Paper 4_Fundamentals of Business Mathematics and Statistics (FBMS)

Test Paper 1

Answer all questions. Each question carries 2 marks.

Choose the correct answer among the alternatives given. Suitable justification needs to be provided.

Section A: Fundamentals of Business Mathematics [40 marks]

Q1. If twice of money of A = 5 times of money of B, then the ratio of money of A to that of B
(a) 2 : 5
(b) 15: 25
(c) 12 :30
(d) 5: 2

Q2. If $\frac{1}{2}$ of money of A = $\frac{1}{3}$rd money of B = $\frac{1}{4}$ of money of C, then the continued ratio of money of A, B and C
(a) 2 : 3 : 4
(b) 6: 4 :3
(c) 4 :3 : 2
(d) 3 : 2 : 1

Q3. If 0.5 of A = 0.6 of B = 0.75 of C and A+B+C = 60, then the number which is to be added to A so that the result of this addition and B, C will be in continued proportion, is :
(a) 1
(b) 2
(c) 3
(d) 4

Q4. A borrowed ₹ 5,000 from S at simple interest. After 3 years, S got ₹ 300 more than what he had given to A. What was the rate of interest per annum?
(a) 2%
(b) 5%
(c) 8%
(d) 10%

Q5. Satish took a loan at 10% p.a. S.I. After 4 years, he returned the principal along with the interest. If he returns in all ₹ 3,500, what is the principal amount?
(a) ₹3,250
(b) ₹2,500
(c) ₹ 3,150
(d) ₹ 2,100

Q6. If the compound interest on a certain sum at $16\frac{2}{3}$ % for 3years is ₹1,270, the simple interest on the same sum at the same rate and for the same period is:
(a) ₹1,200
(b) ₹ 1,165
(c) ₹ 1,080
(d) ₹ 1,220

Q7. A container contains 40 kg of milk. From this container 4 kg of milk was taken out and replaced by water. This process was repeated further two times. Who much milk is now contained by the container?
(a) 27.36 kg
(b) 29.16 kg

(c) 28 kg
(d) 26.34 kg

Q8. The number of permutations if the letters in the word "BANANA" in which two letters N do not come together is:
(a) 40
(b) 60
(c) 80
(d) 100

Q9. There are 11 distinct books. Among them 6 books can be arranged in a shelf. The number of arrangements so that 3 particular books will be always side by side is:
(a) 2,016
(b) 8,064
(c) 144
(d) None of the above.

Q10. If $^{n}C_{12} = {}^{n}C_{8}$, then n :
(a) 20
(b) 12
(c) 6
(d) None of the above.

Q11. If x:y = 2:1, then $(x^2 - y^2) : (x^2 + y^2)$ is :
(a) 3:5
(b) 5:3
(c) 1:3
(d) 3:1

Q12. The value of $\int_0^1 \frac{dx}{x+\sqrt{x}}$ is
(a) $\log_e 2$
(b) $2\log_e 2$
(c) $-\log_e 2$
(d) None of these.

Q13. Let p be 'It is hot' and q be 'It is dry'. Then the statement 'It is not hot and it is not dry' can be written in symbolic form as
(a) $\sim p \vee q$
(b) $\sim p \wedge \sim q$
(c) $\sim p \vee q$
(d) $p \vee q$

Q14. If A = {1,3,5}, B = {1,3,6}, $\cup$ = { 1,2,3,4,5,6} then the set (A – B) $\cap$ B^c equals to
(a){ 1}
(b) { 5 }
(c) {1, 5}
(d) none of these.

Q15. If $\log_8 x + \log_8 \frac{1}{6} = \frac{1}{3}$, then the value of x is :
(a) 12
(b) 16
(c)18
(d) 24.

Q16. A Bill of ₹ 1,020 is due in 6 months. True discount in rupees at interest rate 4% per annum is
(a) 25
(b) 20
(c) 20.4
(d) None of them

Q17. If $y \propto \frac{1}{x^3}$ and x = 2 when y = 3, then for x = 3 the value of y is:
(a) $\frac{4}{3}$
(b) $\frac{\mathbf{8}}{\mathbf{9}}$
(c) $\frac{4}{9}$
(d) None of them

Q18. If $\log_{10000} x = -\frac{1}{4}$, then, x is equal to:
(a) $\frac{\mathbf{1}}{\mathbf{10}}$
(b) $\frac{1}{100}$
(c) $\frac{1}{1000}$
(d) $\frac{1}{10000}$

Q19. $\lim_{x \to 0} \frac{e^{px} - e^{qx}}{x}$ is evaluated as
(a) q - p
(b) $\frac{p}{q}$
(c) p - q
(d) None of these.

Q20. If h = g(x) = $\frac{px+q}{rx-p}$ then g(h) is equal to
(a) q
(b) x
(c) p
(d) None of these .

Section B : Fundamentals of Business Statistics [60 marks]

Q21. The total cost of manufacturing an article is ₹150. A pie diagram was drawn to show the cost. If the labour charges are represented ny a sector of 114°, find the sum spent for other expenses.
(a)₹105.20
(b)₹102.50
(c)₹501.20
(d)₹250.10

Q22. The arithmetic mean of first 9 counting numbers occurring with same frequency has its value:
(a) 45
(b) 190
(c) 5
(d) None of them.

Q23. The median of marks 55,60,50,40,57,45,58,65,57,48 of 10 students is
(a) 55
(b) 57
(c) 52.5
(d) None of them.

Q24. If the relation between two variables x and y is 3x – 2y = 5 and mode of x is 5 then mode of y is:
(a) 5
(b) 7.5
(c)10
(d) None of them.

Q25. If mean, mode and standard deviation of 10 observations are 65, 80 and 25 respectively then type of skewness of the data is
(a) Symmetric
(b) Positively skewed
(c) Negatively Skewed
(d) None of them.

Q26. If the sum of deviations of a number of observations about 4 and that about 3 are 40 and 50 respectively then arithmetic mean of the observations is

(a) 4
(b) 6
(c) 10
(d) None of these.

