De Mazenod College Kandana

Business Statistics

28.07.2016

Grade 12

3rd Term Test | 2016 July | 2 hours

- Answer all questions.
- Select most appropriate answer.

1. Which of the following statements is true?
   I. Employee's attendance register is an example for primary data.
   II. Collecting data by conducting an employee's survey is an example for secondary data.
   III. The order in which questions are asked not influence a respondent's reply in personal interview method.
   IV. Interpretation of collected and analyzed data is called Inferential Statistics.
   V. Scientific conclusions are accurate than Statistical conclusions.

2. Which of the following statements is false?
   I. Statistics does not come to conclusions by studying individual items.
   II. Education level of respondents is directly influence on telephone conversation method.
   III. When financially burden, the personal interview method is not suitable.
   IV. Practically Direct observation method cannot be used in all situations.
   V. Self enumeration method is not suitable when expecting high response rate.

3. Which of the following statements is true?
   I. Data collected by the surveys which are done under an enumerator is more reliable.
   II. Checking the completeness of a questionnaire is done by editing.
   III. Removal of incomplete questionnaires is a function of editing.
   IV. Questionnaire is used to collect data in telephone conversation method.
   V. It is easy to get ideas through covert questions.

4. The most appropriate chart to present monthly rainfall for 5 years is,
   I. Simple bar chart
   II. Component bar chart
   III. Multiple bar chart
   IV. Graphs
   V. Mode diagrams

5. The most appropriate chart to present how certain product compressed among companies is,
   I. Pie chart
   II. Lorenze curve
   III. Z curve
   IV. Pictogram
   V. Mode diagram

6. When organizing, the uniqueness of data get affected,
   I. In data array
   II. In raw data
   III. In stem and leaf diagram
   IV. In ungrouped frequency distribution
   V. In grouped frequency distribution

7. The measure which cannot be obtained easily by an ogive is,
   I. Mode
   II. Median
   III. 1st quartile
   IV. 75th percentile
   V. 1st declies.

8. Consider following statements about box and whisker diagram

A: In a positively skewed distribution the length of left side box is longer than the length of right side box.

B: In a Symmetrical distribution the length of left side box is equal to the length of right side box.

C: When the length of left side box is equal to half of right side box, the distribution is negatively skewed distribution.

The correct statement is,

I. A only
II. B only
III. A and B only
IV. B and C only
V. All A, B and C

9. The weights of students in a certain class are given in the following stem and leaf diagram.

Stem	Leaf
4	3 5 8 8 9
5	0 1 2 2 3 3 3 5 7 7 8
6	1 3 3 4 5 7 9
7	2 5

Median of this distribution is,

I. 52
II. 53
III. 54
IV. 55
V. 57

10. The value which is represented by the average value of upper limit of a class interval and lower limit of the next class interval is,

I. Width of the class interval
II. Class boundary
III. Range
IV. Class mark
V. Practical limits of class interval

11. Which of the following statements is true?

I. Measures of dispersion assure the reliability of central tendency measures.
II. In a skewed distribution mean is reliable than median
III. It is difficult to compute mean when there are open class intervals.
IV. In a histogram the area of each rectangle is equal to the frequency of relevant class interval.
V. Area of the histogram is not equal to the corresponding frequency polygon.

12. The frequency distribution with $Q_3-Q_2=1/2(Q_2-Q_1)$ is,

I. Symmetrical
II. Positively skewed
III. Negatively skewed
IV. Can be positively skewed or negatively skewed
V. Cannot say exactly

13. Geometric mean of 3, 9, 27 is,

I. 6
II. 8.24
III. 9
IV. 10.12
V. 13

14. Group A takes 20days to complete certain task. Group B takes 25 days to complete same task. If both groups start to complete this task together on same date, the number of days need to complete that task is,

I. 22
II. 22.22
III. 22.5
IV. 22.75
V. 23

15. The average mark of 50 students in a class is 72kg. If the average mark of 35 boys in this class is 75 kg, the average marks of girls is,

I. 60 III. 65 V. 70
II. 62 IV. 68

16. The coefficient of variation of a frequency distribution is 20% and variance is 225, the mean of this distribution is,

I. 1125 IV. 80
II. 1000 V. 75
iii. 750

17. If a student obtained standard mark of 1.2 in an examination with mean 60 and standard deviation 20, the marks obtained by the student in that examination is,

I. 64 III. 80 V. 90
II. 75 IV. 84

18. Mean and standard deviation depth of a lake are 8m and 2.5m respectively. When water level decreased by 2m due to drought, the new mean and standard deviation depth of that lake are,

