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De Mazenod College, Kandana
Business Statistics I

2nd Term test - (April 2016) **Grade 12**

01 $\frac{1}{2}$ hours

Learning Resource Center De Mazenod College Kandana

Answer all questions.

1. Which of the following statements is true?
   1) One of the main advantages of mailed questionnaire method is that it ensures a high response rate.
   2) In general personal interview method is cheaper than the self enumeration method.
   3) There is no difference between questionnaire and a schedule.
   4) Statistical conclusions are not always exact as mathematical conclusions.
   5) Data taken from an annual report of an institution is considered as primary data.

2. Which of the following statements is not true?
   1) Data obtained in a sample survey are termed as primary data.
   2) Data taken from an annual report of a company is considered as secondary data.
   3) In general, personal interview method gives high response rate than postal questionnaire method.
   4) Even if the respondents are illiterate, the postal questionnaire method can be widely used.
   5) A schedule is used to collect data in personal interviews.

3. Which of the following statements is true?
   1) A schedule is a form containing a set of questions filled out by a respondent.
   2) The personal interview method is an appropriate method for collection of data when high response rate is expected.
   3) Checking of errors on a questionnaire using a pilot survey is called editing.
   4) Mail questionnaire method of enquiry is most appropriate for rural areas compared to urban areas.
   5) If the returned questionnaire is incomplete , then the questionnaire of that respondent should be ignored.

4. The width of a class interval is calculated as
   1) The sum of the upper and lower boundaries
   2) Half of the sum of the upper and lower boundaries
   3) Half of the sum of the upper and lower limits
   4) The difference between upper and lower limits
   5) The difference between upper and lower boundaries.

5. In order to compare annual imports cost and exports income for the last 10 years, the most appropriate diagram would be
   1) Simple bar chart
   2) Component bar chart
   3) Pie chart
   4) Profile chart
   5) Z chart

6. The most appropriate way of displaying monthly sales revenue and monthly cost of sales of a company for last 3 years is a
   1) Simple bar chart
   2) Z chart
   3) Component bar chart
   4) Multiple bar chart
   5) Line graph

7. The average mark of girls and boys in a class of Business statistics is 59. If the average marks of boys is 65 and that of girls is 50 the percentages of boys and girls respectively in the class are
   1) 60 and 40
   2) 55 and 45
   3) 70 and 30
   4) 50 and 50
   5) 45 and 55

In a small company two typists are employed. Typist A types one page in ten minutes while typists B take twenty minutes for the same. Both are asked to type for one hour. What is the average time taken by them for typing one page?

1) 6 minutes and 40 seconds
2) 13 minutes and 20 seconds
3) 14 minutes and 10 seconds
4) 15 minutes
5) 18 minutes

A consumer affairs agency wants to check the weight of a new product. A random sample of 25 items of the roduct was taken and the weights in grams were recorded as follows.

Weight	Number
74 – 77	3
77 – 80	6
80 – 83	9
83 – 86	3
86 – 89	4

The third quartile of the weight of the product is

1) 18.75
2) 75.00
3) 83.00
4) 83.75
5) 84.50

10. Which one of the following measures is unaffected by outliers?

1) Mean
2) Standard deviation
3) Range
4) Absolute deviation
5) Interquartile range

11. Suppose a frequency distribution is skewed with a median 75 and mode 80. Which of the following is a possible value for the mean of the distribution?

1) 70
2) 75
3) 78
4) 80
5) 91

12. Which of the following statements are/is true?

A – If 9 is subtracted from each observation of a data set , then the variance of that data set is reduced by 9.

B – If the mean salary of sewing machine operators of a garment factory is Rs. 600 per day and the standard deviation of salaries isRs.120, then the coefficient of variation is 20%.

C – If the coefficient of variation of data set A is larger than that of data set B then that set A is more consistent.

1) A only
2) B only
3) C only
4) A and B only
5) B and C only

13. The term test scores of 15 students enrolled in a Business Statistics course were recorded in ascending order as follows

4, 7, 7, 9, 10, 11, 13, 15, 15, 15, 17, 17, 19, 19, 20

After calculating the mean, median and mode an error is discovered. One of the values of 15 is really a 17. The measure(s) of central tendency which will change is /are

1) The mean
2) The mode
3) The median
4) The mean and mode
5) The mean , median and mode.

