

VPM's
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Programme: MMS (2016-18)
First Semester Examination December 2016

Subject	Business Statistics		
Roll No.		Marks	60 Marks
Total No. of Questions	7	Duration	3 Hours
Total No. of printed pages	4	Date	19.12.2016

Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.

Q. 1 A. Define the following terms (Any four) **4**
 1. Representative sample 2. Median class 3. Significance level
 4. Posterior probability 5. Contingency tables 6. Degrees of freedom

Q. 1 B. Differentiate between the following pairs (Any 3) **6**
 1. Descriptive and Inferential Statistics
 2. Primary and Secondary data
 3. Binomial and Poisson distribution
 4. Mean and Mode of data
 5. Systematic and Stratified Sampling

Q. 1 C. For four different persons in column A choose the associated concept from column B. **4**

<p>Column A</p> <ol style="list-style-type: none"> 1. Karl Gauss 2. Charles Spearman 3. W. S. Gosset 4. Jacob Bernoulli 	<p>Column B</p> <ol style="list-style-type: none"> 1. Hypothesis testing 2. Normal distribution 3. Rank Order Correlation 4. t test 5. Binomial distribution 6. Regression analysis
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Q. 1 D. Write short notes on (Any three) **6**
 1. Bay's theorem 2. Chi Square test 3. Random sampling
 5. Hypothesis testing 6. Central Limit Theorem

Attempt Any FOUR from the Remaining SIX Questions

Q. 2. Solve any two **10**

Q. 2 A. A Camera Company introduced a new 35-millimeter camera and invested heavily in a nationwide publicity campaign at achieving substantial market penetration. Weekly sales increase for 40 districts were monitored and recorded in percentage figures. The data are given below.

0.3 1.8 1.4 0.8 0.2 1.5 0.3 1.3 1.1 0.7 0.8 0.9 0.7 0.7 0.9 1.6 0.8 1.2 1.2 1.5
 1.2 1.0 1.1 0.9 0.8 0.7 0.1 0.7 1.8 1.4 0.1 1.5 1.3 1.7 1.0 0.6 0.5 0.5 1.1 1.0

- a) Arrange the data in an array from the highest to lowest.
- b) Construct a relative frequency distribution using interval of 0.25
- c) Construct a histogram from the data.

Q. 2 B. A financial controller of a company has company's short term cash in a variety of savings accounts with following rates: 5.25%, 5.5%, 5.75%, 6%, 6.5%, 7%. Calculate the mean, variance and standard deviation for these rates.

Q. 2 C. A furniture company has a revolving credit agreement with the national bank. The loan showed the following monthly balances in dollars last year.

Jan	121,300	Feb	112,300	Mar	72,800
Apr	72,800	May	72,800	Jun	57,300
Jul	58,700	Aug	61,100	Sep	57,300
Oct	52,800	Nov	49,200	Dec	46,100

The company is eligible for a reduced rate of interest if its average monthly balance is over \$ 65,000. Does it qualify for the reduced interest rate?

Q. 3. Solve any two **10**

Q. 3 A. Classify the following probability estimates into classical, relative frequency or subjective:

- The probability that you will make a B in this course is 0.75
- The probability that a randomly selected family from a particular community has two children is 0.25,
- The probability that my candidate will win the election.
- The probability that a student from a school will go to college is 0.90.
- The probability my ticket's winning a raffle drawing for which 1000 tickets were sold is 0.001.

Q. 3 B. Data on readership of a certain magazine indicate that the proportion of male readers over 30 years old is 0.20. The proportion of male readers under 30 is 0.40. If the proportion of readers under 30 is 0.70, what is

- The proportion of subscribers that are male?
- The probability that a randomly selected male subscriber is under 30?

Q. 3 C. A box contains 5 blue and 8 green balls. If two balls are selected at random from the box, what is the probability that

- Both balls will be blue
- One ball will be blue and another green

Q 4. Solve any two **10**

Q. 4 A. From a population of size 240, a sample of 49 individuals is taken. From this sample, the mean is found to be 15.8 and the standard deviation 4.2

- Find the estimated standard error of the mean
 - Construct a 98 percent confidence interval for the mean.
- Note that z value at 98 percent confidence level is 2.33.