Q27. If two samples of sizes 4 and 5 have same mean but different standard deviations 1 and 3 respectively then the standard deviation of the combined sample is
(a) $\sqrt{5}$
(b) $\frac{\sqrt{51}}{3}$
(c) $\frac{\mathbf{7}}{\mathbf{3}}$
(d) None of these.

Q28. The mean and coefficient of variation of runs made by a batsman in 10 innings are 40 and 125% respectively. The s. d. of the runs made by the batsman is
(a) 50
(b) 40
(c) 20
(d) none of these.

Q29. What is the regression coefficient b_{xy} from the following details X = 0.64y + 19.10 ; Y = x + 5.25
(a) 0.85
(b) 0.64

(c) 0.98
(d) 1.

Q30. From the following data the Karl Pearson coefficient of correlation is

x	**6**	**8**	**10**	**7**	**10**	**7**
y	**12**	**10**	**8**	**12**	**8**	**10**

(a) 0.97
(b) 0.85
(c) -0.93
(d) 0.65

Q31. Frequency distribution may be defined as
(a) Tabular Representation of Statistical data
(b) Graphical representation of statistical data
(c) Pictorial Graphical representation of statistical data
(d) Line diagram.

Q32. Find the coefficient of correlation between X and Y if the covariance is 25 and the variance of X and Y are 9 and 12.66 respectively
(a) 1.89
(b) 0.58
(c) 2.32
(d) 1.54

Q33. From the following data , compute the index numbers using Laspeyres' method.

	p0	**q0**	**p1**	**q1**	**p0q0**	**p0q1**	**p1q0**	**p1q1**
A	**10**	**4**	**12**	**6**	**40**	**60**	**48**	**72**
B	**15**	**6**	**20**	**4**	**90**	**60**	**120**	**80**
C	**2**	**5**	**5**	**3**	**10**	**6**	**25**	**15**
D	**4**	**4**	**4**	**4**	**16**	**16**	**16**	**16**

Laspeyres' Index Number is:
(a)144.97
(b) 133.97
(c)128.87
(d)131.

Q34. Using the data in Q 33 Paasche's Index Number is
(a)144.97
(b) 133.97
(c)128.87
(d)131.

Q35. Using the data in Q 33 Fisher's Index Number is
(a)144.97
(b) 133.97
(c)128.87
(d)131.

Q36. What is the standard deviation of the data 10,12,5,8,15
(a)3.09
(b) 3.41
(c) 2.67
(d) 3.10

Q37. If AM and HM are 10 and 4.9 respectively, GM will be …
(a)4.1
(b) 13

(c) 7
(d) 14.75.

Q38. Fit a straight line trend to the following data by least square method.

2001	2003	2005	2007	2009
18	21	23	27	16

The trend line is:
(a) $Y_c = 31+0.1X$
(b) $Y_c = 21+0.1X$
(c) $Y_c = 41+0.1X$
(d) $Y_c = 11+0.1X$

Q39. Using the data in Q38 , expected total sales in 2012 is
(a)₹21.7 lakh
(b)₹31.7 lakh
(c)₹41.7 lakh
(d)₹61.7 lakh

Q 40. Using data in Q 38, annual increase in trend value of sales is
(a) ₹10000
(b)₹12000
(c)₹15000
(d)₹9000

Q41. What is the chance of getting a king in a draw from a pack of 52 cards?
(a)1/52
(b)1/12
(c)1/13
(d)1/14

Q42. Two cards are drawn from a pack of 52 cards. Find the probability that both are red cards.
(a)$^{26}C_2$
(b)$^{52}C_4$
(c)$^{52}C_2$
(d)$^{26}C_3$

Q43. The odds in favour of an event P are 3:4. The odds against another independent event Q are 7:4. What is the probability that at least one of the events will happen?
(a) 3/7
(b)4/7
(c)7/11
(d)7/12

Q44. A coin is tossed six times. What is the probability of obtaining at least 4 heads?
(a)$[1/2]^6$ ($^5C_4$ +$^4C_5$+$^4C_6$)
(b)$[1/2]^6$($^6C_4$+$^6C_5$+$^6C_6$)
(c)$[1/2]^6$($^4C_4$+$^5C_5$+$^6C_6$)
(d)$[1/2]^6$ ($^5C_5$ +$^4C_5$+$^4C_6$)

Q45. A box contains 100 transistors, 20 of which are defective, 10 are selected for inspection. Indicate what is the probability that all 10 are defective?
(a)$1/5^{10}$
(b)5^{10}
(c)10^5
(d)10^{20}

Q46. Using data in Q45, what is the probability that all 10 are good?
(a)$1-1/5^{10}$
(b)$1-5^{10}$
(c)$1-10^{5}$
(d)$1-10^{20}$

Q47. Using data in Q45, what is the probability that at least one is defective?
(a) $1-(5/5)^{10}$
(b)) $1-(4/5)^{10}$
(c)) $1-(6/5)^{10}$
(d)) $1-(10/5)^{10}$

Q48. Which of the following is true for a poison distribution
(a)Mean>Variance
(b) Mean<Variance
(c) Mean=Variance
(d) None of the above.

Q49. The mean of binomial distribution is measured by
(a)np
(b) npq
(c) pq
(d) nq.

Q50. ..... Is known as positional average
(a)Median
(b) Mean
(c) Mode
(d) Range.

Fundamentals of Business Mathematics and Statistics(FBMS)

Test Paper 2

Answer all questions. Each question carries 2 marks.

Choose the correct answer among the alternatives given. Suitable justification needs to be provided.

Section A: Fundamentals of Business Mathematics [40 marks]

Q1. The ratio of two numbers is 12 : 5. If the antecedent is 45, then the consequent is :
(a) 108
(b) 15
(c) 18.75
(d) 20

Q2. 5 years ago, the ages of father and son were in the ratio 5 : 3. If the sum of their present ages is 90 years. The present age of father is:
(a) 50 years
(b) 60 years
(c) 55 years
(d) None of the above.

Q3. If 0.4 : 1.4 :: 1.4 : x, the value of x is:
(a) 49
(b) 4.9
(c) 0.49
(d) 0.4.

Q4. A took a loan of ₹ 15,000 for 3 years at simple interest. If the total interest paid is ₹ 2,700, what is the rate of interest per annum?
(a) 5.4%
(b) 6%
(c) 9%
(d) 18%.