I. 10m, 2.5m IV. 6m, 0.5m
II. 6m, 2.5m V. 8m, 0.5m
III. 10m, 4.5m

19. In a moderately skewed distribution with mode 60, median 54 and standard deviation 16, the nearest value that can be obtained for median is,

I. 58 III. 52 V. 48
II. 50 IV. 56

20. Following measures were obtained in a small population.

$\sum X=150$ $\sum X^2=2500$ $\sigma=5$

The size of this population is,

I. 5 III. 15 V. 50
II. 10 IV. 25

21. Which of the following statements is false about probability approaches?

I. Under the classical approach the probability of an event can be calculated without performing the experiment.
II. All the persons cannot obtain same probability value under relative frequency approach.
III. In subjective approach, the probability value depends on degree of belief of a person.
IV. The relative frequency approach assumes the outcomes of an experiment are equally likely.
V. It is unable to use Relative frequency approach when an experiment cannot be repeated.

22. Which of the following cases are not true when A and B are independent events?

I. $P(A' \cap B')=P(A').(B')$ IV. $P(A/B)=P(A)$
II. $P(A' \cap B)=P(A').(B/A')$ V. $P(A \cup B)= P(A)+P(B)$
III. $P(A' \cap B)=P(A').(B)$

23. If A and B are two independent events such that $P(A)=P(B)=p$, The value of $P(A \cup B)$ is,

I. $2p$
II. $3p$
III. p^2
IV. p^2+2p
V. $2p-p^2$

24. When tossing two fair coins together, probability that total of values greater than 10 is,

I. 1/9 III. 1/18 V. 5/36
II. 1/12 IV. 1/36

25. There are 6 skilled workers and 4 unskilled workers working in the quality control section of a company. When randomly select two employees out of them probability of selecting two skilled workers is,

I. 1/2 III. 1/4 V. 4/5
II. 1/3 IV. 3/5

26. When P(A-B)=P(B-A), the probability between A and B is,

I. P(A)=1-P(B) III. P(A)=P(B) V. P(A)+P(B)=1
II. P(B)=1-P(A) IV. P(A∪B)=1

27. Ratio of happening and not Happening a certain event is given by p:q, then the probability of happening that event is,

I. $\frac{p}{p+q}$ II. $\frac{q}{p+q}$ III. $\frac{p}{q}$ IV. $\frac{q}{p}$ V. Cannot say exactly

28. The value of P(B'/A) is equal to,

I. 1-P(A∩B') III. 1-P(A∩B) V. 1-P(B/A)
II. 1-P(A'∩B) IV. 1-P(A/B)

29. A Sales man has 60% probability of selling an item to any customer. If he meets two customers in a particular day, the probability of selling that item to one of them is,

I. 36% III. 64% V. 20%
II. 16% IV. 84%

30. A and B are two independent events such that P(A)=0.4 and P(A∪B)=0.7. The value of p(B) is,

I. 0.2 III. 0.4 V. 0.7
II. 0.3 IV. 0.5

31. If random variable x can take only 1,2,3,4 values, the probability function of that variable is,

I. $f(x)=\frac{x-2}{2}$ II. $f(x)=\frac{x-1}{4}$ III. $f(x)=\frac{x+1}{4}$ IV. $f(x)=\frac{x^2}{15}$ V. $f(x)=\frac{x+2}{18}$

32. Expected value of following probability distribution is,

x:	4	5	6	8
P(x):	0.1	0.3	0.4	0.2

I. 4.9 III. 5.9 V. 5.2
II. 3.9 IV. 6.9

33. X and y are two independent variables with means 50 and 120 respectively and variances 10 and 12 respectively. If z=4x+3y expected value of z is,

I. 360 IV. 560
II. 400 V. 160
III. 460

34. The Parameters of a binomial distribution with mean 12 and standard deviation 2 is,

I. n=15, p=4/5 IV. n=16, p=3/4
II. n=18, p=2/3 V. n=18, p=1/3
III. n=20, p=3/5

35. The probability of getting success in a binomial distribution with 6 trials and 4P(x=4)=P(x=2) is,

I. 1/2 III. 1/3 V. 2/3
II. 1/4 IV. 3/4

36. The mean value of a poisson distribution with 3 P(x=2) = P(x=4) is,

I. 2 III. 4 V. 8
II. 3 IV. 6

37. The value of P(x=2) in a poisson distribution with P(x=0)=p(x=1) is,

I. e/2 III. 1/6e V. 1/2e
II. e/6 IV. 1/e

38. The mean value of x normal distribution is 25.variance is 100. If P(25<x<b)=0.4772, the value of b is,

I. 45 III. 50 V. 65
II. 35 IV. 55

39. Mean of x normal distribution is μ and variance is σ^2. The value of $P(x<\mu+2\sigma)$ is,

I. 0.3413 III. 0.4473 V. 0.9773
II. 0.6827 IV. 0.8413

40. In an examination mean marks of 1000 candidates is 42 and standard deviation is 24. The minimum marks of 100 candidates who obtained highest marks is,

