, mean and variance are respectively:

(a) 0 and 7 (b) 7 and 0
(c) 7 and 49 (d) None of these

12.45 If the variance of 2, 5, 7, 10 and 14 is 17.04 then the variance of 5, 8, 10, 13 and 17 is:

(a) 17.04 (b) 20.04
(c) 51.12 (d) None of these

12.46 If the variance of 2, 5, 7, 10 and 14 is 17.04 then the variance of 6, 15, 21, 30 and 42 is:

(a) 17.04 (b) 51.12
(c) 153.36 (d) None of these

12.47 If some constant is added to each observation of a given set of data then the variance will:

(a) Increase by that constant (b) Decrease by that constant
(c) Remain unchanged (d) None of these

12.48 If some constant is subtracted from each observation of the given set of data, variance will:

(a) Decrease by the that constant
(b) Increase by that constant
(c) Remain unchanged
(d) None of these

12.49 If each observation of the given set of data is multiplied by a constant x, then the variance will:

(a) Increase by x times
(b) Decrease by x times
(c) Increase by x^2 times
(d) None of these

12.50 If each observation of the given set of data is divided by a constant x, then the variance will:

(a) Decrease by x times
(b) Increase by x times
(c) Decrease by x^2 times
(d) None of these

12.51 For the values -2, -5, -7, -10 and -14 the variance is:

(a) -17.04
(b) +17.04
(c) -8.54
(d) None of these

12.52 If the variance of a given set of observations is 81, the standard deviation is:

(a) ± 9
(b) +9
(c) -9
(d) None of these

12.53 Which of the following is likely to produce a bell shaped curve:

(a) Ages of people of Pakistan
(b) Incomes of people of Pakistan
(c) Heights of students in a class
(d) None of these

12.54 For a bell-shaped distribution the interval $\bar{x} \pm s$ approximately contains:

(a) 75% of observations
(b) 68% of observations
(c) 95% of observations
(d) None of these

12.55 For a bell shaped distribution the interval $\bar{x} \pm 2s$ approximately contains:

(a) 89% of observations
(b) 95% of observations
(c) 99.7% of observations
(d) None of these

12.56 For a bell shaped distribution the interval $\bar{x} \pm 3s$ approximately contains:

(a) 89% of observations
(b) 95% of observations
(c) 99.7% of observations
(d) None of these

12.57 The 50^{th} percentile, fifth decile, second quartile and median of a distribution are:

(a) Unequal
(b) Equal
(c) Approximately equal
(d) None of these

12.58 The measure of variation which measures the length of interval that contains the middle 50% of data is known as:

(a) Quartile-deviation
(b) Semi-inter quartile range
(c) Inter-quartile range
(d) None of these

12.59 Any process that generates a set of data is called:

(a) An experiment (b) A random process
(c) A statistical experiment (d) None of these

CHAPTER 13: REGRESSION AND CORRELATION

13.1 If the values of two different variables (say *x* and *y*) are plotted on a rectangular axes, such a plot is referred to as a:

(a) Frequency diagram (b) Value diagram
(c) Scatter diagram (d) None of these

13.2 From the inspection of scatter diagram if it is seen that the points follow closely a straight line, it indicates that the two variables are to some extent:

(a) Unrelated (b) Related
(c) Linearly related (d) None of these

13.3 In a scatter diagram, if the points follow closely a straight line of positive slope, the two variables are said to have:

(a) No correlation (b) High positive correction
(c) Negative correlation (d) None of these

13.4 In a scatter diagram, if the points follow clearly a straight line of negative slope, the two variables are said to have:

(a) No correlation (b) High positive correlation
(c) High negative correlation (d) None of these

13.5 In a scatter diagram, if the points follow a strictly random pattern, the two variables are said to have:

(a) No linear relationship (b) Low positive relationship
(c) Low negative relationship (d) None of these

13.6 A measure of the strength or degree of relationship or the interdependence is called:

(a) Correlation (b) Regression
(c) Least square estimate (d) None of these

13.7 The phenomenon that investigates the dependence of one variable on one or more independent variables is called:

(a) Correlation (b) Regression
(c) Least square estimate (d) None of these

13.8 The linear relation between a dependent and an independent variable is called:

(a) Regression line (b) Regression co-efficient
(c) Co-efficient of correlation (d) None of these

13.9 Slope of the regression line is called:

(a) Regression parameter (b) Sample parameter
(c) Regression co-efficient (d) None of these

13.10 In regression analysis, if the value of a is positive the value of b:

(a) Must be positive (b) May take any value
(c) Must be negative (d) Less than -1or more than 1

13.11 The procedure which selects that particular line for which the sum of the squares of the vertical distances from the observed points to the line is as small as possible, is called:

(a) Sum of squares method (b) Sum of squares of errors method
(c) Least square method (d) None of these

13.12 The numerical values of regression co-efficients must be:

(a) Both positive (b) Both negative
(c) Both positive or both negative (d) None of these

13.13 In regression, the dependent variable is assumed to be a random variable whereas the independent variable is assumed to have:

(a) Random values (b) Fixed values
(c) Both (a) or (b) (d) None of these

13.14 The dependent variable is also called response or:

(a) The explained variable (b) Unexplained variable
(c) The explanatory variable (d) None of these

13.15 Which of the statements about Spearman's Co-efficient of Correlation is **NOT** correct:

(a) It can co-relate two or more set of rankings
(b) It applies only when no ties exist
(c) Both (a) and (b)
(d) None of the above

13.16 The explained variable or response is also called:

(a) The independent variable (b) The dependent variable
(c) Non-random variable (d) None of these

13.17 The predictor or unexplained variable is also called:

(a) The independent variable
(b) The dependent variable
(c) Random variable
(d) None of these

13.18 In regression analysis, *b* = *2.8*, indicates that the value of dependent variable:

(a) Increases by 2.8 units at per unit increase in independent variable
(b) Decreases by 2.8 units at per unit increase in independent variable
(c) Increases by 2.8 units at per unit decrease in independent variable
(d) None of these

13.19 If $\bar{x}$ = 11.33; $\bar{y}$ = 33.56 and b_{yx}=2.832 then a is equal to:

(a) 0.96
(b) 1.47
(c) 11.85
(d) 4.00

13.20 If a random sample of 9 observations yielded the values $\sum x = 102, \sum y = 302, \sum xy = 3583\ and\ \sum x^2 = 1308$ then the value of b is:

(a) 1.47
(b) 2.831
(c) Cannot be determined
(d) None of these

13.21 If *Y* is the observed value and $\hat{Y}$ is the estimated value (estimated by using the regression line) then $\sum(Y - \hat{Y})$:

