

Roll No: _____

B.A Hons Business Economics (CBCS) / Semester III
Statistics for Business Economics
House Examination, 2019

Duration: 2 Hrs.

All the questions are compulsory.

(MM: 50)

1. If A and B are mutually exclusive events with $P(A) = 0.6$ and $P(B) = 0.2$, find the $P(\bar{A} \cap B)$ and $P(\bar{A} \cap \bar{B})$. (2)
2. Income distribution in Mojoland is normally distributed with mean of 70 and standard deviation 10. Find the top 10 percent of the income group. (3)
3. Find the probability of getting two heads when five coins are tossed. (2)
4. A bag contains some coins one of which is a 2-headed coin (both side heads) and rest are fair coins. A coin is selected at random and the probability of heads comes out to be $\frac{7}{12}$. Find the number of fair coins in the bag. (3)
5. A man is known to speak truth 2 out of 3 times. He throws a die and reports that number obtained is a four. Find the probability that the number obtained is actually a four given he reports that the no. is 4. (5)
6. a) Define a Random Variable and a Bernoulli Random Variable (2)
b) For a random variable Y, the probability density function is given by the following:

Y	1	2	4	5	6
P(y)	.05	.10	.35	.40	.10

- i) Plot cumulative density function (3)
 - ii) Find probability that $(2.5 < Y < 8.5)$ (1)
 - iii) Find $E(Y)$ (1)
 - iv) Find $E(5Y + 2)$ (1)
 - v) Find Variance (Y) (1)
 - vi) Find Variance $(5Y + 2)$ (1)
7. If X is a continuous random variable with probability density function (5)
- $$f(x) = \begin{cases} \frac{x}{6} + k & 0 < x < 3 \\ 0 & \text{Otherwise} \end{cases}$$
- i) Find k and draw the corresponding density curve
 - ii) Find $P(1 < X < 2)$ and $P(X > 2)$
8. Let X be a normal random variable with mean 104 and standard deviation 5
- i) Find the probability that X 'differs' from the mean value by more than one standard deviation
 - ii) Find $P(X > 106)$ and $P(X \geq 106)$

Class Test-1
Statistics for Business Economics
September 27, 2019

Answer the questions logically.

(MM: 25)

1. Find the variance and standard deviation of the first n even natural numbers. (3)

2. The following measures were computed from a sample

Mode = 83, Arithmetic Mean = 74 and Median = 77

Comment on the Skewness of the data. What can be the shape of the distribution? Is the third central moment positive, negative or zero? Why? (4)

3. The median and standard deviation of a distribution that is symmetric and mesokurtic (with kurtosis value=3) are 20 and 3 respectively. Find first four moments about zero. (5)

4. What property of arithmetic mean leads to zero first order central moment? Show it. (2)

5. If the coefficient of correlation between X and Y is 0.3

a. Find the coefficient of correlation between X and $2Y$

b. Find the coefficient of correlation between X and $-Y$

Hint: Write the formula of coefficient of correlation and make the necessary substitutions (3)

6. Suppose marks of 10 students are given by the following:

15.0, 13.0, 18.0, 14.5, 12.0, 11.0, 8.9, 8.0, 8.4, 9.6

What would you report as a representative value of marks and why. (3)

7. If second, third and fourth central moments of a distribution are in geometric progression, how are skewness and kurtosis of the distribution related? (5)

Class Test-2
 Statistics for Business Economics
 November 13, 2019

Answer the questions logically.

(MM: 25)

1. a) Calculate Laspeyers' price index with year 2008 as base: (3)

YEAR	X (quantity)	X (price)	Y (quantity)	Y (price)
2008	4	100	20	200
2009	5	120	25	300

- b) Why does Laspeyers' price index overvalue the true value as compared with Paasche's price index? (2)

2. The prices of a certain commodity increased by 10 percent from year 2005 to 2006. The price index in 2007 with base 2006 was 130. The price index in 2008 with 2005 as base was 150. Calculate the price index series from 2005 to 2008 with 2006 as base. (5)

3. a) For a normal population with standard deviation 1.20 a random sample of 16 is chosen resulting in sample mean of 94.32 to test the null hypothesis $H_0: \mu = 95$ versus alternate hypothesis $H_a: \mu \neq 95$ using a two-tailed test with a level of significance $\alpha = 0.01$. Find the result of the test using p value. (3)