I. 73 III. 79 V. 68
II. 63 IV. 65

41. Which of the following statements is false if the value of coefficient of determination is 1?

I. Coefficient of correlation is 1
II. Perfect correlation is there.
III. A regression with discriminant model
IV. Out of total variation 100% belongs to regression.
V. Linear relationship is there.

42. Equation of regression line is y= 8-0.2x and coefficient of determination is 0.64. Which of the following statements is true?

I. Out of total variation 64% belongs to errors.
II. Coefficient of correlation is 0.8
III. Independent variable presents 20% out of dependent variable.
IV. When x increases by one unit, y increases by 0.2 units.
V. Regression line intercept y axis at (0, -0.2)

43. Coefficient of correlation between annual value of exports and annual number of infant births is 0.9. Which of the following conclusions is true?

I. There is no linear relationship between variables.
II. There is a perfect positive linear relationship between variables.
III. It is good to fit a regression line for two variables.
IV. Even though there is a strongly positive relationship between two variables that is a meaningless correlation.
V. There is a perfect correlation between two variables.

44. If coefficient of correlation is -0.8 the variation expressed by errors out of total variation is,

I. 80% III. 64% V. 36%
II. -80% IV. 16%

45. A- There is no any error term in a discriminant model.
B- In a discriminant model square values of errors is minimum.
C- Coefficient of correlation of a discriminant model can be +1 only.
Which of these statements is/are true?

I. A only
II. B only
III. C only
IV. A and B only
V. A and C only

46. A production company plans to increase production quantity by 25% in next year. In order to get 50% increment in income , the price of good need to increase by,

I. 50%
II. 33.3%
III. 30%
IV. 25%
V. 20%

47. In year 2000 and 2015, consumer price indices were 125 and 200 respectively. If a person earned RS.25000 in year 2000, how much extra income worker should have earned in 2015 in order to maintain same standard of living as in 2000.

I. Rs.40000
II. Rs.32000
III. Rs.20000
IV. RS.15000
V. RS.12000

48. Annual wage of an employee increased by 20%.Consumer price index increased by 25%. The percentage increased in real wage of employee is,

I. 96
II. 120
III. 5
IV. -5
V. -4

49. In year 2000 consumer price index was 125 and price index for food was 120and price index for other items was 135. Out of total weight how much percentage allocated for food?

I. 20%
II. 25%
III. 30%
IV. 33.33%
V. 66.67%

50. When value index is 160 and laspeyre's price index is 200, the paasche's quantity index is,

I. 80
II. 100
III. 120
IV. 125
V. 140

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Grade 12

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❖ Answer five questions selecting three questions from part I and two questions from part II.

PART I

1. (a) Explain self enumeration method in collecting primary data. State merits and demerits (04 marks)

(b) What is a pie chart?
Mention two situations where pie chart can be used to present data. (03 marks)

(c) Consider the following distribution

Weights of students (kg):	31-40	41-50	51-60	61-70	71-80	81-90
Number of students:	8	12	18	22	13	7

Draw a less than ogive and find the number of students whose weight between 55 kg and 75 kg. (05 marks)

(d) What is Lorenz Curve?
Mention two situations where Lorenze curve can be applied.
Income distribution of a city is as follows.

No. of people	Income
320	400
200	600
160	1000
80	1200
40	1800

Draw a Lorenze curve and find percentage of people who earn maximum 10% income. (08 marks)

2.(a) Explain the role of measures of central tendency, dispersion, skewness, kurtosis. (04 marks)

(b) Define Simple arithmetic mean, Geometric mean, Weighted mean and Harmonic mean.
State the situations where each mean can be used practically. (04 marks)

(C) Following are the average marks and standard deviation marks of Economics, Accounting and Business Statistics in G.C.E. Advanced level examination and marks obtained by student A.