(a) Should be zero
(b) Is likely to be close to zero
(c) In majority of the cases would be equal to zero
(d) None of these

13.22 If two variables tends to vary simultaneously in some direction, they are said to be:

(a) Dependent
(b) Independent
(c) Correlated
(d) None of these

13.23 If two variable tends to increase (or decrease) together, the correlation is said to be:

(a) Zero
(b) Direct or positive
(c) 1
(d) None of these

13.24 If one variable tends to increase as the other variable decreases, the correlation is said to be:

(a) Zero
(b) Inverse or negative
(c) -1
(d) None of these

13.25 While calculating "r" if x and y are interchanged i.e. instead of calculating r_{xy} if r_{yx} is calculated then:

(a) $r_{xy} = r_{yx}$ (b) $r_{xy} > r_{yx}$
(c) $r_{xy} < r_{yx}$ (d) None of these

13.26 Limits of the co-efficient of Correlation are:

(a) -1 to 0 (b) 0 to 1
(c) 1- to +1 (d) None of these

13.27 If *r* = *0.9* and if *5* is subtracted from each observation of *x*, then *r* will:

(a) Decrease by 5 units (b) Decreases by less than 5 units
(c) Remain unchanged (d) None of these

13.28 If *r* = *0.9* and if *5* is added to each observation of *x*, then *r* will:

(a) Increase by 5 units (b) Increase by more than 5 units
(c) Remain unchanged (d) None of these

13.29 If *r* = *0.9* and if *3* is subtracted from each observation of *Y*, then *r* will:

(a) Decrease by 3 units (b) Decrease by less than 3 units
(c) Remain unchanged (d) None of these

13.30 If *r* = *0.9* and if *3* is added to each observation of *y*, then *r* will:

(a) Increase by 3 units (b) Increase by more than 3 units
(c) Remain unchanged (d) None of these

13.31 If *r* = *0.9* and if *3* is subtracted from each observation of *x* and *5* is added to each observation of *y*, then *r* will:

(a) Decrease by 2 units (b) Increase by 2 units
(c) Remain unchanged (d) None of these

13.32 If *r* = 0.9 and each observation of x is multiplied by 100, then *r* will:

(a) Increase by 100 times (b) Less than 100 times
(c) Remain unchanged (d) None of these

13.33 If *r* = 0.9 and each observation of *Y* is divided by *10*, then *r* will:

(a) Decrease by 10 times (b) Decrease by less than 10 times
(c) Remain unchanged (d) None of these

13.34 If *r* = *0.9* and each observation of *x* and *y* is divided by *10*, then *r* will:

(a) Decrease by 10 times (b) Decrease by 100 times
(c) Remain unchanged (d) None of these

13.35 The co-efficient of correlation is independent of:

(a) Only origin (b) Only scale
(c) Origin and scale (d) None of these

13.36 The geometric mean of two regression co-efficients is equal to:

(a) Co-efficient of determination (b) Co-efficient of correlation
(c) Co-efficient of rank correlation (d) None of these

13.37 If b_{xy} = -0.78 and b_{yx} = -0.45, then r is equal to:

(a) +0.351 (b) -0.351
(c) Cannot be determined (d) None of these

13.38 If b_{xy} = -0.78 and b_{yx} = 0.45, then r is equal to:

(a) +0.351 (b) -0.351
(c) Cannot be determined (d) None of these

13.39 If b_{xy} = +1.93 and b_{yx} = 0.6, then r is equal to:

(a) 1.158 (b) 1.0761
(c) Data is fictitious (d) None of these

13.40 If b_{xy} = 1.93 and b_{yx} = 0.51, then r is equal to:

(a) 0.9843 (b) 0.992
(c) Data is fictitious (d) None of these

13.41 If b_{xy} = -1.93 and b_{yx} = 0.51, then r is equal to:

(a) -0.9843 (b) -0.992
(c) Data is fictitious (d) None of these

13.42 If $\sum_{i=1}^{6} x_i = 68, \sum y = 112, \sum xy = 1292, \ \sum x^2 = 786, \ \sum y^2 = 2128$ then r is equal to:

(a) 0.947 (b) 0.8968
(c) Cannot be determined (d) None of these

13.43 If S_{xy} = 2166.67, $S_x = 115.47, S_y = 19.1485$ then r is equal to:

(a) 0.9799 (b) 0.9899
(c) -0.9799 (d) None of these

13.44 The co-efficient of correlation can never be:

(a) Negative (b) Positive
(c) Zero (d) Can assume any value

13.45 If S_{xy} = 0.6, $S_x = 4.1$ and $S_y = 0.23$ then r is equal to:

(a)	0.7976	(b)	0.636
(c)	0.4048	(d)	None of these

13.46 The square of r is known as:

(a)	Co-efficient of correlation	(b)	Co-efficient of regression
(c)	Co-efficient of determination	(d)	None of these

13.47 The lower and upper limits of r^2 are:

(a)	-1 to + 1	(b)	0 to 1
(c)	-∞ to +∞	(d)	None of these

13.48 The quantity which describes that the proportion (or percentage) of variation in the dependent variable explained (or reduced) by the independent variable is called:

(a)	Co-efficient of determination	(b)	Co-efficient of regression
(c)	Co-efficient of correlation	(d)	None of these

13.49 If r = 0.8, then the variation in the dependent variable y due to independent variable x is about:

(a)	80%	(b)	64%
(c)	64% to 80%	(d)	None of these

13.50 If r = 0.8 and b_{yx}= 1.04 then b_{xy} is equal to:

(a)	0.769	(b)	0.615
(c)	Cannot be determined	(d)	None of these

13.51 If r^2 = 0.796 and b_{xy} = -1.04 then b_{yx} is equal to:

(a)	0.765	(b)	-0.765
(c)	Cannot be determined	(d)	None of these

CHAPTER 14: INDICES

14.1 The quantity which is based on the relative change over time in the sum of the values of two or more time series variables is called:

(a)	Simple index number	(b)	Composite index number
(c)	Simple aggregate (or composite)	(d)	None of these

14.2 The relative importance of each time series variable is determined by assigning an appropriate factor called:

(a)	Weighting factor	(b)	Composite factor
(c)	Price factor	(d)	None of these

14.3 Generally the time series variables used to calculate different types of Index numbers are:

(a) Price values (b) Quantities
(c) (a) and (b) both (d) None of these

14.4 Generally the appropriate weighting factors, in the calculation of index numbers are:

(a) Price values (b) Quantities
(c) (a) and (b) both (d) None of these

14.5 The quantity which is based on the relative change over time in the weighted sum of two or more time series variable is called:

(a) Simple aggregate index
(b) Simple index number
(c) Weighted aggregate index number
(d) None of these

14.6 The period with which other periods are to be compared is called:

(a) Current period (b) Base period
(c) Chain-base period (d) None of these

14.7 The index that uses quantities of base period as weights, so that only prices are allowed to change, in calculating weighted price aggregate is known as:

(a) Laspeyer's Index Number (b) Paasche's Index Number
(c) Fisher's Index Number (d) None of these

14.8 If the quantities of current year are used to calculate weighted price aggregate, the index number so calculated is called:

(a) Laspeyer's Index Number (b) Paasche's Index Number
(c) Fisher's Index Number (d) None of these

14.9 The geometric mean of Laspeyer's and Paasche's Index Number is called:

(a) Mean Index Number (b) Marshall Edge Worth's
(c) Fisher's Ideal Index Number (d) None of these

14.10 The equation 1995 = 100 indicates that the index numbers are calculated using:

(a) Base year 1995 (b) Current year 1995
(c) Previous year 1995 (d) None of these

14.11 The index that measures changes in prices that affect the cost of living of a large fraction of population is called:

(a) Whole sale price Index Number (b) Simple price relatives
(c) Consumer Price Index Number (d) None of these

14.12 Index numbers are used as the barometers of:

(a) Prices (b) Quantities
(c) Inflation (d) None of these

14.13 If the reciprocal of consumer price Index is expressed as the percentage the resulting value is called:

(a) Rate of inflation (b) Rate of deflation
(c) Purchasing power of money (d) None of these

14.14 If the purchasing power of money is multiplied by the current per capita income the resulting value is known as:

(a) Rate of inflation
(b) Error in per capital income
(c) Real (or deflated) per capita income
(d) None of these

14.15 If the relative changes in the current year prices are expressed on the basis of previous year prices the simple Index so calculated is known as:

(a) Simple Price Relative
(b) Fixed base Index
(c) Chain-base Index or Link Relative
(d) None of these

CHAPTER 15: COUNTING METHODS AND PROBABILITY

15.1 The set of all possible outcomes of a statistical experiment is called:

(a) Data (b) Statistical data
(c) Sample space (d) None of these

15.2 Something which can take different values with different probabilities is called:

(a) A variable (b) A random variable
(c) A discreet variable (d) A continuous variable

15.3 If two events have no elements in common then they are known as:

(a) Union of two events (b) Intersection of two events
(c) Mutually exclusive events (d) None of these

15.4 If two events have at least one element in common then the events are said to be:

(a) Union of two events (b) Intersection of two events
(c) Not mutually exclusive events (d) None of these

15.5 If three coins are tossed, then the number of outcomes are:

(a) 6 (b) 8
(c) 9 (d) None of these

15.6 If three dice are rolled; then the number of outcomes are:

(a) 18 (b) 216
(c) 36 (d) None of these

15.7 If an experiment consists of rolling a dice and then flipping a coin, the number of outcomes are:

(a) 36 (b) 8
(c) 12 (d) None of these

15.8 Which of the following applies to discreet as well as continuous variables:

(a) Binomial distribution (b) Normal Distribution
(c) Chi Square distribution (d) (b) and (c)

15.9 The arrangement of some or all of the objects without considering the order of arrangement is called:

(a) Selection (b) Permutation
(c) Combination (d) None of these

15.10 If ${}^{10}P_3 = 720$ then ${}^{10}C_3 = ?$

(a) 120 (b) 2,160
(c) 720 (d) None of these

15.11 If ${}^{n}P_2 = 20$ then the value of n = ?

(a) 10 (b) 5
(c) 8 (d) None of these

15.12 If 4 coins are tossed simultaneously the number of outcomes containing at least one head are:

(a) 15 (b) 1
(c) 8 (d) None of these

15.13 If 4 coins are tossed simultaneously, the number of outcomes containing at least two tails are:

(a) 11 (b) 15
(c) 9 (d) None of these

15.14 If ${}^{5}C_r = 10$, then r = ?

(a) 2 (b) 5
(c) 4 (d) None of these

15.15 If the experiment, tossing a pair of dice, is repeated over and over again in a very long series of trials, what proportion of outcomes do you think would result in a sum less than 7?

(a) $\frac{5}{12}$ (b) $\frac{6}{36}$
(c) $\frac{6}{12}$ (d) None of these

15.16 If the experiment, tossing a pair of dice, is repeated over and over again in a very long series of trials, what proportion of outcomes do you think would result in a sum equal to 7?

(a) $\frac{5}{12}$ (b) $\frac{6}{36}$
(c) $\frac{6}{12}$ (d) None of these

15.17 If the experiment, tossing a pair of dice, is repeated over and over again in a very long series of trials, what proportion of outcomes do you think would result in a sum more than 7?

(a) $\frac{5}{12}$ (b) $\frac{6}{36}$
(c) $\frac{6}{12}$ (d) None of these

15.18 If event A means that exactly 150 out of 500 persons plan to purchase a PC and B means that exactly 160 out of these 500 persons plan to purchase a PC, then the events A and B are:

(a) Mutually exclusive (b) Not mutually exclusive
(c) Independent (d) None of these

15.19 If probability of an event A is 0.2 and the probability of an event B is 0.3 and the probability of either A or B is 0.5, then A and B are:

(a) Mutually exclusive (b) Independent
(c) Dependent (d) None of these

15.20 If a coin is tossed four times, the probability of four heads is equal to:

(a) 0.25 (b) 0.0625
(c) 0.625 (d) Zero

15.21 When all events have the same chance of occurrence, the events are said to be:

(a) Equally likely (b) Independent
(c) Dependent (d) None of these

15.22 If two or more events cannot occur simultaneously then they are called:

(a)	Independent	(b)	Mutually exclusive
(c)	Not equally likely	(d)	None of these

15.23 If the probability of an event is 0.01, which of the following statements is correct:

(a) The event is unlikely to occur
(b) The event is expected to occur about 10% of the time
(c) The event cannot occur
(d) None of the above

15.24 If a coin is tossed five times, the probability of:

(a) Five heads is equal to the probability of five tails
(b) Five heads is equal to the probability of zero tails
(c) Five heads is equal to the probability of zero heads
(d) All of the above

15.25 The probability of two mutually exclusive events is:

(a)	$P(A \cup B)$	(b)	$P(A \cap B)$
(c)	$P(A) + P(B)$	(d)	None of these

15.26 The probability of two non-mutually exclusive events is:

(a)	$P(A \cup B)$	(b)	$P(A \cap B)$
(c)	$P(A) + P(B) - P(A \cap B)$	(d)	None of these