Q5. The compound interest on ₹20,480 at $6\frac{1}{4}$ % per annum for 2 years 73 days, is:
(a) ₹ 3,000
(b) ₹ 3,131
(c) ₹ 2,929
(d) ₹ 3,636

Q6. A sum of money placed at compound interest doubles itself in 5 years. It will amount to eight times itself in:
(a) 10 years
(b) 12 years
(c) 15 years
(d) 20 years.

Q7. To find out the total compound interest accrued on a sum of money after 5 years, which of the following information given in the statements P and Q will be sufficient?
P: The sum was ₹ 20,000.
Q: The total amount of simple interest on the sum after 5 years was ₹ 4,000.
(a) Only P is sufficient
(b) Only Q is sufficient
(c) Either P or Q is sufficient
(d) Both P& Q are needed

Q8. The marginal cost function is given by mc= $3x^2+5x$ and fixed cost is ₹5. The total cost function can be expressed as

(a) $x^3+\frac{5x^2}{2}+5x$

(b) x^3+5x^2+5

(c) $3x^2+5x$

(d) $3x^2+5$

Q9. The value of $\log_{\sqrt{2}} 32$ is :

(a) $\frac{5}{2}$

(b) 5

(c) 10

(d) $\frac{1}{10}$

Q10. If $\log_x \frac{1}{125} = -\frac{1}{2}$, the x is equal to:

(a) $\frac{3}{4}$

(b) $-\frac{4}{3}$

(c) $\frac{81}{256}$

(d) $\frac{256}{81}$.

Q11. True discount of a bill value due in 2 years at 4% per annum. Simple interest is ₹40. Then bill value is

(a) ₹ 540

(b) ₹ 500

(c) ₹ 460

(d) None of the above.

Q12. The value of $\lim_{x \to 0} \frac{1-\sqrt{1-x^2}}{x^2}$

(a) $\frac{1}{2}$

(b) $\frac{1}{3}$

(c) 0

(d) None of the above.

Q13. ---------- is the quadratic equation whose roots are 2+5 and 2- $\sqrt{5}$

(a) $X^2-4X-1=0$

(b) $2X^2-4X=1$

(c) $X^2-2X-1=0$

(d) $2X^2-2X-1=0$

Q14. If the roots of the equation $X^2+6X+C = 0$, are equal then C is equal to …….
(a) (7)
(b) (6)
(c) 9
(d) (3)

Q15. If the monthly sales of two companies X and Y are in the ratio of 2:3 and their operating expenses in the ratio of 5:8. If both makes an operating profit of `10,000 PM, their sales will be……..
(a) (₹69,000 , ₹70,000)
(b) (₹75,000, ₹65,800)
(c) (₹60,000, ₹90,000)
(d) (₹54,750, ₹45,960)

Q16. If $y= (\log x)^4$, then $\frac{dy}{dx}$ =
(a) $(4(\log x)^3/x)$
(b) $(4(\log x)^3/2x)$
(c) $(2(\log x)^3/x)$
(d) $(x \log x^3)$

Q17. The number of different words that can be formed from the letters of the word "TRIANGLE" so that no vowels are together is
(a) 7200
(b) 36000
(c) 14400
(d) 1240.

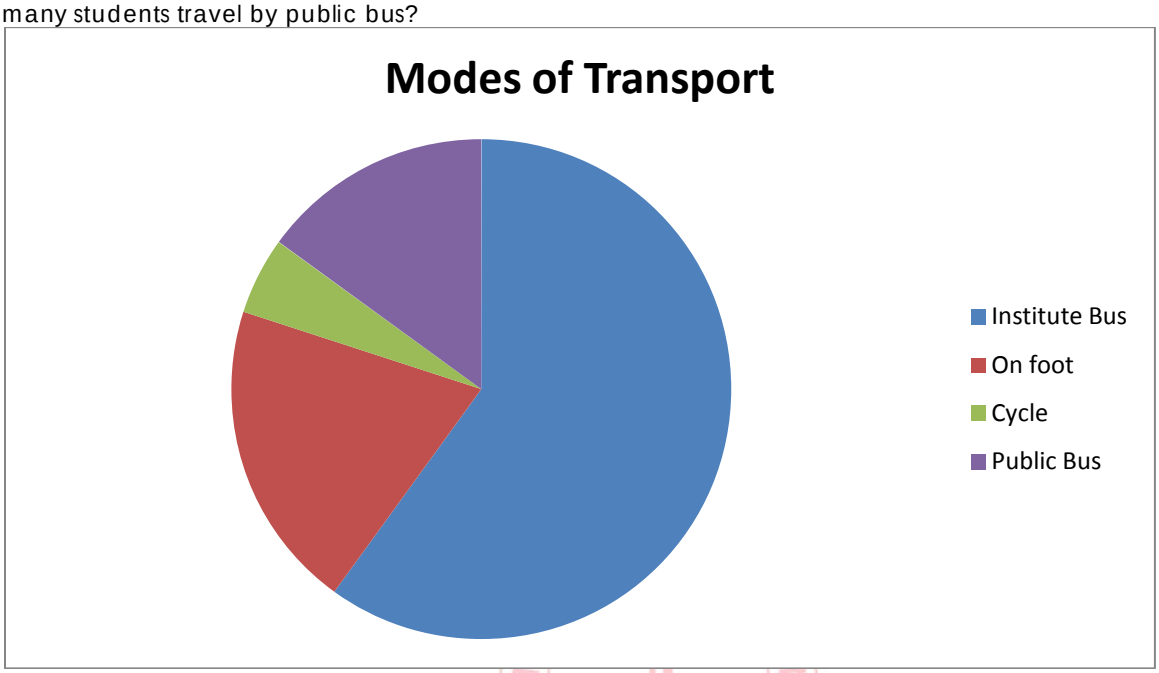
Q18. 5 letters can be posted in 4 letters in:
(a) 256 ways
(b) 1024 ways
(c) 625 ways
(d) None of the above.

Q19. Let p be "the student is a girl" and q be "the student is studious". Then the symbolic form of the statement "the student is a boy but he is not studies is
(a) p^~q
(b) ~p^q
(c) ~p^~q
(d) None of the above.

