

K. J. SOMAIYA INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH,
Vidyavihar, Mumbai- 400077

Program: MCA-II Sem-2016-19 Batch

Subject: Probability and Statistics

Maximum Marks: 50

**Duration: 3hrs.
2017**

Date: 21st April,

Note:

- 1. Exam will be conducted in the computer Lab.**
- 2. Please write section A and section B separately in answer book.**
- 3. Question No 1 is compulsory in part A and part B.**
- 4. Attempt any two questions out of three remaining questions from part A**
- 5. Similarly attempt any two questions out of three remaining questions from part B.**
- 6. Please use excel where required and attach excel files as necessary named with your roll no for identification.**

Part A

Question 1.
(5)

. The following is the age distribution of 80 policy holders insured through an agent:

Age-Group	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
No of policy holders	8	15	13	20	11	7	3	2	1

Calculate the mean deviation from median and standard deviation

Question 2.
(7+3)

- a) The distribution of monthly income of the customers in a locality is given as in the following table. Determine the arithmetic mean, and median and mode. Interpret.

Income (in thos.)	No. of Customers	Income (in thos.)	No. of Customers
6-8	10	16-18	80
8-10	25	18-20	40
10-12	40	20-22	20
12-14	60	22-24	15

14-16	75	24-26	10
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- b) Find the probability that in five tosses of a fair die, a 3 will appear (a) twice (b) at most once (c) at least twice.

Question 3
(7+3)

- a) A corporation owns several companies. The strategic planner for the corporation believes dollars spent on advertising can to some extent be a predictor of total sales dollars. As an aid in long-term planning, she gathers the following sales and advertising information from several of the companies for 2002 (\$ millions).

Advertising	:	12.5	3.7	21.6	60.0	37.6	6.1	16.8	41.2
Sales	:	148	55	338	994	541	89	126	379

- i). Obtain the regression equation of sales on Advertising budget.
ii). If the advertisement budget is 65, what would be her expected sales?

- b) Let variable X has the distribution
 $P(X=0)=P(X=2)=p$
 $P(X=1)=1-2p$ for $0 \leq p \leq 1/2$
 For what p, is the $\text{Var}(X)$ a maximum?

Question 4
(7+3)

- a) A prospective buyer tested the burning pressure of the sample of polythene bags received from a manufacturer. The test gives the following results.

Bursting pressure (in ib.)	5-10	10-15	15-20	20-25	25-30	30-35
No of students	2	10	30	50	6	2

The buyer calculated the mean and mode of the sample as 20.20ib. and 20.50ib.respectively. Calculate (i) Coefficient of variation (ii) Karl Pearson's coefficient of Skewness.

- b) The mean and standard deviation of a group of 50 items were 475 and 25 respectively. It

was later found that one value was wrongly recorded as 400 instead of 500. Find the corrected mean and standard deviation

PART B

Questions 1. (5)

In a test given to two groups of students, the marks obtained are as follows:

First group: 28 20 36 50 49 26 34 49 41
 Second group: 19 28 26 35 30 44 46

Examine the significance of the difference between the arithmetic mean of the marks secured by the students of the above two groups.

Question 2.1 (5 +5)

Based on information from 1000 randomly selected fields about the tenancy status of the cultivation of these fields and use of fertilizers, collected in an agro-economic survey, the following classifications were noted:

	Owned	Rented	Total
Using Fertilizers	416	184	600
Not using fertilizers	64	336	400
Total	480	520	1000

Would you conclude that owner cultivators are more inclined towards the use of fertilizers at $\alpha = 0.05$ level of significance? Carry out the chi-square test as per testing procedures.

Question2.2

In a library, the visitors are classified according to the department that they visit. Using this information, compute the following probability.

	Reference	Books	Back issues	Total
Professor	23	15	10	48
Student	7	30	5	42
Total	30	45	15	90

- a) Probability that a randomly selected visitor is a professor
- b) P (a randomly selected visitor has visited reference section)
- c) P (visitor is a professor and visited book section)
- d) Probability of a visitor who visited back issues section and is a student

e) P (a book section visit / Professor)

Question3.1.

(5+5)

The weekly food expenditure for large families (families at least 2 children) in London is known to be normally distributed with mean £155 and a standard deviation of £32.

1. What is the probability that a randomly selected large family spends less than £110
2. What is the probability that a randomly selected large family spends between £ 115 and £210 per week?
3. In a random sample of 420 large families in London how many families spend less than £225?

Question 3.2

In an examination, 30% of the students have failed in Accounts, 20% of the students have failed in Business studies and 10% have failed in both Accounts and Business studies. A student is selected at random.

- (i) What is the probability that the student has failed in Accounts if it is Known that he has failed in Business studies?
- (ii) What is the probability that the student has failed either in Accounts or in Business studies?

Question4.1

(5+5)

An ambulance service claims that it takes, on the average 8.8 minutes to reach its destination in emergency calls. To check on this claim, the agency which licenses ambulance services has then timed on 50 emergency calls, getting a mean of 9.2 minutes with a standard deviation of 1.7 minutes. Does this constitute evidence that the figure claimed is too low at 1 per cent significance level?

Question 4.2

20 juice cans are taken at random from an automatic filling machine. The mean weight of the

cans is 15.8 kg and the standard deviation is 0.50 kg. Does the sample mean differ significantly from the intended weight of 16 kg ?

*****All the best*****