15.27 The probability of two independent events is:

(a)	$P(A \cap B)$	(b)	$P(A) \times P(B)$
(c)	$P(A) \times P(B/A)$	(d)	None of these

15.28 The probability of two non-independent events if the event A occurs first is:

(a)	$P(A \cap B)$	(b)	$P(A) \times P(B)$
(c)	$P(A) \times P(B/A)$	(d)	None of these

15.29 The sum of the probabilities of two compliment events is always:

(a)	Zero	(b)	1
(c)	Does not exist	(d)	None of these

15.30 The probability of an impossible event is always:

(a)	Equal to zero	(b)	Less than zero
(c)	More than zero	(d)	None of these

15.31 The probability of a certain event is always:

(a) Equal to zero (b) Equal to one
(c) More than one (d) None of these

15.32 If P(A) = -0.3 and P(B) = +1.3 then $P(A \cup B)$ is, when A and B are mutually exclusive events:

(a) 1 (b) -1.6
(c) +1.6 (d) None of these

15.33 A box contains 10 items, 3 of which are defective. If 4 are selected at random without replacement, the probability that at least two are defective is:

(a) 70% (b) 66.67%
(c) 33.33% (d) 50%

15.34 Three horses A, B and C are in a race; A is twice as likely to wins as B and B is three times as likely to wins as C. The probability that A wins is:

(a) $\frac{3}{5}$ (b) $\frac{3}{7}$
(c) $\frac{6}{7}$ (d) None of these

15.35 Three horses A, B and C are in a race; A is twice as likely to wins as B and B is three times as likely to wins as C. The probability that B or C wins is:

(a) $\frac{3}{5}$ (b) $\frac{2}{5}$
(c) $\frac{3}{10}$ (d) None of these

15.36 Three horses A, B and C are in a race; A is twice as likely to wins as B and B is three times as likely to wins as C. The probability that A or B wins is:

(a) $\frac{3}{5}$ (b) $\frac{9}{10}$
(c) $\frac{7}{10}$ (d) None of these

15.37 If P(A) = 1 – P(B); then A and B are:

(a) Independent events (b) Compliment events
(c) Mutually exclusive events (d) None of these

15.38 A person invests in three stocks. After 12 months, he records the gain or loss in price as follows:
A: All three stocks rise in price
B: Stock1 rise in price
C: stock 2 experiences a Rs. 5 drop in price.

Therefore A and B are:

(a)	Not mutually exclusive events	(b)	Mutually exclusive events
(c)	Independent	(d)	None of these

15.39 A person invests in three stocks and after 12 months, he records the gain or loss in price as:
A: all three stocks rise in price
B: Stock 1 rises in price
C: stock 2 experiences a Rs. 5 Drop in price.
Therefore A and C are:

(a)	Not mutually exclusive events	(b)	Mutually exclusive events
(c)	Independent	(d)	None of these

15.40 The probability of an event A, given that an event B has occurred, is denoted as:

(a)	$P(A \cap B)$	(b)	$P(A\backslash B)$
(c)	$P(B\backslash A)$	(d)	None of these

15.41 From a deck of 52 cards, two cards are drawn in succession. The probability that both cards are spades is:

(a)	0.0588	(b)	0.0625
(c)	0.25	(d)	None of these

15.42 From a deck of 52 cards, two cards are drawn in succession. The number of elements the sample space contains is:

(a)	2,704	(b)	1,326
(c)	2,652	(d)	None of these

15.43 From a deck of 52 cards, two cards are drawn in succession. All the outcomes of the experiment are:

(a)	Independent	(b)	Dependent
(c)	Mutually exclusive	(d)	None of these

15.44 If one coin is tossed 7 times the number of possible outcomes would be:

(a)	128	(b)	14
(c)	49	(d)	None of these

15.45 If seven coins are tossed simultaneously. All possible outcomes of the experiment are:

(a) Not mutually exclusive (b) Independent
(c) Not independent (d) None of these

15.46 In the game of craps, two dice are rolled. If the sum on the dice is 7 or 11 he wins, and if the sum is 2, 3 or 12, he loses. The probability of his winning is: ***(01)***

(a) $\frac{2}{9}$ (b) $\frac{1}{18}$
(c) $\frac{1}{6}$ (d) None of these

15.47 In the game of craps, two dice are rolled. If the sum on the dice is 7 or 11 he wins, and if the sum is 2, 3 or 12, he loses. The probability that he loses is:

(a) $\frac{1}{9}$ (b) $\frac{1}{36}$
(c) $\frac{1}{12}$ (d) None of these

15.48 Given P(A) = 0.24; P(B) = 0.39 And $P(A \cup B)$=0.49.
If A and B are not mutually exclusive events, then $P(A \cap B)$ is equal to:

(a) 0.49 (b) 0.63
(c) 0.14 (d) None of these

15.49 If P(A)= 0.5; P(B)=0.6 and $P(A \cap B) = 0.4$

then $P(A \cup B)$ is:

(a) 0.4 (b) 1.1
(c) 0.7 (d) None of these

15.50 If P(A) = 0.20; P(B) = 0.08 and P(C) = 0.03

where A = A person views a T.V. show
B = A person reads a magazine
C = A person views a T.V. show and reads a magazine

Then $P(A \cup B)$ is:

(a) 0.25 (b) 0.28
(c) 0.11 (d) None of these

CHAPTER 16: PROBABILITY DISTRIBUTIONS

16.1 If n=5; p = 0.2; then P(x=2) is:

(a)	0.409	(b)	0.2048
(c)	0.0512	(d)	None of these

16.2 If n=5; p = 0.2; then P(x>3) is:

(a)	0.0643	(b)	0.576
(c)	0.0064	(d)	None of these

16.3 If mean of Binomial Distribution is 1.0 and q = 0.98 then n = ?

(a)	50	(b)	1
(c)	10	(d)	None of these

16.4 If mean of Binomial distribution is 1 and variance is 0.98 then p =

(a)	0.98	(b)	0.02
(c)	Does not exist	(d)	None of these

16.5 If mean of Binomial distribution is 1 and variance is 0.98, then q is:

(a)	0.98	(b)	0.2
(c)	5	(d)	None of these

16.6 If n = 10 and p = 0.9, then mean and variance of Binomial Distribution is:

(a)	9 and 0.9	(b)	0.9 and 0.09
(c)	9 and 100	(d)	None of these

16.7 The probability distribution showing the probability of x occurrences of an event over a specified time, distance or space is known as:

(a) Binomial probability Distribution
(b) Poisson Probability Distribution
(c) Chi-square Distribution
(d) None of these