Q20. A two digit number is 6 times the sum of its digit, however if 9 is deducted from it the digits are reversed. The number is ……..
(a) 61
(b) 54
(c) 65
(d) 69.

Section B : Fundamentals of Business Statistics [60 marks]

Q21. In an Institution there are 800 students. Students use different modes of transport for going to the Institution and return. The given pie-diagram represents the requisite data. Read the diagram carefully and answer how many students travel by public bus?



(a)160
(b)120
(c)320
(d)480

Q22. On basis of data in Q21, how many students go on foot?
(a)160
(b)120
(c)320
(d)480

Q23. On basis of data in Q21, how many students do not use the Institute's bus?
(a)160
(b)120
(c)320
(d)480

Q24. If for two observations arithmetic mean is 80 and harmonic mean is 5 then geometric mean of them is
(a) 20
(b) 400
(c) 16
(d) None of the above.

Q25. If the maximum and minimum values of 10 observations are 40 and 10 then coefficient of range is:
(a) $\frac{5}{3}$
(b) $\frac{3}{5}$
(c) 30

(d) None of the above.

Q26. If the relation between 2 variables x and y is xy = 2 and arithmetic mean of variable x is 10, then harmonic mean of variable y is

(a) $\frac{1}{5}$

(b) $\frac{1}{10}$

(c) $\frac{2}{5}$

(d) None of the above.

Q27. What is the coefficient of regression of X on Y from the following information σ_x = 4, $\bar{Y}$ = 20, $\bar{X}$ = 25, r = 0.6. Standard deviation of Y = 5

(a) 0.48
(b) 0.75
(c) 0.90
(d) 0.58

Q28. From the following data the Karl Pearson coefficient of correlation is

x	9	11	13	10	13	10
y	16	14	12	16	12	14

(a) -0.93
(b) 0.85
(c) 0.70
(d)0.65

Q29. The following are the marks of 10 students in Physics and Maths obtained in CBSE Examination during 2012-13

Sr. No	1	2	3	4	5	6	7	8	9	10
Physics	80	87	59	89	97	95	79	90	94	76
Maths	74	78	76	70	89	90	65	81	83	75

The coefficient of rank correlation between the marks in Maths and Physics is

(a) 0.63
(b) 0.769
(c) 0.73
(d) 0.71

Q30. Given the coefficient of correlation being 0.8, the coefficient of determination will be……

(a) 0.98
(b) 0.64
(c) 0.66
(d) 0.54

Q31. In a group of 150 observations the arithmetic mean is 60 and arithmetic mean of first 100 observations of the group is 50. Then arithmetic mean of the remaining observations of the group is

(a) 80
(b) 60
(c) 50
(d) None of the above.

Q32. If the mean and coefficient of valuation of x are 10 and 50% respectively, then the standard deviation of 3 – 2x is
(a) 100
(b) 50
(c) 10
(d) None of the above.

Q33. If the coefficient of skewness, mean and variance of a set of values are -3, 40 and 4 respectively then media of the values is
(a) 46
(b) 42
(c) 41
(d) None of the above.

Q34. From the following data , compute the index numbers using Laspeyres' method.

	p0	q0	p1	q1	p0q0	p0q1	p1q0	p1q1
A	2	8	4	6	32	16	24	12
B	5	10	6	5	60	50	30	25
C	4	14	5	10	70	56	50	40
D	2	19	2	13	38	38	26	26

(a) 126.21
(b)125.0
(c)125.61
(d)125.62

Q35. Using data in Q34 compute index number using Paasche's method.
(a) 126.21
(b)125.0
(c)125.61
(d)125.62

Q36. Using data in Q34 compute index number using Fisher's Ideal method.
(a) 126.21
(b)125.0
(c)125.61
(d)125.62

Q37. For time series data---------- is used.
(a) Bar diagram
(b)Vertical diagram
(c)Pie chart
(d)Line diagram.

Q38. Below are given the figures of sales in thousand quintals of a firm operating in the sugar industry :

Year	2001	2003	2005	2007	2009
Sales in '000 quintals	70	90	100	130	170

Fit straight line trend to these figures using the least squares method
(a)$Y_c = 113+12\ X$
(b) $Y_c = 114+12\ X$
(c) $Y_c = 112+12\ X$
(d) $Y_c = 111+12\ X$

Q39. Using the data in Q38 , expected total sales in 2012 is
(a)197
(b)198
(c)196
(d)200.

Q40. Using data in Q 38, annual increase in the expected sales is ---------('000 quintals)
(a) 13
(b)12
(c)10
(d)11

Q41. Two coins are tossed simultaneously. What is the probability of getting a head and a tail?
(a) 1/4
(b)4/4
(c)2/4
(d)3/4

Q42. A bag contains 7 red, 12 white and 4 green balls. What is the probability that 3 balls drawn are all white?
(a)0.1242
(b)0.1348
(c)0.1254
(d)0.1534

Q43. Using the data in Q42, what is the probability that 3 balls drawn are one of each colour?
(a)0.1879
(b)0.1888
(c)0.1897
(d)0.1899

Q44. The probability that X and Y will be alive ten years hence is 0.5 and 0.8 respectively. What is the probability that both of them will be alive ten years hence ?
(a)0.12
(b)0.4
(c)0.13
(d) 0.1

Q45. A university has to select an examiner from a list of 50 persons, 20 of them women and 30 men, 10 of them knowing Hindi and 40 not. 15 of them being teachers and the remaining 35 not. What is the probability of the University selecting a Hindi-knowing women teacher ?
(a)0.024
(b)0.420
(c)0.240
(d)0.424

Q46. A problem in statistics is given to three students A, B, C hose chances of solving it are 1/2, 1/3, ¼ respectively. What is the probability that the problem will be not be solved ?
(a)1/4
(b)1/8
(c)1/5
(d)1/7

Q47. On basis of data in Q46 , what is the probability that the problem will be solved ?
(a)1/4
(b)2/4
(c)3/4
(d)4/4.

Q48. Which of the following is true for a binomial distribution
(a)Mean>Variance
(b) Mean<Variance
(c) Mean=Variance
(d) None of the above.