14. The output of a machine over a period of seven days is given below.

Day	1	2	3	4	5	6	7
Output	107	110	103	107	106	104	105

The mean and mean absolute deviation for the above data are respectively

1) 106 and 1.56
2) 107 and 2.0
3) 106 and 1.714
4) 108 and 1.857
5) 108 and 1.92

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15. A scientist is weighting each of 30 fish. She obtained a mean of 30g and a standard deviation of 2 g. After completing the weighting she finds that scale was wrong, and always under reported every weight by 2 g. What is the mean and standard deviation after correcting the error in the scale?
    1) 28 and 2
    2) 30 and 4
    3) 32 and 2
    4) 32 and 4
    5) 28 and 4

16. The sum of 10 observations is 150. The sum of squares of these observations are 2500 and the median is 14. The Pearson's coefficient of skewness is
    1) 0.6
    2) 0.2
    3) -0.2
    4) -0.6
    5) 1

17. If $Q_3 - Q_2 = 1/2\ (Q_2 - Q_1)$ of a certain distribution, that distribution is
    1) Right skewed
    2) Left skewed
    3) Symmetrical
    4) Leptokurtic
    5) Mesokurtic.

18. Which of the following statements is true about box and whisker diagram?
    A – The longer whisker to the left and longer box indicate that the distribution is positively skewed.
    B - The length of the box is equal to the interquartile range.
    C – For a normal distribution the length of the left box and left whisker are equal to the length of right box and right whisker.
    1) C only
    2) A and B only
    3) A and C only
    4) B and C only
    5) A, B, and C

19. The harmonic mean of 5 sample observations 4, 20, 12, 10, and 15 is,
    1) 7.09
    2) 8.09
    3) 9.09
    4) 9.92
    5) 10.02

20. Coefficients of variation of two series are 75 and 90 with standard deviations 15 and 18 respectively. The means of two series are
    1) 5 and 5
    2) 5 and10
    3) 10 and 10
    4) 20 and10
    5) 20 and 20

21 The geometric mean of 4,8 and 16 is
    1) 6.86
    2) 8
    3) 9
    4) 9.33
    5) 22.63

22. For the given set of observations 7, 8, 9, 9 and 17
    1) Mean is greater than median
    2) Mode is greater than mean
    3) Mode is greater than median
    4) Median is greater than mode
    5) Median is greater than mean.

23. Which of the following statements are/is true about the skewness?
    A – In a positively skewed distribution, mean<median<mode
    B – The median does not always lie between the mean and the mode in a skewed distribution.
    C – Bowley's measure of skewness is based on quartiles.
    1) A only
    2) B only
    3) C only
    4) A and B only
    5) B and C only

If the coefficient of variation of the data set A is larger than that of data set B, which of the following statements is/are true?

P – The data set A is more consistent

Q – The data set A is less consistent.

R – The distribution of A is skewed than the distribution of B.

1) P only
2) Q only
3) R only
4) P and Q only
5) Q and R only

25. Which of the following statement/s is/are true about weighted mean?

A – Weighted mean is used to represent a distribution if some items in the distribution are more important than others

B – Weighted mean gives the result equal to the arithmetic mean if the weights assigned to all the items are equal.

C – The mean of a frequency distribution can be regarded as a weighted mean with relative frequencies as weights.

1) A only
2) A and B only
3) A and C only
4) B and C only
5) A, B and C

26. For a population of size 9, the following summations were calculated.

$\sum X = 450 \qquad \sum (X - \overline{X})^2 = 324$

The coefficient of variation of X is

1) 1.2%
2) 12%
3) 138.8%
4) 83.3%
5) 833.33%

27. In regression analysis , the method of least squares

1) Maximizes the value of coefficient of determination
2) Minimizes the error sum of squares
3) Maximizes the error sum of squares
4) Minimizes the total variation in dependent variable.
5) Minimizes the sum of errors

28. If U = Y – 64 and V = X/2, then the regression equation of U on V is U = -34+ V. What would be the regression equation for the original variables of Y on X?

1) Y = 30 + 2X
2) Y = -30 + 3X
3) Y = 30 + 1/2X
4) Y = -98 + 1/2X
5) Y = 98 + 2X

29. Which of the following statements is not true regarding the coefficient of correlation?

1) It can range from -1 to +1
2) Its square is the coefficient of determination
3) It measures the percentage of total variation of the dependent variable explained by regression equation.
4) It is a measure of strength of the linear association between two variables.
5) The coefficient of correlation is a value that is independent of the units of measurements.