16.8 The number of days in a given year in which a 130-point change occurs in the Karachi Stock Exchange index.
The above statement may describe a random variable that may posses:

(a)	Binomial Distribution	(b)	Poisson Distribution
(c)	Normal Distribution	(d)	None of these

16.9 The statement “The number of fatal accidents that occur per month in a large manufacturing plant” may describe a random variable that may possess:

(a)	Binomial Distribution	(b)	Poisson Distribution
(c)	Normal Distribution	(d)	None of these

16.10 The number of blind babies born per month in the city of Karachi.
The above statement may describe a random variable that may possess:

(a) Binomial Distribution (b) Poisson Distribution
(c) Normal Distribution (d) None of these

16.11 If μ = 1.2 then P(x = 0) is:

(a) 0.301 (b) 0.361
(c) 0.338 (d) None of these

16.12 If μ = 1.2 the P(x > 0) is:

(a) 0.699 (b) 0.639
(c) 0.662 (d) None of these

16.13 If $e^{-4.5}$ = 0.0111 then the mean of Poisson distribution is:

(a) 4.5 (b) 45
(c) Does not exist (d) None of these

16.14 If $e^{-6.0}$ = 0.002478; then P (x = 0):

(a) Cannot be determined (b) 0.002478
(c) 0.5488 (d) None of these

16.15 If e^{-6} = 0.002478; then mean of Poisson distribution is:

(a) Incomplete information (b) 6
(c) 5.488 (d) None of these

16.16 If e^{-6} = 0.002478; then variance of Poisson distribution is:

(a) Can't be determined (b) 6
(c) $\sqrt{6}$ (d) None of these

16.17 If P (x = 4) = $\frac{(1.5)^4 e^{-y}}{4!}$=0.04706' then y =

(a) 4 (b) 1.5
(c) Can't be determined (d) None of these

16.18 If P (x = y) = $\frac{(3.0)^2 e^{-3}}{y!}$=0.07468 then y =

(a) 4 (b) 2
(c) Can't be determined (d) None of these

16.19 A complete list of formula that gives the probabilities associated with each value of a random variable x is called:

(a) Frequency distribution (b) Probability distribution
(c) Expected value (d) None of these

16.20 A variable that assumes the numerical values associated with events of an experiment is called:

(a) Parameter (b) Statistic
(c) Random variable (d) None of these

16.21 A function whose value is a real number determined by each element in the sample space is called:

(a) Parameter (b) Statistics
(c) Random variable (d) None of these

16.22 A table or formula listing all possible values that a random variable can take on, along with the associated probabilities is called:

(a) Probability distribution (b) Frequency distribution
(c) Expected value (d) None of these

16.23 If x is a random variable belonging to a continuous probability distribution, then $P(x = a)$ is:

(a) Equal to zero (b) Less than 1
(c) More than zero (d) None of these

16.24 Let x be a random variable with probability distribution $P(X=x)$, then $\Sigma x\, p(x)$ is known as:

(a) Sum of probabilities (b) Mean or expected value
(c) Mean of Binomial Distribution (d) None of these

16.25 In a game, a man is paid Rs. 50 if he gets all heads or all tails when 4 coins are tossed and he pays out Rs. 30 if 1, 2 or 3 heads appear. His expected gain is:

(a) Rs. 20 (b) Rs. 6.26
(c) Rs. - 20 (d) None of these

16.26 In terms of mathematical expectation the formula $E(x^2)-[E(x)]^2$ represents :

(a) Standard deviation of distribution
(b) Variance of distribution
(c) Difference of squared deviation
(d) None of these

16.27 Let x assumes the value 0, 1, 2, and 3 with the respective probabilities 0.51, 0.38, 0.10 and 0.01 the mean of distribution is:

(a) 0.38 (b) 0.61
(c) 0.4979 (d) None of these

16.28 Let x assumes the value 0, 1, 2 and 3 with the respective probabilities 0.51, 0.38, 0.10 and 0.01 the variance of distribution is:

(a) 0.87 (b) 0.61
(c) 0.4979 (d) None of these

16.29 By investing into a particular stock, a person can make a profit in 1 year of Rs. 5000 with probability 0.4 or take a loss of Rs. 1500 with probability 0.8. the person's expected gain is:

(a) 1200
(b) 800
(c) Can't be determined due to wrong values of probabilities
(d) None of these

16.30 If an experiment is repeated for n trials, each trial results in an outcome classified as success or failure, with constant probability of success, and trials are independent, the experiment is known as:

(a) Binomial Experiment (b) Poisson experiment
(c) Hyper geometric experiment (d) None of these

16.31 (i) A random sample of size n is selected from a population of N items.
(ii) K on N items may be classified as success and N-K classified as failures
The above properties are related to a

(a) Binomial experiment (b) Poisson experiment
(c) Hypergeometric experiment (d) None of these

16.32 If a random sample of size n is drawn with replacement the events are said to be:

(a) Independent (b) Not independent
(c) Not mutually exclusive (d) None of these

16.33 If a random sample of size n is drawn without replacement the events are said to be:

(a) Independent (b) Not independent
(c) Not mutually exclusive (d) None of these

16.34 Whenever we measure time intervals, weights, heights, volumes and so forth, our underlying population is described by a:

(a) Discrete distribution (b) Continuous distribution
(c) Frequency distribution (d) None of these

16.35 A distribution whose graph is a symmetric bell shaped curve extending indefinitely in both directions, with equal measures of central tendency is known as:

(a) Non-skewed distribution (b) Normal distribution
(c) Binomial distribution (d) None of these

16.36 The normal probability distribution is a continuous distribution with parameter(s):

(a) Mean (b) Mean and variance
(c) Mean and mean deviation (d) None of these

16.37 A standard normal distribution is one that has mean and variance equal to:

(a) Zero and one (b) One and one
(c) One and zero (d) None of these

16.38 If μ = 50, σ = 10 and z = 1.2 then the corresponding x value must be:

(a) 54 (b) 62
(c) 42 (d) None of these

16.39 If μ = 50, z = -0.5and x = 45 the variance must be equal to:

(a) 10 (b) 100
(c) 3.1622 (d) None of these

16.40 The percentage of measurements of a normal random variable fall within the interval is $\mu \pm \sigma$ is:

(a) 68.26% (b) A least 75%
(c) 95.44% (d) None of these

16.41 The percentage of measurements of a normal random variable fall within the internal $\mu \pm 2\,\sigma$ is:

(a) At least 75% (b) 95.44%
(c) 99.74% (d) None of these

16.42 The percentage of measurement of a normal random variable fall within the interval is $\mu \pm 3\,\sigma$ is:

(a) At least 88.9% (b) 95.44%
(c) 99.74% (d) None of these

16.43 On an examination the average grade was 74 and the standard deviation was 7. If 10% of the class are given A's and the distribution of grades is to follow a normal distribution. Then the lowest possible A and highest possible B if $z_{.10}$ = 1.28 is:

(a) 83 and 82 (b) 84 and 83
(c) 85 and 84 (d) 82 and 81

16.44 Given a normal distribution with μ = 200 and σ^2= 100 then the two x values containing the middle 75% of the area if $z_{.125}$ = 1.15 are:

(a) 188.5 and 211.5 (b) 85 and 315
(c) 187.5 and 212.5 (d) None of these

16.45 If a set of observations is normally distributed, then the percentage of observations differs from mean by more than 1.3 σ is:

(a) 19.36% (b) 90.32%
(c) 9.68% (d) None of these

16.46 If a set of observations is normally distributed, then the percentage of observations differs from mean by less than 0.52 σ is:

(a) 69.85 (b) 30.15
(c) 39.7% (d) None of these

16.47 The IQ of 300 applicants to a certain college are approximately normally distributed with a mean of 115 and a standard deviation of 12. If the college required an IQ of at least 95, then the number of students those will be rejected on this basis regardless of their other qualifications are:

(a) 26 (b) 14
(c) None will be rejected (d) None of these

CHAPTER 17: SAMPLING AND SAMPLING DISTRIBUTIONS

17.1 The probability distribution of a statistic is called a:

(a) Probability distribution (b) Sampling distribution
(c) Frequency distribution (d) None of these

17.2 The probability distribution of $\bar{x}$ is called:

(a) Probability distribution of mean (b) Sampling distribution of mean
(c) Frequency distribution of mean (d) None of these

17.3 It is customary to refer to the standard deviation of the sampling distribution as the:

(a) Variance (b) Standard deviation of mean
(c) Standard error (d) Mean deviation

17.4 If all possible samples of size n are drawn, without replacement, from a finite population of size N with mean μ and standard deviation σ, then the sampling distribution of the sample mean $\bar{x}$ will be approximately normally distributed with a mean and standard deviation given by:

(a) $\mu_{\bar{x}} = \bar{x} \text{ and } \sigma_{\bar{x}} = \frac{S}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}}$ (b) $\mu_{\bar{x}} = \mu \text{ and } \sigma_{\bar{x}} = \frac{S}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}}$

(c) $\mu_{\bar{x}} = \bar{x} \text{ and } \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}}$ (d) None of these

17.5 The quantity $\sqrt{\frac{N-n}{N-1}}$ is known as:

(a) Sampling fraction (b) Population correction
(c) Finite population correction (d) None of these

17.6 If the population size is infinite or N is large as compared to n, then the finite population correction factor will be approximately equal to:

(a) Zero (b) One
(c) Infinite (d) None of these

17.7 If n = 10 and N = 1000 the value of finite population correction factor (fpc) is:

(a) 0.9909 (b) 1
(c) 0.9954 (d) None of these

17.8 If n = 2 and N = 5 the value of fpc is:

(a) 0.75 (b) 0.86
(c) 0.866 (d) None of these

17.9 If n = 40 and N = 10,000 the value of fpc is:

(a) 0.99 (b) 0.996
(c) 0.998 (d) None of these

17.10 If N = 4, n = 2, μ = 5.25; σ^2 = 2.1875 then the values of $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$ if sampling is done without replacement:

(a) 5.25 and 1.2076 (b) 5.25 and 0.8539
(c) 5.25 and 0.729 (d) None of these

17.11 If n = 2, μ = 5.25 and σ^2 = 2.1875 then the values of $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$ if sampling is done with replacement, are:

(a) 5.25 and 1.09375
(b) 5.25 and 1.0458
(c) Cannot be determined
(d) None of these

17.12 From a given population with $\sigma = 5.6$ kilograms samples were drawn with replacement, how may the standard error of the mean change, when the sample size is increased from 64 to 196:

(a) Reduced from 0.7 to 0.4
(b) Increased from 0.4 to 0.7
(c) Reduced from .0875 to .0286
(d) Increased from .0286 to .0875

17.13 From a given population with $\sigma = 5.6$ kilograms samples were drawn with replacement, how may the standard error of the mean change, when the sample size is decreased from 784 to 49:

(a) Decreased from 0.8 to 0.2
(b) Increased from 0.2 to 0.8
(c) Increased from 0.0071 to 0.114
(d) Decreased from 0.114 to 0.0071

17.14 If the random variable x and y are independent and normally distributed with means μ_x and μ_y and variances σ_x^2 and σ_y^2 respectively then the distribution of the difference x-y is normally distribute with mean $\mu_{x-y} = \mu_x - \mu_y$ and variance:

(a) $\sigma_{x-y}^2 = \sigma_x^2 - \sigma_y^2$
(b) $\sigma_{x-y}^2 = \sigma_x^2 + \sigma_y^2$
(c) $\sigma_{x-y}^2 = \sigma_x^2 - 2\sigma_x\sigma_y + \sigma_y^2$
(d) None of these

17.15 A sampling process that selects every k^{th} element in the population for the sample, with the starting point determined at random from the first k elements is known as:

(a) Sample random sampling
(b) Stratified random sampling
(c) Systematic random sampling
(d) None of these

17.16 A sampling process that selects simple random samples from mutually exclusive sub populations, of population is called:

(a) Simple random sampling
(b) Stratified random sampling
(c) Systematic random sampling
(d) None of these

17.17 A sampling process which selects samples from the given population with equal chance of selection to each unit is called:

(a) Systematic Random sampling
(b) Stratified random sampling
(c) Simple random sampling
(d) None of these

17.18 Given $\mu_1 = 5,\ \sigma_1^2 = \frac{8}{3}, \mu_2 = \frac{3}{2}$ and $\sigma_2^2 = \frac{9}{4}$ for two independent normal variates x_1 and x_2 then $\mu_{x_1-x_2}$ and $\sigma_{x_1-x_2}^2$ are:

(a) $\frac{13}{2}$ and $\frac{59}{12}$
(b) $\frac{7}{2}$ and $\frac{59}{12}$
(c) $\frac{7}{2}$ and $\frac{5}{12}$
(d) None of these

CHAPTER 18: HYPOTHESIS TESTING

18.1 The simplest form of inferential statistics, which uses known sample evidence (statistic) to draw conclusions regarding unknown population characteristics (parameter) is known as:

(a) Test of hypothesis (b) Estimation
(c) Inferential statistics (d) None of these

18.2 A numerical value assigned to the unknown population parameter is called:

(a) Statistic (b) Parameter
(c) An estimate (d) None of these

18.3 The statistic is referred to as ___________ of the unknown parameter.

(a) Estimator (b) Characteristic
(c) Unbiased (d) None of these

18.4 If the expected value of the estimator is equal to parameter being estimated, the estimator is said to be:

(a) Random (b) Efficient
(c) Unbiased (d) None of these

18.5 If an estimator achieves improved reliability and precession as the sample size becomes larger than the estimator is said to be:

(a) Efficient (b) Sufficient
(c) Consistent (d) None of these

18.6 Of all possible unbiased estimators of some parameter the one with the smallest variance is said to be:

(a) Most efficient (b) More consistent
(c) More random (d) None of these

18.7 A single numerical quantity used to estimate the population parameter is called:

(a) Point estimate (b) Interval estimate
(c) Unbiased estimate (d) None of these

18.8 If it is desirable to determine an interval within which one would expect to find the value of a parameter, such an interval is called:

(a) Point estimate (b) Interval estimate
(c) Unbiased estimate (d) None of these

18.9 The value obtained by subtracting the number of parameters to be estimated from the number of independent values in a sample is called:

(a) Type-I error (b) Type-II error
(c) Degrees of freedom (d) None of these

18.10 The procedure of establishing a set of rules that lead to the acceptance or rejection of some kind of statements about population parameters is called:

(a) Statistical hypothesis (b) Null hypothesis
(c) Testing of hypothesis (d) None of these

18.11 Any assumption or conjecture about one or more population is called:

(a) Statistical hypothesis (b) Null hypothesis
(c) Composite of hypothesis (d) None of these

18.12 The hypothesis against which we hope to gather evidence is called:

(a) Statistical hypothesis (b) Null hypothesis
(c) Composite of hypothesis (d) None of these

18.13 The hypothesis for which we wish to gather supporting evidence is called:

(a) Null hypothesis (b) Alternate hypothesis
(c) Composite hypothesis (d) None of these

18.14 All hypothesis testing results are important, but the test is statistically significant only when the hypothesis is:

(a) Accepted (b) Rejected
(c) Unbiased (d) None of these

18.15 Rejection of the null hypothesis when it is true is called:

(a) Type-I error (b) Type-II error
(c) Level of confidence (d) None of these

18.16 The probability of committing a type-I error is called:

(a) Type-II error (b) Level of significance
(c) Level of confidence (d) None of these

18.17 Acceptance of null hypothesis when it is false is called a:

(a) Type-I error (b) Type-II error
(c) Level of confidence (d) None of these

18.18 The very first statement which is tested for possible rejection is called:

(a) Null hypothesis (b) Alternate hypothesis
(c) Composite hypothesis (d) None of these

18.19 To prove that one teaching method is superior to another, the null hypothesis would be; that there is no difference in the two methods.

Is the stated hypothesis is:

(a) Correct (b) Incorrect
(c) Does not exist (d) None of these

18.20 The procedure by which we verify an established hypothesis is known as:

(a) Test of significance (b) Test-statistic
(c) Two-tailed test (d) None of these

18.21 A function obtained from sample data which provides the means of testing a statistical hypothesis, is called:

(a) Test of significance (b) Test-statistic
(c) One-tailed test (d) None of these

18.22 The area specified for the values which are significantly different from Null hypothesis value is called:

(a) Acceptance region (b) Critical region
(c) Level of significance (d) None of these

18.23 If the alternate hypothesis does not specify the departure from H_o in a particular direction, then the test is called:

(a) Significant (b) One-tailed
(c) Two tailed (d) None of these

18.24 If the alternate hypothesis specifies the departure from H_o in a particular direction, then the test is called:

(a) Not significant (b) One-tailed
(c) Two tailed (d) None of these

18.25 Given H_o : student A and B are equal in ability.

The given hypothesis was rejected and the conclusion was drawn that student A is more capable than student B.

In the coming years it was found that the conclusion drawn was incorrect and there was no difference in their capabilities. The type of error was committed by the statistician was:

(a) Type-I error (b) Type-II error
(c) Error in drawing conclusion (d) None of these

18.26 If n is large i.e. n>30, the variance of population is unknown, then the test-statistic for testing mean of population must be:

(a)	t-test	(b)	z-test
(c)	χ^2 test	(d)	None of these

18.27 If the sample size is small (i.e. n<30) and variance of population is known, then to test the population mean, the test statistic to be selected is:

(a)	Z-test	(b)	t-test
(c)	χ^2 test	(d)	None of these

18.28 While testing the hypothesis about population mean, t-test is only selected if: ***(01)***

(a)	n < 30	(b)	σ^2 is unknown
(c)	If (a) and (b) both are valid	(d)	None of these

18.29 While testing the hypothesis about population mean, if variance of population is known, then:

(a)	Only z-test is valid	(b)	Only t-test is valid
(c)	Either can be selected	(d)	None of these

18.30 While testing the hypothesis about population mean, if variance of population is unknown then the selection of test-statistic depends upon:

(a)	Size of population	(b)	Size of sample
(c)	The value of $\bar{x}$ and μ	(d)	None of these

18.31 While testing the hypothesis about population mean, if size of sample is large i.e. n> 30, then the selection of test-statistic depend upon:

(a)	Variance of population	(b)	Variance of sample
(c)	Does not depend upon anything	(d)	None of these

18.32 The sum of squares of a sequence of independent normal variates with mean μ and variance σ^2 is said to be:

(a)	A chi-square variate	(b)	A standard normal variate
(c)	A normal variate	(d)	None of these

CHAPTER 19: CHI-SQUARE

19.1 For α = 10% the value of $\chi^2_{.05}$ and $\chi^2_{.95}$ are:

(a) 3.84 and -3.84
(b) 3.84 and 0.004
(c) -3.84 and 0.004
(d) None of these

19.2 Chi-square values ranges from:

(a) $-\infty$ to $+\infty$
(b) -1 to +1
(c) 0 to ∞
(d) None of these

19.3 If we want to test whether or not two samples are independent, the test-statistic to be selected is:

(a) t-test
(b) z-test
(c) Chi-square test
(d) None of these

19.4 It is assumed (H_0) that the political affiliation of a person depends upon the level of education. The hypothesis was tested using:

(a) Normal distribution
(b) Chi square distribution
(c) Binomial distribution
(d) None of these

19.5 A CA Foundation course instructor believes that the grades of students in Foundation examination depend upon the college. The conjuncture will be tested by using:

(a) Chi-square distribution
(b) t-distribution
(c) Normal distribution
(d) None of these

19.6 Two populations proportions can be compared by using:

(a) Binomial distribution
(b) Normal distribution
(c) Chi-square distribution
(d) None of these

19.7 More than two (or several) population proportions can be tested simultaneously by using:

(a) Binomial distribution
(b) Normal distribution
(c) Chi-square distribution
(d) None of these

19.8 The expected frequencies are obtained by multiplying the row total with the column total and:

(a) Dividing by total number of observations
(b) Dividing by row total
(c) Multiplying by total number of observations
(d) None of these

19.9 When we want to test the hypothesis concerning population variance the distribution to be used is:

(a)	Normal distribution	(b)	t-distribution
(c)	Chi-square distribution	(d)	None of these

19.10 A table containing the data classified according to characteristics of population (attributes) is known as:

(a)	Frequency table	(b)	Contingency table
(c)	Correlation table	(d)	None of these

19.11 A technique by means of which we test the hypothesis whether the sample distribution is in agreement with the theoretical distribution is called:

(a)	Parametric test	(b)	Non-parametric test
(c)	Goodness of-fit-test	(d)	None of these

19.12 A goodness of-fit-test can be applied by using:

(a)	Normal distribution	(b)	t-distribution
(c)	Chi-square distribution	(d)	None of these

A

Answers

CHAPTER 1: ELEMENTARY MATHEMATICAL OPERATIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	A	A	D	D	B	A	C	B	D	B	A	A	C	C
16	**17**	**18**	**19**	**20**										
B	D	A	D	B										

CHAPTER 2: COORDINATE SYSTEM AND EQUATION OF A STRAIGHT LINE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	C	D	A	C	A	A	B	D	B	D	B	A	D	D
16	**17**	**18**	**19**	**20**										
A	A	C	B	D										

CHAPTER 3: SOLVING EQUATIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	B	C	D	A	D	A	B	D	C	D	B	C	B	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
A	B	A	A	D	A	C	D	B	D	B	A	B	C	C
31	**32**													
B	A													

CHAPTER 4: MATHEMATICAL PROGRESSION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	B	C	B	A	C	B	A	C	C	C	D	B	C	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
A	A	C	D	A	A	C	A	B	B	D	A	A	C	A
31	**32**	**33**	**34**	**35**	**36**									
A	A	B	B	D	D									

CHAPTER 5: FINANCIAL MATHEMATICS: COMPOUNDING

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
A	C	A	D	C	A	D	C	B	B	A	C	D	C	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
A	B	B	A	B	A	B	A	C	C	C	D	A	A	A
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
D	A	D	B	B	B	D	C	B	A	A	A	D	C	B
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
B	B	C	A	A	C	A	D	D	B	A	C	B	D	C
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**
B	A	B	A	D	A	B	C	C	A	D	B	B	B	C
76	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**
D	A	B	A	B	D	A	C	B	D	C	B	C	A	B
91	**92**	**93**	**94**	**95**										
C	B	D	A	B										

CHAPTER 6: FINANCIAL MATHEMATICS: DISCOUNTING

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**					
C	B	D	B	B	D	C	A	A	C					

CHAPTER 7: LINEAR PROGRAMMING

1(i)	**1(ii)**	**1(iii)**	**1(iv)**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
B	C	A	B	A	C	D	D	A	B	B	B	D	C	A
13	**14**	**15**	**16**	**17**										
C	B	A	A	C										

CHAPTER 8: CALCULUS: DIFFERENTIATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	C	B	A	C	A	C	A	C	A	D	D	C	A	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**					
D	A	B	A	A	A	B	A	B	C					

CHAPTER 9: CALCULUS: TURNING POINTS, MAXIMA, MINIMA AND POINTS OF INFLECTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	B	D	A	D	B	A	D	A	C	C	C	C	D	B
16	**17**	**18**	**19**	**20**										
B	A	D	B	B										

CHAPTER 10: MATRICES AND DETERMINANTS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	A	C	B	A	A	B	B	A	C	C	A	A	A	B
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	B	D	C	C	C	C	B	B	A	B	B	B	D	A
31	**32**	**33**	**34**	**35**										
A	A	C	B	B										

CHAPTER 11: COLLECTION, TABULATION AND PRESENTATION OF DATA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	A	C	C	C	B	C	B	C	A	B	A	C	B	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**							
C	B	A	B	B	C	B	A							

CHAPTER 12: STATISTICAL MEASURES OF DATA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	C	B	A	A	A	B	B	A	A	B	A	C	C	B
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
A	A	C	A	C	B	A	B	C	A	B	A	A	B	A
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
C	C	B	A	B	C	A	A	B	B	C	C	B	B	A
46	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	
C	C	C	C	C	B	B	C	B	B	C	B	C	C	

CHAPTER 13: REGRESSION AND CORRELATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	C	B	C	A	A	B	A	C	B	C	C	B	A	C
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	A	A	B	D	A	C	B	B	A	C	C	C	C	C
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
C	C	C	C	C	B	D	C	B	B	C	A	A	D	B
46	**47**	**48**	**49**	**50**	**51**									
C	B	A	B	B	B									

CHAPTER 14: INDICES

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	A	A	B	C	B	A	B	C	A	C	C	C	C	C

CHAPTER 15: COUNTING METHODS AND PROBABILITY

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
C	A	C	C	B	B	C	B	C	A	B	A	A	A	A
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	A	A	A	B	A	B	A	D	C	C	B	C	B	A
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
B	D	C	A	B	B	B	A	B	B	A	C	B	A	B
46	**47**	**48**	**49**	**50**										
A	A	C	C	A										

CHAPTER 16: PROBABILITY DISTRIBUTIONS

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
B	A	A	B	A	A	B	B	B	B	A	A	A	B	B
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	B	B	B	C	A	A	A	B	C	B	B	C	B	A
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
C	A	B	B	B	B	A	B	B	A	B	C	A	A	A
46	**47**													
C	B													

CHAPTER 17: SAMPLING AND SAMPLING DISTRIBUTIONS

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
B	B	C	C	C	B	C	C	C	B	B	A	B	B	C
16	**17**	**18**												
B	C	B												

CHAPTER 18: HYPOTHESIS TESTING

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	C	A	C	C	A	A	B	C	C	A	A	B	B	A
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	B	A	A	A	B	B	C	B	A	A	A	C	A	B
31	**32**													
C	A													

CHAPTER 19: CHI-SQUARE

1	2	3	4	5	6	7	8	9	10	11	12			
B	C	C	B	A	A	C	A	C	B	C	C			