Q49. The middle most value of a frequency distribution table is known as
(a) Mean
(b) Median
(c) Mode
(d) Range.

Q50. Which of the following is a quantitative data
(a) Age
(b) Weight
(c) Height
(d) All the above.

Fundamentals of Business Mathematics and Statistics(FBMS)

Test Paper 3

Answer all questions. Each question carries 2 marks.

Choose the correct answer among the alternatives given. Suitable justification needs to be provided.

Section A: Fundamentals of Business Mathematics [40 marks]

Q1. ₹ 2530 is distributed between Ram and Hari such that Ram gets $\frac{11}{12}$ part that Hari gets. Then Hari gets :

(a) ₹1320
(b) ₹1210
(c) ₹1230
(d)₹1310.

Q2. The mean proportional of 4X and $16X^3$ is:
(a) $10x^2$
(b) $12x^2$
(c) $8x^2$
(d) $64x^4$

Q3. If $^{n}p_3 = 120$, then n :
(a) 8
(b) 4
(c) 6
(d) None of the above.

Q4. If ₹ 64 amount to ₹ 83.20 in 2 years, what will ₹ 86 amount to in 4 years at the same rate percent per annum?
(a) ₹ 127.40
(b) ₹124.70
(c) ₹114.80
(d) ₹ 137.60

Q5.V lent ₹ 150 to Sandeep for 4 years and₹600 to Deepak for 2 years. If he receives ₹ 90 as simple interest altogether, the rate of interest is:
(a) 12%
(b) 10%
(c) 5%
(d) 4%

Q6. The compound interest on ₹ 5,600 for $1\frac{1}{2}$ years at 10% per annum compounded annually is:

(a) ₹ 882.70
(b) ₹ 873.50
(c) ₹868
(d) ₹840

Q7. The value of $\log_{343} 7$ is:

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

Q8. If $\log_{32} x = 0.8$, then x is equal to:
(a) 25.6
(b) 16
(c) 10
(d) 12.8

Q9. If the total cost function $C = x^3 - 2x^2 + 5x$, then the marginal cost is equal to:
(a) $x^2 - 4x + 5$

(b) $3x^2 - 4x + 5$
(c) $3x^2 - 4x$
(d) None of the above.

Q10 . If $y = x^x$ then $\frac{dy}{dx}$ is
(a) x log x
(b) x (1+log x)
(c) x^x (1 + log x)
(d) None of the above.

Q11. The maxima value of the function $4x^3 + x^2 - 4x + 12$ is
(a)113/2
(b) 376/27
(c) -2/3
(d) 43/4

Q12. A firm's variable cost $c=x^3-x^2-5x$. The level of output at which average variable cost is minimum is
(a) (2 ton)
(b) (5/3 ton)
(c) (1 ton)
(d) (3/2 ton)

Q13. If $y = (x^2 + 5)^2$ then $\frac{dy}{dx}$, at x = 2 is
(a) 18
(b) 72
(c) 81
(d) 36

Q14. The number of ways in which letters of the word 'ALGEBRA' can be arranged so that the two A's will not remain together is
(a)1600
(b) 1800
(c) 2000
(d) None of the above.

Q15. If $^{15}c_r : {}^{15}c_{r-1} = 11 : 5$, then r :
(a) 4
(b) 5
(c) 6
(d) 7

Q16. A man has 6 friends. The total number of ways so that he can invite one or more of his friends is equal to:
(a) 64
(b) 60
(c) 720
(d) 63

Q17. The total number of arrangements of the letters in the expression $x^3y^2z^4$ when written in full length is
(a) 2520
(b) 1260
(c) 610
(d) None of the above.

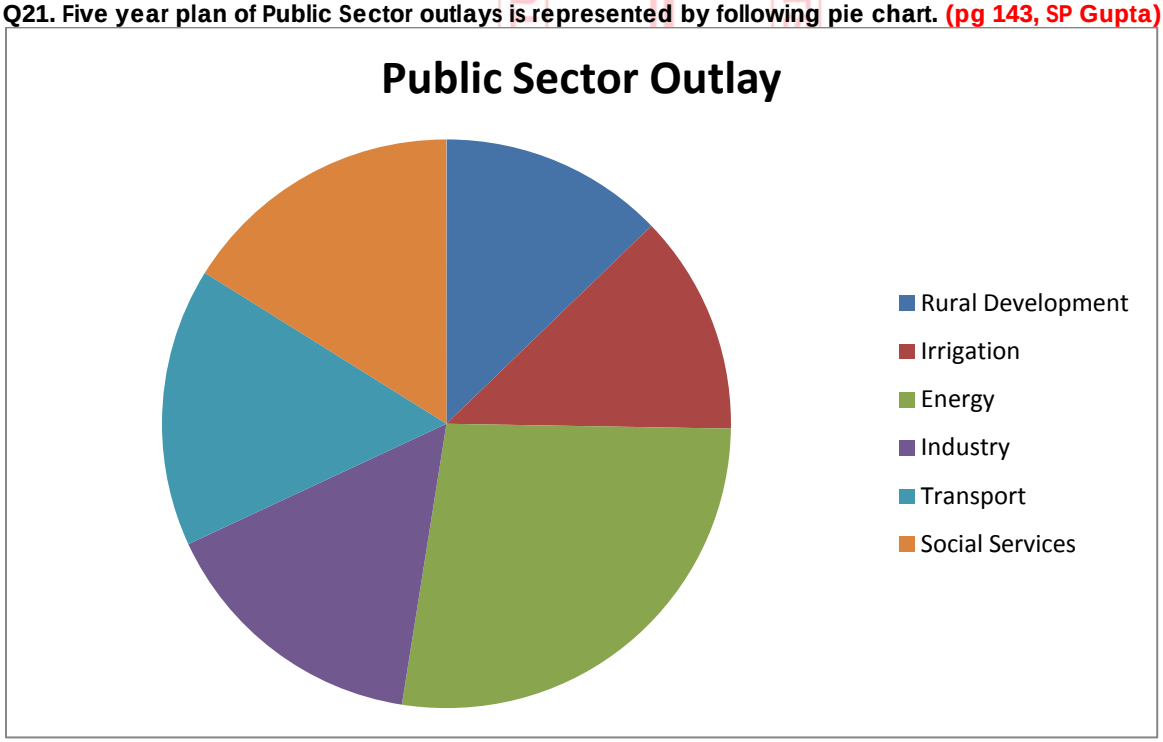
Q18. How many numbers can be formed between 100 to 1000 out of 1,3,4,7,8 if repetition of any number is allowed
(a)60
(b) 84
(c) 125
(d) 92

Q19. If f(x-1) = 2x-3, then f (x) :
(a) 2x - 1
(b) 2x + 1
(c) x – 2
(d) 3x + 2.

