VPM's
DR VN BRIMS, Thane
Programme: MMS (2019-21)
First Semester Examination January 2020

Subject	**Business Statistics**		
Roll No.		**Marks**	**60 Marks**
Total No. of Questions	**7**	**Duration**	**3 Hours**
Total No. of printed pages	**4**	**Date**	**04.01.2020**

Instructions:-
- **Q. No 1** is compulsory.
- Attempt **Any Four** from the Remaining Six Questions.
- Figures to the right indicate marks in full.

Q. 1 — Case/Case-let Study — **20**

a. The following data represents the number of units of production per day turned out by 5 different workers using 4 different types of machines

	Machine Types		
Workers	A	B	C
1	44	38	47
2	46	40	52
3	34	36	44
4	43	38	46
5	38	42	49

(i) Test whether the mean productivity is the same for different machine types at 5 % significance level.
(ii) Test whether the 5 men differ with respect to mean productivity at 5 % significance level.

b. 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 2019 ($ millions).

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

Develop the equation of the simple regression line to predict sales from advertising expenditures using these data

Q. 2 — Answer **Any two** from the following. — **5x2 = 10**

a. A company has three manufacturing plants, and company officials want to determine whether there is a difference in the average age of workers at the three locations. The following data are the ages of five randomly selected workers at each plant. Perform a one-way ANOVA to determine whether there is a significant difference in the mean ages of the workers at the three plants. Use = .01 and note that the sample sizes are equal.
Plant (Employee Ages)

Plant 1	Plant 2	Plant 3

29	32	25	
27	33	24	
30	31	24	
27	34	25	
28	30	26	

	b.	Comment on the effectiveness of using pie charts to display the revenue of the top industries?	
	c.	The frequency distribution of weights in grams of mangoes of the given variety is as given below. Calculate the median of the data	

Weights In grams	410-420	420-30	430-440	440-450	450-460	460-470	470-480
Number of mangoes	14	20	42	54	45	18	7

Q. 3		Answer **Any two** from the following.	**5x2= 10**
	a.	Compute the Spearsman rank correlation for the following data:	

Candidate	1	2	3	4	5	6	7
Judge X	20	22	28	23	30	30	23
Judge Y	28	24	24	25	26	27	32

	b.	A survey conducted by the Northwestern University Lindquist-Endicott Report asked 320 companies about the procedures they use in hiring. Only 54% of the responding companies review the applicant's college transcript as part of the hiring process, and only 44% consider faculty references. Assume that these percentages are true for the population of companies in the United States and that 35% of all companies use both the applicant's college transcript and faculty references. (i) What is the probability that a randomly selected company uses either faculty references or college transcript as part of the hiring process? (ii) What is the probability that a randomly selected company uses either faculty references or college transcript but not both as part of the hiring process?	
	c.	Creation of hypothesis is very important for research. Explain in detail the hypothesis and that is its role in providing solution?	
Q. 4		Answer **Any two** from the following.	**5x2 = 10**
	a.	Comment on the skewness of the data given below:	

Scores	Frequency
10-15	2
15-20	8
20-25	6
25-30	12
30-35	7
35-40	6
40-45	4
45-50	3
50-55	1
55-60	1

	b.	Define coefficient of correlation? What is it intended to measure? How would you interpret the sign and magnitude related to r?	
	c.	Outline the difference between sample and population. Comment on statement "Research by probability sampling provides more quality	

		results".	
Q. 5		Answer **Any two** from the following.	**5x2 = 10**
	a.	Lives of two models of refrigerators in a recent survey are: Life (No. Of Years) | Model A | Model B 0-2 | 5 | 2 2-4 | 16 | 7 4-6 | 13 | 12 6-8 | 7 | 19 8-10 | 5 | 9 10-12 | 4 | 1 What is the average life of refrigerator? Which model has greater uniformity?	
	b.	Explain the term Kurtosis? What purpose the measures of Kurtosis serve?	
	c.	In a factory manufacturing razor blades, there is small chance of 1/50 for any blade to be defective. The blades are in packet each containing 10 blades. Using the Poisson distribution calculate the approximate number of packets not having more than 2 defective blades in a consignment of 10000 packets ($e^{-0.2}$ = .818)	
Q. 6		Answer **Any two** from the following.	**5x2 = 10**
	a.	The radio music listener market is diverse. Listener formats might include adult contemporary, album rock, top 40, oldies, rap, country and western, classical, and jazz. In targeting audiences, market researchers need to be concerned about the ages of the listeners attracted to particular formats. Suppose a market researcher surveyed a sample of 170 listeners of country music radio stations and obtained the following age distribution. Age | Frequency 15–under 20 | 9 20–under 25 | 16 25–under 30 | 27 30–under 35 | 44 35–under 40 | 42 40–under 45 | 23 45–under 50 | 7 50–under 55 | 2 What are the variance and standard deviation of the ages of country music listeners?	
	b.	How far can statistics be applied for business and management decisions? Discuss briefly bringing out limitations if any?	
	c.	The customer accounts at a certain departmental store have an average balance of Rs.480 and a standard deviation of 160. Assuming that the account balance is normally distributed What proportion of the accounts is over Rs. 600	
Q. 7		Answer **Any two** from the following	**5x2 = 10**
	a.	A public opinion poll surveyed a simple random sample of 1000 voters. Respondents were classified by gender (male or female) and by voting preference (Republican, Democrat, or Independent). Results are shown in the contingency table below. | Voting Preference |	

			Rep	Dem	Ind	Total	
		Male	200	150	50	400	
		Female	250	300	50	600	
		Total	450	450	100	1000	
		Is there a gender gap? Do the men's voting preferences differ significantly from the women's preferences? Use a 0.05 level of significance.					
	b.	From the following data calculate the Karl Pearsons coefficient of correlation					
		Price (Rs.)	Sales (in units)				
		103	500				
		98	610				
		85	700				
		92	630				
		90	670				
		84	800				
		88	800				
		90	750				
		93	700				
		95	680				
	c.	Outline the difference between Binomial distribution and Poisson distribution?					