NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
MBA (Integrated)
SEM: III - THEORY EXAMINATION (2024 - 2025)
Subject: Advanced Business Statistics

Time: 2.5 Hours   Max. Marks: 60

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A   15

1. Attempt all parts:-

1-a. Mean deviation can be calculated with the help of----(CO1, K1)   1

  (a) Mean

  (b) Median

  (c) Mode

  (d) Either of these

1-b. One of the normal equation for the fitting straight line $y = a + bx$ is $\sum y = ---$ (CO2, K2)   1

  (a) $a\sum x + b\sum x^2$

  (b) $a + b\sum x$

  (c) $Na\sum x + b\sum x^2$

  (d) None of these

1-c. From A pack of 52 cards, one card is drawn at random, probability of getting a king is (CO3 ,K2)   1

  (a) 1/13

  (b) 1/12

  (c) 1/52

  (d) None of these

1-d. An estimator is said to be unbiased if:(CO4, K1)   1

  (a) It provides the smallest possible estimate of the parameter.

(b)   Its expected value equals the true value of the parameter.

(c)   It is resistant to outliers in the data.

(d)   It minimizes the variance of the estimates.

1-e.   ---------not a type of index number: (CO5, K1)   1

(a)   Price index number

(b)   Aggregative index number

(c)   Cost of living index number

(d)   Coefficient of correlation

2. Attempt all parts:-

2.a.   How do you interpret the first quartile, second quartile, and third quartile? (CO1, K3)   2

2.b.   Write normal equations of $y = mx + c$, m and c are constants , total number of observation = N (CO2, K2)   2

2.c.   Define addition theorem of probability(CO3, K2)   2

2.d.   Describe the concept of sufficiency in the context of an estimator. (CO4)   2

2.e.   Name the method which is best for calculating the weighted index number and also write its formula.(CO5, K2)   2

SECTION-B   15

3. Answer any <u>three</u> of the following:-

3-a.   Calculate quartile deviation of the given data: (CO1, K3)   5

X	15	16	17	18	19	20	21
Frequency	4	6	10	15	12	9	4

3-b.   Using the method of least squares ,fit a straight line to the data given below:(CO2, K2)   5

x	0	1	2	3	4
y	1	2.9	4.8	6.7	8.6

3.c.   A single card is drawn from a deck of 52 cards. Find the probability of selecting the following.(CO3, K2)   5
a) a "2" or a "5"
b) "8" or a "heart"
c) A "Queen" or a "red card"

3.d.   Define estimation and explain all the properties of a estimator. (CO4, K3)   5

3.e.   Explain different types of index numbers.(CO5, K2)   5

SECTION-C   30

4. Answer any <u>one</u> of the following:-

4-a.   The mean life of a sample of 60 bulbs was 650 hours and the standard deviation was 8 hours. A second sample of 80 bulbs has a mean life of 660 hours and standard deviation 7 hours. Find the combined standard deviation. (CO1,K3)   6

4-b. Calculate the Coefficient of Variation if the scores of two batsmen A & B in ten 6
innings during acertain match are given below: (CO1, K3)

A	32	28	47	63	71	39	10	60	96	14
B	19	31	48	53	67	90	10	62	40	80

5. Answer any <u>one</u> of the following:-

5-a. By the method of least squares, find the straight line that best fits for the following 6
data: (CO2, K3)

x	0	1	2	3	4
y	1	1	3	4	6

5-b. Fit a straight-line trend by method of least square for the following data. Find the 6
sale for the year 2020. (CO3, K3)

Year	2015	2016	2017	2018	2019
Sale	14	15	18	11	14

6. Answer any <u>one</u> of the following:-

6-a. A problem is given to 5 students P, Q, R, S, T. If the probability of solving the 6
problem individually is 1/2, 1/3, 2/3, 1/5, 1/6 respectively, then find the
probability that the problem is solved. (CO3, K2)

6-b. Net profit of 400 companies is normally distributed with a mean profit of Rs. 150 6
lakhs and a standard deviation of Rs. 20 lakhs. Find the number of companies
whose profits(Rs. Lakhs) are between 100 and 138. Given:Area for $Z = 2.5$
,0.35 and 0.6 are 0.4938,1.04 and 0.2251 respectively (CO3, K3)

7. Answer any <u>one</u> of the following:-

7-a. Below are the given yield kg for 4 varieties A,B,C,D of seeds. Prepare ANOVA 6
table and test that varieties differ significantly.

A	B	C	D
20	25	24	23
19	23	20	20
21	21	22	20

Given the tabulated value of F at 5% level of significance is 8.85. (CO4, K3)

7-b. A manufacturer produces three types of light bulbs: Incandescent, CFL, and LED. 6
They want to know if there is a relationship between the type of light bulb used
and the customer satisfaction level (Satisfied, Neutral, Dissatisfied). They collect
data from 500 customers. Perform a chi-square test of independence using the
following data:

	Satisfied	Neutral	Dissatisfied
Incandescent bulbs	120	80	20
CFL bulbs	100	60	40
LED bulbs	60	100	40

Given that the tabular value of $\chi 2$ is 9.488 at 5% Level of significance (C04,
K3)

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8. Answer any <u>one</u> of the following:-

8-a.   Define an index number.Explain the utility of the index number.(CO5, K3)   6

8-b.   Compute the Laspeyre's and Paasche's index number from the following data: 6
(CO5, K3)

Item	1880		1889	
	Price	Quantity	Price	Quantity
A	15	22	16	30
B	13	18	4	11
C	3	10	5	20
D	11	4	3	7