

<i>The Hunger Games</i>	579,288	36,871
<i>Bridesmaids</i>	6,564	8,995
<i>Red Tails</i>	11,104	7,477
<i>Act of Valor</i>	9,152	8,054

- (a) Use the least-squares method to compute the regression coefficients  $b_0$  and  $b_1$ . Interpret their meaning.
- (b) Predict the mean receipts for a movie that has a Twitter activity of 100,000.
- (c) Determine the coefficient of determination,  $R^2$ , and explain its meaning in this problem.
- (d) Construct a 95% confidence interval estimate of the mean receipts for a movie that has a Twitter activity of 100,000. (6,2,6,4)

(200)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1306

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Unique Paper Code : 6202462302

Name of the Paper : Business Statistics And Financial Mathematics

Name of the Course : Bachelor Of Vocation (Banking, Financial Services And Insurance)

Semester : III

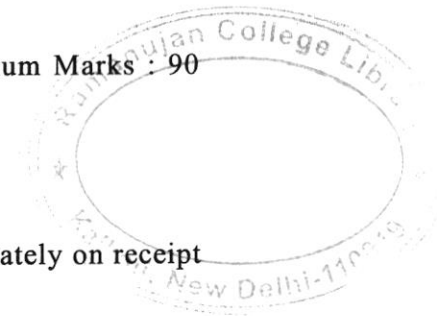
Duration : 3 Hours

Maximum Marks : 90

**Instructions for Candidates**

- Write your Roll No. on the top immediately on receipt of this question paper.
- Attempt any 5 out of 8 questions given below.
  - (a) Nutritional data about a sample of seven Chips packet includes the number of calories and fat per serving :

P.T.O.



Chips	Calories	Fat (gms)
Cheetos	80	6
Fritos Original	100	2
Doritos Nacho	100	4
Ruffles Sour Cream	110	4
Ruffles Onion Potato	130	4
Lays Indian Masala	190	11
PikNik	200	10

- (i) Compute the mean number of calories and fat in these breakfast cereals.
- (ii) Which varies more from chips to chips—the number of calories or the amount of fat (in grams)? (3,6)
- (b) What are sinking funds? An individual wants to have \$50,000 in a savings account to buy a car five years from now. How much should they deposit at the end of each year into the account, given an annual interest rate of 8%, to reach their goal? (9)
2. (a) Does correlation always signify a cause-and-effect relationship between the variables? Given below

- (b) After an analysis of incoming faxes the manager of an accounting firm determined the probability distribution of the number of pages (X) per facsimile as follows :

X	1	2	3	4	5	6	7
P(X)	.05	.12	.20	.30	.15	.10	.08

Compute the mean and variance of the number of pages per fax. Further analysis by the manager revealed that the cost of processing each page of a fax of Rs. 0.25. Determine the mean and variance of the cost per fax. (9)

8. The following data indicate the Twitter activity (“want to see”) and the receipts (\$) per theater on the weekend a movie opened for seven movies :

Movie	Twitter Activity (X)	Receipts (\$; Y)
<i>The Devil Inside</i>	219,509	14,763
<i>The Dictator</i>	6,405	5,796
<i>Paranormal Activity 3</i>	165,128	15,829

(b) What are the characteristics of Poisson distribution. Assume that the number of new visitors to a museum in one minute is distributed as a Poisson variable. The mean number of new visitors to the museum is 8.0 per minute. What is the probability that in any given minute

- (i) zero new visitors will arrive at the museum?
- (ii) exactly one new visitor will arrive at the museum?
- (iii) two or more new visitors will arrive at the museum?
- (iv) fewer than three new visitors will arrive at the museum? (9)

7. (a) What is the difference between nominal and effective rate of interest. You have \$5,000 to invest, and two banks offer different savings accounts. Bank A offers an annual interest rate of 4% compounded quarterly, while Bank B offers an annual interest rate of 3.75% compounded monthly. Which bank should you choose for your investment? (9)

are scores of ten potential candidates in two different tests undertaken to measure aptitude in fine arts :

Test A	35	54	80	95	73	73	35	91	83	81
Test B	40	60	75	90	70	75	38	95	75	71

Calculate the Spearman's rank correlation for the scores and interpret the results. (9)

(b) List the conditions under which a binomial distribution can be approximated as a Poisson distribution. A company's packaging machine is expected to generate 3 defectively packaged items out of every 150. Determine the mean and variance of defectively packaged items. Estimate the probability that there will be (i) no defectives, (ii) at most two defectives. (9)

3. (a) Differentiate between range and interquartile range, the percentage of the country population that bought something online via a mobile phone in the past month, for twenty- eight of the world's economies:

17	15	15	13	27	12	20	23	9	9	16	6	19	14
11	14	8	15	23	11	37	17	11	19	27	18	18	15

Compute the first quartile, the third quartile, and the interquartile range. Also compute the variance of the same. (9)

(b) Comment "A rupee of today is not equal to the rupee of tomorrow."

A company is offered a contract that involves an initial cash outlay of \$20,000 and promises a cash inflow of \$26,500 at the end of two years. Calculate the rate of return for this contract. (9)

4. (a) In a call center, three customer service representatives handle 35%, 40%, and 25% of the calls, respectively. The error rates for these representatives are 0.05, 0.03, and 0.06, respectively. If a randomly selected call is found to have an error, what is the probability that it was handled by the representative with an error rate of 0.03 or 0.06? (9)

(b) What is the difference between correlation and regression analysis. Describe in detail explained and unexplained variations in the context of regression analysis. Also, elaborate on the concept of goodness of fit. (9)

5. (a) Distinguish between type 1 and type 2 errors. A research study claims that the average mean that the kids start walking is almost 13 months. A researcher wants to check if the claim is true or false. A random sample of 20 kids was selected randomly, with average mean and standard deviation 14 and 1 month respectively. Check whether the hypothesis is true or false give that  $t_{\text{tabulated}} = 2.093$ . (9)

(b) Distinguish between point estimation and interval estimation of population mean. Given that the income of 25 executives in an industry as approximately normally distributed with a mean of Rs. 50,000 per month, find at 95% confidence interval if,

(i) the population standard deviation is known to be Rs. 8900 and

(ii) the sample standard deviation is computed as Rs. 9500. (9)

6. (a) Describe a normal distribution and area under the standard normal curve with the help of a diagram. The heights of a population of trees follow a normal distribution with a mean height of 180 centimeters and a standard deviation of 10 centimeters. Calculate the probability that a randomly selected tree is taller than 195 centimeters. (9)