	Economics	Accounting	Business Statistics
Mean	48	54	52
Standard deviation	15	16	14
Marks of student A	72	76	73

State with the calculations, in which subject was student A relative standing higher? (05 marks)

(d)Following table shows the salaries of two samples of employees in company A and company B.

Monthly Salary	No. of employees in company A	No. of employees in company B
0-20000	15	12
20000-40000	25	24
40000-60000	40	48
60000-80000	15	10
80000-100000	5	6

I. Calculate mean and standard deviation salary of the employees in both companies.
ii. Which company is having high mean salary?
iii. Which company is having high uniformity in salary distribution? (07 marks)

3. (a) What do you mean by an index number?
What are the advantages of index numbers? (04 marks)

(b) What is the difference between Laspeyre's price index and Paasche's price index?
Mention advantages and disadvantages of both. (06 marks)

(c) Following are the prices and quantities of three types of commodities in year 2000 and 2010.

Commodity	2000		2010	
	Price	Quantity	Price	Quantity
A	20	5	30	6
B	25	4	40	5
C	50	3	60	2

Prove $\frac{LP}{LQ} = \frac{PP}{PQ}$ by using Laspeyre's price and quantity indices and Paasche's price and quantity indices for year 2010 by considering year 2000 as base year. (05 marks)

(d) What is consumer price index?
Following are the price index numbers and weights of expenditure items in year 2010 and 2015

Expenditure item	Group index numbers in 2010	Group index numbers in 2015	Weights
Food	200	250	60
Housing	120	180	15
Clothing	150	180	10
Health	160	200	5
Other	250	300	10

Calculate the cost of living index number for year 2015 as compared with that of 2010. (05 marks)

4. (a) What do you mean by regression analysis and correlation. Explain the practical importance in business field. (04 marks)

(b) Explain the difference between product movement coefficient of correlation and rank coefficient of correlation. (04 marks)

(c) Promotional expenses and Profit of a certain company in rupees million during first 6 months are as follows.

Month	Promotional expenses	Profit
January	6	60
February	9	75
March	15	105
April	12	90
May	30	120
June	18	90

i. Obtain least squares regression line of profit on promotional expenses.
ii. Find the expected profit when promotional expenses is Rs. 40 million.
iii. Compute Product movement coefficient of correlation and interpret it.
iv. Compute coefficient of determination. Which decision can you make on it? (08 marks)

(d) Coefficient of correlation between ranks of two judgers assigned to 10 competitors is 0.8. If the difference between ranks 5 was recorded as 3, calculate the correct rank coefficient of correlation. (04 marks)

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5. (a)Explain the importance of probability in business field. (03 marks)

(b) Define conditional probability. Explain the importance of conditional probability when making decisions in business field using an example. (03 marks)

(c) A doctor recommends a test for Dengue disease for patients having high fever. 20 percent of people having high fever has possibility of having Dengue disease. 95 percent of the the cases in which Dengue disease is present the test reveals the presence of the disease. In 90 percent of the cases in which the disease is not present the test reveals the absence of the disease.
i. If a person having high fever face for this test, what is the probability that the test reveals the presence of the disease?
ii. If the test reveals that the Dengue disease is present, what is the probability that the patient is actually having the disease? (05 marks)

(d) Probability of passing Advance level examination by student A is 90%. Probability of passing same examination by student B is 80%. Find,
i. Probability of passing the examination by both students.
ii. Probability of passing the examination by only student A.
iii. Probability of passing the examination by only one student.
iv. Probability of passing the examination by student A or student B.

(e) A and B are two events such that P(A/B)= 2/3, P(B/A)=3/8 and P(A)+P(B)=1, Find the probability of P(A). (05 marks)

6. (a) What is a random variable.
Define different random variables and provide two examples for each. (05 marks)

(b) Define the Binomial distribution stating the conditions under which it will arise.
There are 10000 units in a stock and 2000 units in that stock are defective. If randomly select a sample of 10 units, Find the probability of selecting,
i. no any defective item.
ii. at least two defective items. (05 marks)

(c) The burning of street lamps in a city has a poisson distribution with speed of burning once in every two days.
i. Find the probability of burning less than two street lamps within 5 days.
ii. Find the probability of burning exactly three street lamps within a week.
iii. Find the probability of burning less than 25 street lamps within 10 weeks. (05 marks)

(d) Life time of a battery follows a normal distribution with mean 800 hours and standard deviation 80 hours.
i. Find the probability that randomly selected battery having the life time between 750 hours and 850 hours.
ii. Compute, after how many hours 10% of bulbs would burnout. (05 marks)