30. The least square regression line of Y on X minimizes

1) Total of the squares of horizontal deviations from regression line.
2) Total of the squares of vertical deviations from regression line.
3) Total of the squares of absolute vertical deviations from regression line.
4) Total of the absolute horizontal deviations from regression line.
5) Both total of vertical and horizontal deviations from regression line.

31. The regression line of son's height on his father's height has been fitted as $\hat{y} = 33.7 + 0.52\,x$. In this equation,

1) $\hat{Y}$ is the son's height when father's height is x.
2) $\hat{Y}$ is the estimate of the mean of son's height when father's height is x.
3) $\hat{Y}$ is the mean of the son's height when father's height is x.
4) Son's height is 33.7 when x is equal to the mean of the father's height.
5) The positive regression coefficient 0.52 indicates that tall fathers tend to have taller sons than fathers.

B.Sc.,

32. A regression equation was calculated to be $\hat{Y}=25 + 6X$. The value 25 indicates that
1) An increase in one unit of X will result in increase of 25 units in Y.
2) There is a strong relationship between X and Y.
3) 25% of the variation in Y is explained by regression.
4) The regression line crosses the Y axis at 25.
5) The regression line crosses the X axis at 25.

33. Suppose the correlation coefficient between two linearly related variables, X and Y is -0.95. Which of the following conclusions is correct.
1) The linear relation between X and Y is weak, and Y decreases when X increases.
2) The linear relation between X and Y is strong, and Y decreases when X increases.
3) The linear relation between X and Y is strong, and Y increases when X increases.
4) The linear relation between X and Y is weak, and Y increases when X increases.
5) There is no linear relation between X and Y since the correlation coefficient is negative.

34. For the probability of an event all the persons get the same answer as the correct answer. This is possible under
1) Relative frequency approach to probability
2) Classical approach to probability
3) Subjective approach to probability
4) Both classical and relative frequency approach to probability
5) Both classical and subjective approach to probability

35. Which of the following statements is/are true about the approaches of probability.
A – The classical approach cannot be applied if the possible outcomes of the random experiment are not equally likely
B – One of the limitations of the relative frequency approach is that the experimental conditions may change when the experiment is repeated.
C – The axiomatic approach is not concerned with calculation of the probability of events.
1) A only
2) A and B only
3) A and C only
4) B and C only
5) All A, B and C

36. The probability that both events A and B occur, The probability that event A occurs and event B does not occur, and probability that event B occurs and event A does not occur are all equal to p. The probability that at least one of the events A or B occurs is
1) 2p
2) P
3) $3p^2$
4) 3p
5) P^3

37. If A and B are any two events such that $P(A/B) = P(B/A)$, $P(A) \neq 0$, $P(B) \neq 0$which of the following statements is true?
1) $P(A \cap B) = P(A)$
2) $P(A \cap B) = P(B)$
3) $P(A \cap B) = 0$
4) $P(A) = P(B)$
5) $P(A \cap B) = P(A).\ P(B)$

38. If $P(A \cap B) = 1/2$, $P(A' \cap B') = 1/3$ and $P(A) = P(B) = p$ then the value of p is given by
1) 1/3
2) 1/2
3) 7/12
4) 4/8
5) 1/6

39. If A and B are two events, the probability that exactly one of them occurs is given by
1) $P(A \cap B')$
2) $P(A' \cap B)$
3) $P(A \cup B)$
4) $P(A' \cup B')$
5) $P(A' \cap B) + P(A \cap B')$

40. If A and B are two events with $P(A) = 3/8$, $P(B) = 5/8$ $P(A \cup B) = 3/4$, then $P(A/B)$ is
1) 2/3
2) 1/4
3) 2/5
4) 3/5
5) 1/8

6. 04. 2016

De Mazenod College, Kandana

Business Statistics II

2nd Term test (April 2016) **Grade 12** **$1\frac{1}{2}$ hours**

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Answer **three** questions only.

1. (a) Explain the difference between primary data and secondary data.
What are the factors that should be considered when using primary data? (04 marks)

(b) Explain, Personal interview method.
Mention examples for two practical situations where personal interview method can be used for data collection (04 marks)

(c) Explain the difference between pre testing and editing.
Mention the function of pre testing and editing in data collection. (04 marks)

(d) Marks obtained by 35 students for a term test are given below.

47	58	79	54	81	38	61	87	53
21	84	72	67	57	43	91	59	66
65	70	44	73	40	67	34	16	29
75	47	60	52	63	86	68	53	

Present these data in a Stem and leaf diagram and draw a box and whisker diagram. Mention your ideas about the nature of the distribution. (06 marks)

(e) Explain the importance of Z Curve in presenting business data. (02 marks)

2. (a) Mention the merits and demerits of mean as a measure of central tendency.
Mention the situations where it is appropriate to use mode and median than mean (05 marks)

(b) Salary distribution of workers in a certain company is as follows.