Q20. A mixture of 20kg of spirit and water contains 10% water. How much water must be added to this mixture to raise the percentage of water to 25%?
(a) 4 kg
(b) 5 kg
(c) 8 kg
(d) 30 kg

Section B: Fundamentals of Business Statistics [60 marks]

Q21. Five year plan of Public Sector outlays is represented by following pie chart. (pg 143, SP Gupta)



Percentage outlay in Rural development is
(a)12.08
(b)12.09
(c)12.9
(d)12.6

Q22. On basis of data in Q21, percentage outlay in Energy is
(a)16.1
(b)27.2
(c)15.9
(d)16.1

Q23. On basis of data in Q21, percentage outlay in Transport is
(a)16.1
(b)27.2
(c)15.9
(d)16.1

Q24. On basis of data in Q21, percentage outlay Industry is
(a)16.1
(b)27.2
(c)15.4
(d)16.1

Q25. If the observations 2,4,8 and 16 occur 8,6,4 and 2 times respectively then the geometric mean of the observations is
(a) 8
(b) $4\sqrt{2}$
(c) 4
(d) None of the above.

Q26. If sum of deviation of 4 values about 2 is 4 and standard deviation of those 4 values is 2 then sum of squares of the 4 observations is
(a) 52
(b) 40
(c) 20
(d) None of the above.

Q27. What is the coefficient of regression of X on Y from the following information
$\sigma_x = 8$ $\bar{Y} = 36$ $\bar{X} = 30$, $r = 0.7$. **Standard deviation of Y = 6**
(a) 0.40
(b) 0.75
(c) 0.93
(d) 0.65

Q28. From the following data the Karl Pearson coefficient of correlation is

X	**7**	**9**	**11**	**8**	**11**	**8**
y	**14**	**12**	**10**	**14**	**10**	**12**

(a) 0.97
(b) 0.85
(c) 0.78
(d) -0.93

Q29. Number of observations N=10
Mean X= 22, Mean Y=15, Sum of squared deviations of X from mean value = 120, Sum of squared deviation of Y from mean value=144. Sum of multiplication of deviation of X and Y =124
From the above details the coefficient of correlation will be
(a) 0.78
(b) 0.87
(c) 0.65
(d) 0.43

Q30. The following are the ranks of 10 students in Economics and Accountancy

Sr. No.	1	2	3	4	5	6	7	8	9	10
Rank Accountancy	10	4	1	8	3	9	6	5	2	7
Rank Economics	8	3	2	6	1	7	10	9	4	5

The coefficient of rank correlation between the marks in Accountancy and Economics is

(a) 0.648
(b) 0.872
(c) 0.69
(d) 0.78

Q31.If harmonic mean of first 5 observations is 5/2 and harmonic mean of another 5 observations is the harmonic mean of all 10 observations is

(a) 7
(b) $\frac{45}{14}$
(c) $\frac{101}{36}$
(d) None of the above.

Q32. The price index & quantity index of a commodity were 120 & 110 respectively in 2012 with base 2011. Find its value index number in 2012 with base 2011.

(a) 134
(b)133
(c)132
(d)131

Q33. From the following data , compute the index numbers using Bowleys' method.

	p0	q0	p1	q1	p0q0	p0q1	p1q0	p1q1
A	2	8	4	6	32	16	24	12
B	5	10	6	5	60	50	30	25
C	4	14	5	10	70	56	50	40
D	2	19	2	13	38	38	26	26

(a) 126.21
(b)125.00
(c)125.61
(d)125.62

Q34. From the data in Q33, compute the index numbers using Marshall-Edgeworth method.

(a) 126.21
(b)125.00
(c)125.61
(d)125.48

Q35. The sales of a commodity (in '000 of) are given below :

Year	2001	2002	2003	2004	2005	2006	2007
Sales(in 000 of `)	82	86	81	86	92	90	99

Using the method of least squares, fit a straight line equation to the data:

(a)$Y_C = 89+2.5\ X$
(b) $Y_C = 88+2.5\ X$
(c) $Y_C = 87+2.5\ X$
(d) $Y_C = 86+2.5\ X$

Q36. Using data in Q35 , what is average annual change in sales?
(a)₹2600
(b)₹2700
(c)₹2500
(d)₹3000

Q37. Using data in Q35, what is expected sales in 2012?
(a)₹100000
(b)₹108000
(c)₹109000
(d)₹106000

Q38. What is the coefficient of regression of X on Y from the following information
$\sigma_x = 36$ $\bar{Y} = 30$ $\bar{X} = 36$, $r = 0.8$. Standard deviation of Y = 32
(a) 0.48
(b) 0.55
(c) 0.40
(d) 0.90

Q39. Arithmetic mean of 5 observations is 8. After calculation it was noted that observations 10 and 20 have been wrongly taken place of correct values 15 and 25 respectively. The correct mean is
(a) 18
(b) 9
(c) 13
(d) none of the above.

Q40. For a group of 10 observations, $\sum x = 452$, $\sum x^2 = 24270$ and mode 43.7 the coefficient of skewness is
(a) 0.8
(b) 0.08
(c) 8
(d) none of the above.