- b) Explain type I and type II errors. What will be the respective values in the above mentioned case if the true population mean is 94? (5)

- c) Without calculating explain what would happen to type II error if α is increased to 0.05. (2)

4. Consider the following information :

	Population 1	Population 2
Standard deviation	1.6	1.4
Sample size	40	32
Sample mean	18.12	16.87

Test the null hypothesis $H_0: \mu_1 - \mu_2 = 0$ versus alternate hypothesis $H_a: \mu_1 - \mu_2 > 0$ with a level of significance $\alpha = 0.01$.

MCQ
Statistics for Business Economics

1. Normal distribution is a probability distribution of ___ random variable.

a. Continuous

b. Constant

c. Discrete

d. Normal

(Answer a)

2. In a normal distribution quartile deviation is ___ (S.D.)

a. .2745

b. .3789

c. .79079

d. .6745

(Answer d)

3. Normal distribution has _ parameter.

a. Three

b. Two

c. Four

d. One

(Answer b)

4. The ___ order moments about mean are all zero.

a. None

b. Four

c. Odd

d. Even

(Answer c)

5. The quartile deviation is ___ (S.D.) is normal dist.

a. .6734

b. .7879

c. .6745

d. .4567

(Answer c)

6. If $n \geq 30$ and ___ then binomial approaches to normal distribution

a. q/p

b. $p = q$

c. pq

d. $p = n$

(Answer b)

7. In normal distribution $Q1 = \underline{\hspace{2cm}}$

a. $u + .6745$ (S.D.)

b. $u - .7979$ (S.D.)

c. $u + .6745$ (S.D.)

d. $u - .6745$ (S.D.)

(Answer d)

8. Standard normal variable Z is: $\underline{\hspace{2cm}}$

a. $x - \mu / \sigma$

b. $\mu - x / \sigma$

c. $\sigma - x / \mu$

d. $x - \sigma / \mu$

(Answer a)

9. For a normal distribution having $\mu = 241$ and $\sigma = 2$ $P(X \geq 235)$ is: ____

a. 0.9986

b. 0.5

c. 0.475

d. 0.235

(Answer a)

10. Area of normal distribution total is equal to ____

a. Two

b. One

c. Four

d. Three

(Answer b)

11. $P(\mu - \sigma \leq X \leq \mu + \sigma) =$ ____ -

a. .6826

b. .6743

c. .6745

d. .2345

(Answer a)

12. If $X \sim N(\mu, \sigma^2)$ then $Z \sim$ _____

a. $N(0, \sigma^2)$

b. $N(1, \sigma^2)$

c. $N(0, 1)$

d. $N(1, 1)$

(Answer c)

13. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?

a. $3/4$

b. $1/4$

c. $7/4$

d. $1/2$

(Answer a)

14. A box has 6 black, 4 red, 2 white and 3 blue shirts. What is probability of picking at least 1 red shirt in 4 shirts that are randomly picked?

a. $4/15$

b. $24/455$

c. $69/91$

d. $22/91$

(Answer c)

15. A box has 6 black, 4 red, 2 white and 3 blue shirts. What is the probability that 2 red shirts and 1 blue shirt get chosen during a random selection of 3 shirts from the box?

a. $18/455$

b. $7/15$

c. $7/435$

e. $7/2730$

(Answer a)

Assignment- Statistics for Business Economics

Descriptive Statistics quantitatively summarize a given piece of information called data. It is an essential exercise for any empirical work as it helps to understand the central tendency and spread of the data. As a student of Statistics it is crucial to understand how to make an inference from the summary statistics of the data.

Therefore, as an empirical researcher and a statistician find a real data set from the internet and do the descriptive statistics of the data. You can take any univariate data set for this purpose and mention the following things for your assignment:

1. Describe your data
2. Source of data
3. Soft copy of the data file
4. Explain in a few lines the meaning and importance of each of the descriptive stats you have used; Mean, Median, Mode, Variance, Standard deviation, Minimum and Maximum values, Skewness and Kurtosis
5. Find the respective values for your data (Preferably using Excel)
6. Inference from these values