Q. 4 B. To determine whether different income groups have different purchasing habits concerning a certain brand, a marketing researcher asked 4 income groups, Do you always, never or sometimes purchase the brand? If the results of the survey are as given in the table below should null hypothesis be accepted or rejected at 0.10 significance level?

Income group	< \$7000	\$7,000 - 12999	\$13,000 – 19,999	\$20,000.00	Total
Always	25	40	47	46	158
Never	69	51	74	57	251
Sometimes	36	29	19	37	121
Total	130	120	140	140	530

- State the null and alternative hypothesis.
- calculate chi square value.
- At the 0.10 significance level, should the null hypothesis be rejected? (Note that the value from Chi square table is 6.251).

Q 4 C. The study compared the effects of 4 one- month point-of-purchase promotions sales. Below are

the unit sales for 5 stores using all 4 promotions in different months,

Free sample:	77	86	80	88	84
One-pack gift:	95	92	88	91	89
Cents off:	72	77	68	82	75
Refund by mail:	80	84	79	70	82

- Calculate the mean unit sale for each promotion and then determine the grand mean.
- Estimate between-column variance
- Calculate within-column variance.
- Calculate F ratio (11.31). At the 0.05 level of significance do the promotions produce different effects on sale? (Note that the F ratio at the degree of freedom 3/16 is 3.24).

Q. 5. Solve any two

10

Q. 5 A. Explain the terms null hypothesis and alternative hypothesis. State the null and alternative hypotheses for the following situations:

- The researcher wishes to test whether a certain enrichment class leads to test scores greater than the population average of 85 point.
- A university official wishes to determine if the average enrollment for the past 10 years is significantly different from a hypothesized value of 12,500.

Q. 5 B. A coal fired power plant is comparing two different systems for pollution abatement. The first system has reduced the emission of pollution to acceptable levels 63 percent of time as determined from 200 air samples. The second (and more expensive) system has reduced the emission of pollutants to acceptable levels 79 percent of time, as determined from 300 air samples. At the 0.10 level of significance can management conclude that the more expensive system is no significantly more effective than the inexpensive system? (z value at 0.1 level of significance is 1.64).

Q. 5 C. A consumer research organization routinely selects several car models a year and tests their claims regarding safety, mileage, and comfort. In one study of two similar subcompact models manufactured by two different automakers, the average gas mileage for 7 cars of make A was 21 miles per gallon with a standard deviation of 5.8. For 9 cars of make B, the average gas mileage was 26 miles per gallon with a standard deviation of 5.3 miles per gallon. Test the hypothesis that the average gas mileage for cars of make B is greater than the average gas mileage for cars of make A. Use the 0.05 level of significance where the value of t is 1.734.

Q. 6. Solve any two

10

Q. 6 A. What do you understand by the term correlation? Explain the term correlation coefficient. Comment on the statement “Correlation does not show dependence”.

Q. 6 B. calculate the coefficient of correlation from the following data and comment on it.

Sr. No. of Students	01	02	03	04	05	06	07	08	09	10
Marks in Statistics	20	35	15	40	10	35	30	25	45	30
Marks in Accounts	25	30	20	35	20	25	25	35	35	40

Q 6 C. Two ladies were asked to rank 7 different lipsticks, The ranks given by them are shown below. Calculate the rank order correlation.

Lipstick	A	B	C	D	E	F	G
Lady 1	2	1	4	3	5	7	6
Lady 2	1	3	2	4	5	6	7

Q. 7. Solve any two

10

Q. 7 A. Explain the term Regression. How does it differ from correlation? What role Regression Analysis plays in Business and Management?

Q. 7 B. A sales Manager for a large appliance retailer is measuring his radio advertising campaign featuring major appliances. Over the last seven weeks he has purchased a varying amount of radio time. The first row gives the value of radio time in minutes while the second row gives the number of appliances sold that week.

Minutes (X)	25	18	32	21	35	28	30
No. sold (Y)	16	11	20	15	26	32	20

- Calculate the equation of a best fitting line
- Find Y when X is 27.

Q. 7 C. A television documentary on overeating claimed that Americans are 16 pounds overweight on an average. To test this claim, 9 randomly selected individuals were examined. The average excess weight was found to be 18 pounds with SD of 4 pounds. At the 0.05 percent level of significance, is there a reason to believe the claim of 16 pounds to be in error? (t value at 5 percent SL and at 8 DF is 2.306).

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