Q41. One card is drawn at random from a well-shuffled pack of 52 cards. What is the probability that it will be a diamond ?
(a) 1/13
(b)1/4
(c)1/52
(d)1/15

Q42. Using data in Q41, what is the probability that it will be queen?
(a) 1/13
(b)1/4
(c)1/52
(d)1/15

Q44. An urn contains 8 white and 3 red balls. If two balls are drawn at random, find the probability that both are white ?
(a)3/55
(b)28/55
(c)24/55
(d)11/55

Q45. Using data in Q44, find the probability that both are red ?
(a)3/55
(b)28/55
(c)24/55
(d)11/55

Q46. Using data in Q44, find the probability that one is of each colour ?
(a)3/55
(b)28/55
(c)24/55
(d)11/55

Q47. The probability that an evening college student will graduate is 0.4. Determine the probability that out of 5 students none, will graduate.
(a) 0.080
(b)0.259
(c)0.922
(d)0.078

Q48. On basis of data in Q47, what is the probability that one will graduate?
(a) 0.080
(b)0.259
(c)0.922
(d)0.078

Q49. On basis of data in Q47, what is the probability that atleast one will graduate?
(a) 0.080
(b)0.259
(c)0.922
(d)0.078

Q50. Class mark is
(a) A midpoint of class interval
(b) Upper point of class interval
(c) Lower class
(d) None of the above.

Fundamentals of Business Mathematics and Statistics(FBMS)

Test Paper 4

Answer all questions. Each question carries 2 marks.

Choose the correct answer among the alternatives given. Suitable justification needs to be provided.

Section A: Fundamentals of Business Mathematics [40 marks]

Q1. The inverse ratio of $1\frac{3}{5} : 2\frac{1}{4}$ is

(a) 32 : 45
(b) 45: 32
(c) 18 :5
(d) 5: 18

Q2. The ratio of two numbers is 2: 3. If 6 is subtracted from the second number then the number which is subtracted from the first number so that the new ratio becomes the same as that of the previous, is
(a) 2

(b) 6
(c) 8
(d) 4

Q3. The third proportional of 1 hour 20 minutes, 1 hour 40 minutes is:
(a) 1 hrs 50 minutes
(b) 2 hrs
(c) 2 hrs 5 minutes
(d) 2hrs 25 minutes

Q4. If A: B = 5 : 8, A : C = 6 : 11, then A : B: C :
(a) 30: 36 : 55
(b) 24 : 30 : 55
(c) 30 : 48 : 55
(d) None of the above.

Q5. In how many ways 1 boy and 1 girl can be selected out of 12 boys and 7 girls for a Kho Kho team
(a)120
(b) 84
(c) 19
(d) 5

Q6. If $^{n}p_{5} = 20.\ ^{n}p_{3}$, then the value of n is:
(a) 6
(b) 8
(c) 7
(d) None of the above.

Q7. The number of different numbers of 6 digits (without repetition) can be formed from the digits 3, 1, 7,0,9,5 is
(a) 600
(b) 120
(c) 720
(d) None of the above.

Q8. The number of six letter word that can be formed using the letters of the word "assist" in which s's alternate with other letters is:

(a) 12
(b) 24
(c) 6
(d) 18

Q9. If $^{n}c_{6} : {}^{n-3}c_{3} = 33 : 4$, then n :

(a) 9
(b) 10
(c) 11
(d) None of the above.

Q10. If $f(x) = \frac{2x+3}{4x-1}$, then $f(x) \cdot f(\frac{1}{x})$:

(a) 1

(b) $\frac{6x^2+13x+6}{17x-4-4x^2}$

(c) $\frac{6x^2}{4x^2} \quad \frac{13x+6}{4 \quad 17x}$

(d) None of the above.

Q11. The average number of first five prime number is :

(a) 4.5
(b) 5
(c) 5.6
(d) 7.5

Q12. How many kilograms of sugar costing ₹ 9 per kg must be mixed with 27 kg of sugar costing ₹ 7 per kg so that there may be a gain of 10% by selling the mixture at ₹ 9.24 per kg?

(a) 54 kg
(b) 63 kg
(c) 36 kg
(d) 42 kg

Q13. A person borrowed ₹ 500 at the rate of 5% per annum S.I. What amount will he pay to clear the debt after 4 years?

(a) ₹ 200
(b)₹550
(c) ₹ 600
(d) ₹ 700

Q14. The simple interest at x% for x years will be ₹ X on a sum of:

(a) ₹ x
(b) ₹ 100x

(c) ₹ $\left(\frac{100}{x}\right)$

(d) ₹ $\left(\frac{100}{x^2}\right)$

Q15. The difference between the interests received from two different banks on ₹ 500 for 2 years, is ₹ 2.50. The difference between their rates is:
(a) 1%
(b) 0.5%
(c) 0.25%
(d) 42.5%

Q16. The value of $\log_2 (\log_5 625)$ is:
(a) 2
(b) 5
(c) 10
(d) 15

Q17. If $\log_{10} 2 = 0.3010$ and $\log_{10} 3 = 0.4771$, then the value of $\log_{10} 1.5$ is
(a) 0.7161
(b) 0.1761
(c) 0.7116
(d) 0.7611

Q18. $\int_{1}^{2} \frac{dx}{\sqrt{x-1}}$ is evaluated as
(a) 2
(b) $2\sqrt{2}$
(c) - 2
(d) $-2\sqrt{2}$

Q19. Evaluate $\lim_{x \to 2} (3x + 6)$
(a) 1
(b) 10
(c) 12
(d) 14

Q20. There are 10 lamps in a room. Each one of them can be switched on independently. The number of ways in which the hall can be illuminated is:
(a) 100
(b) 10 24
(c) 1023
(d) 101

Section B : Fundamentals of Business Statistics [60 marks]

Q21. Statistics is derived from
(a) Latin word status
(b) Italian statista
(c) Both of the above.
(d) None of the above.

Q22. Open end class interval is one
(a) Which does not have upper limit
(b) Which does not have lower limit
(c) Which does not have upper and lower limit
(d) None of the above.

Q23. Histogram consists of a set of rectangle having
(a) Bases on X axis and with centre at the class mark and length equal to the class interval
(b) Area proportionate to class frequency

(c) Either of the above.
(d) Both a and b.

Q24. If the mean of 50 observations is 50 and one observation 94 is wrongly recorded there as 49 then correct mean will be
(a) 49.1
(b) 50
(c) 50.9
(d) None of the above.