Daily Salary	0–200	200-400	400-600	600-800	800-1000	1000-1200
No. of employees	8	17	23	32	29	11

Draw a less than ogive using above data. Using that ogive,

I. Mention maximum salary earned by 25% of employees who earn minimum salary.
II. Mention minimum salary earned by 10% of employees who earn maximum salary. (05 marks)

(c) Weight distribution of 50 boys (in kg) in a certain class is as follows.

Weights (X)	35-39	40-44	45-49	50-54	55-59	60-64	65-69
No. of boys (f)	3	5	10	12	9	7	4

I. Calculate mode, median, mean and variance of the weight distribution of boys.
II. There are 50 girls in this class. Data relating to weights of these girls are given below.
$\sum X=2170$ $\sum X^2=106,978$
Calculate mean and variance weight of girls.
iii. Calculate mean and variance of all students in this class. (10 marks)

3 (a) What do you mean by weighted mean
What are the situations where weighted mean can be used practically. (03 marks)

(b) Following are the profit percentages of a certain company during past 5 years.
16.2% 11.4% -2.8% -6.3% 8.7%
Calculate mean profit percentage of this company during last 5 years. (04 marks)

(c) Explain the difference between absolute dispersion and relative dispersion. (04 marks)

(d) The life times of two models of refrigerators are given in the following distribution.

Life time (No. of years)	Number of refrigerators Model A	Model B
0 – 4	3	2
4 – 8	8	7
8 – 12	16	15
12 – 16	13	18
16 – 20	7	6
20 – 24	3	2

i. Calculate the mean and the standard deviation for life time of each refrigerator model.
ii. Which model of refrigerator has more uniform life time.
iii. Out of these two models of refrigerators, which model you prefer to buy? (07 marks)

(e) You are given following measures in a frequency distribution.
$Q_1 = 42$ $Q_2 = 56$ $Q_3 = 62$ $P_{10} = 36$ $P_{90} = 76$
Calculate skewness and kurtosis of this distribution. (02 marks)

4. (a) Mention the importance of regression and correlation in business field. (04 marks)
(b) Explain the difference between product movement coefficient of correlation and rank coefficient of correlation (04 marks)
(c) Followings are the annual income and expenditure on clothing relating to a sample of 10 families.

Annual income (X) (Rs. 100,000)	5	7	9	14	12	10	8	6	16	3
Expenditure on clothing (Y) (Rs. 10,000)	3	4	7	9	12	6	3	3	11	2

$\sum X=90$ $\sum Y=60$ $\sum X^2=960$ $\sum Y^2=478$ $\sum XY=660$

i. Draw a scatter diagram. Explain your views on the relationship between annual income and expenditure on clothing.
ii. Estimate the regression line by least squares method.
iii. Calculate coefficient of correlation and interpret it.
iv. Calculate the coefficient of determination. What it tells you.
v. Estimate the average expenditure on clothing when the annual income is Rs.600,000 (08 marks)

(d) Ranks given by a teacher to 10 students before their examination and the actual ranks that they have obtained after the examination are as follows.

Student	A	B	C	D	E	F	G	H	I	J
Ranks given by the teacher	9	5	1	6	10	2	8	3	4	7
Ranks obtain after the exam	10	6	3	5	9	1	8	2	7	4

Mention your views on teacher's forecasting. (04 marks)

5 (a) Define following terms and provide one example for each.
i. Equally likely events
ii. Mutually exclusive events
iii. Exhaustive events
iv. Independent events (04 marks)

(b) Define classical approach and relative frequency approach and mention limitations of those approaches. (04 marks)
(c) If A and B are two events such that P(A)=1/2, P(B)=3/5 and $P(A \cup B)=4/5$, Find the probabilities of following events.
i. $P(B')$ ii. $P(A \cap B)$
iii. $P(A \cap B')$ iv. $P(A' \cap B)$
v. $P(A' \cap B')$ vi. $P(A/B)$
viii. $P(B'/A)$ viii. $P(A'/B')$ (08 marks)

(d) There are 3 defective and 7 non defective units in a certain product. If randomly selects 3 units, What is the probability of including,
i. 3 defective units
ii. 2 defective units
iii. I defective unit
iv. not including any defective item
(04 marks)