Q25. Out of 100 observations 25 observations have the value 1 and rest of the observations are zero. The standard deviation of 100 observations is
(a) $\frac{\sqrt{3}}{2}$
(b) $\frac{3}{2}$
(c) $\frac{\sqrt{3}}{4}$
(d) None of the above.

Q26. The media of the following distribution

X	**:**	**1**	**2**	**3**	**4**
Frequency	**:**	**7**	**12**	**18**	**4**

(a) 2
(b) 3
(c) 4
(d) None of the above.

Q27. What is the coefficient of regression of X on Y from the following information
$\sigma_x = 5$ $\bar{Y} = 32$ $\bar{X} = 25$, $r = 0.64$. **Standard deviation of Y = 32**

(a) 0.50
(b)0.70
(c) 0.618
(d) 0.65

Q28. From the following data the Karl Pearson coefficient of correlation is

X	11	15	15	12	15	10
y	**18**	**13**	**11**	**15**	**11**	**16**

(a) -0.99
(b) -0.89
(c) 0.80
(d) -0.50

Q29. Sum of deviations of X from mean value =8, Sum of squared deviation of Y from mean value =54. Sum of multiplication of deviation of X and Y =32, Sum of squared deviations of X from mean value =60. From the above details the coefficient of correlation will be
(a) 0.58
(b) 0.56
(c) 0.61
(d) 0.47

Q30. What is the covariance if the coefficient of correlation between x and y is 0.65 and the variance of x and y are 25 and 9 respectively

(a) 10.25
(b) 8.65
(c) 9.75
(d) 11.06

Q31. No of observations N=10
Mean X=22, Mean Y=15, Sum of squared deviations of X from mean value=148, Sum of squared deviation of Y from mean value =168. Sum of multiplication of deviation of X and Y=36
From the above details the coefficient of correlation will be……..

(a) 0.27
(b) 0.61
(c) 0.45
(d) -0.10

Q32. Chain index is derived as

(a)[Current year link relative +previous year link relative]/100
(b)[Current year link relative *previous year link relative]/100
(c)[Current year link relative(-)previous year link relative]/100
(d)[Current year link relative /previous year link relative]/100

Q33. Consumer Price index is= ∑PV/∑V. Here V denotes

(a) p_0q_1
(b) p_1q_0
(c) p_0q_0
(d) p_1q_1

Q34. From the following data , compute the index numbers using Fisher's Ideal Index method.

	p0	q0	p1	q1	p0q0	p0q1	p1q0	p1q1
A	6	50	10	60	300	600	500	360
B	2	100	2	120	200	240	200	240
C	4	60	6	60	240	360	360	240

(a) √(1060/740)* (840/1200)
(b) √(1060/740)* (1200/840)
(c)√(840/740)* (1060/1200)
(d)√(1060/840)* (740/1200)

Q35.

Year	2003	2004	2004	2006	2007	2008	2009
Gross Ex factory value(in croresof `)	672	824	967	1204	1464	1758	2057

Using the method of least squares, fit a straight line equation to the data:

(a) $Y_C = 1278+232.9\ X$
(b) $Y_C = 1268+232.9\ X$
(c) $Y_C = 1258+232.9\ X$
(d) $Y_C = 1248+232.9\ X$

Q36. Using data in Q35, what is expected gross ex -factory value in 2013?

(a)₹2909.3 crores
(b)₹2908.3 crores
(c)₹2907.3 crores
(d)₹2906.3 crores

Q37. Using data in Q35, what is annual average change in gross ex-factory value?
(a) ₹232.9 crores
(b) ₹233.9 crores
(c)₹234.9 crores
(d)₹235.9 crores

Q38. If the coefficient of correlation between x and y is 0.52 and covariance is 25 and the variance of X is 16, the standard deviation of Y will be……..
(a) 4.9
(b) 12
(c) 11.87
(d) 2.99

Q39.

Interview	**44**	**46**	**34**	**41**	**36**	**39**	**45**	**43**	**31**	**32**
Written examination	**49**	**44**	**39**	**40**	**42**	**46**	**41**	**38**	**43**	**47**

The above table shows the marks obtained by 10 students in their personal interview and written examination for Service Commission Examination. The rank correlation between the ranks obtained by them is……..
(a) -0.127
(b) 0.19
(c) 0.33
(d) 0.42

Q40. If the coefficient of determination being 0.49, what is the coefficient of correlation

(a) 0.7
(b) 0.80
(c) 0.90
(d) 0.60

Q40. Two cards are drawn from a pack of cards at random. What is the probability that it will be a diamond and a heart?
(a)1/221
(b)6/663
(c)13/102
(d)26/52

Q41. On basis of data in Q40, what is the probability that it will be a king and a queen?
(a)1/221
(b)6/663
(c)13/102
(d)26/52

Q41. On basis of data in Q40, what is the probability that it will be two kings?
(a)1/221
(b)6/663
(c)13/102
(d)26/52

Q42. Tickets are numbered from 1 to 100. They are well shuffled and a ticket is drawn at random. What is the probability that the drawn ticket has an even number?
(a)1/5
(b)1/2
(c)1/4
(d)1/10

Q43. On basis of data in Q42, what is the probability that the drawn ticket has a number 5 or multiple of 5?
(a)1/5
(b)1/2
(c)1/4
(d)1/10

Q44. On basis of data in Q42, what is the probability that the drawn ticket has a number greater than 75?
(a)1/5
(b)1/2
(c)1/4
(d)1/10

Q45. On basis of data in Q42, what is the probability that the drawn ticket has a number which is a square?
(a)1/5
(b)1/2
(c)1/4
(d)1/10

Q46. If the mean of a Poisson distribution's 4, find S.D.
(a)0.25
(b)2
(c)3.25
(d)4

Q47. On basis of data in Q47, find skewness.
(a)0.25
(b)2
(c)3.25
(d)4

Q48. . On basis of data in Q47, find Kurtosis.
(a)0.25
(b)2
(c)3.25
(d)4

Q49. On basis of data in Q47, find variance.
(a)0.25
(b)2
(c)3.25
(d)4

Q50. Calculate Median value from the following frequency distribution

X	3	5	7	9	11	13
Y (Frequency)	4	3	5	2	3	3

(a) 6.5
(b) 6
(c) 5.5
(d) 7