VPM's
DR VN BRIMS, Thane
Programme: MMS (2023-25)
Second Semester Regular Examination April 2024

Course Name:	Business Research Methods	**Course Code**	C204
Roll No.		**Marks**	**60**
Total No. of Questions	6	**Duration**	**3 Hours**
Total No. of printed pages	6	**Date**	22-04-2024

Course Outcome Statements:

CO1: **DEFINE** the basic concepts related to research, research problem, hypothesis, research design, attitude measurement, scaling, sampling, & data processing.
CO2: **EXPLAIN** the concepts taught through the syllabus of business research methods
CO3: **MAKE USE OF** processes pertaining to research design, data collection, questionnaire designing, sampling, data processing and hypothesis testing for finding solution to the business research problems.
CO4: **EXAMINE** the results of various statistical tests from an analytical perspective
CO5: **APPRAISE** the results of statistical tests for taking business decision

Instructions: -

Q. No 1 (All Questions are Compulsory)

Q. No.		Questions	Marks	BL	CO
Q. 1		Case/Case-let Study (500-800 words)			
		For the past decade, the Healthy Snacking Quick Service Restaurant has built a strong reputation for providing nutritious and delicious snacks. Customers prefer the company for fresh salads, multi-grain burgers, healthy pizzas, and a variety of other healthy options for health-conscious consumers. Beyond the food, people appreciate the warm and welcoming atmosphere created by the friendly staff. As a result, the company has emerged as a top choice for individuals seeking quick and healthy snacks for working professionals However, in recent times, the company has faced a new problem: decline in customer satisfaction scores. Despite its commitment to quality and customer service, the satisfaction ratings for its snacks have declined which has worried management and stakeholders. This decline has impacted customer retention and also the company's profitability. Thus, there's an urgent need to identify the underlying reasons behind this dissatisfaction and take proactive steps to address them swiftly and effectively.			
	a.	**Decide** the important variables that you would study and their rationale	**6**	**Level 4**	**CO4**
	b.	**Recommend** a questionnaire for studying the variables	**6**	**Level 5**	**CO5**
Q. 2		Answer **Any one** from the following.			
	a.	The BRM professors want to check if there was any improvement in understanding of statistics of students by checking their performance before and after course completion. The scores of 9 random students have been recorded as below:	**6**	**Level 5**	**CO5**

		(table below) Evaluate null and alternative hypothesis			

Students	Score before BRM Course	Score after BRM Course
A	75	70
B	70	77
C	46	57
D	68	60
E	68	79
F	43	64
G	55	55
H	68	77
I	77	76

Evaluate null and alternative hypothesis, assume data is normally distributed and use 5% level of significance to arrive at conclusion relevant to the above investigation

	b.	A reputed Business School has recorded its placement statistics for all specializations for past 5 years. The college claims that there is no significant difference in the placements among different specializations.	**6**	**Level 5**	**CO5**

Year	Operations	Finance	Marketing
2024	32	27	30
2023	26	30	25
2022	22	28	19
2021	20	16	18
2020	16	14	11

Justify based on the given information whether the claim is true at 5 % significance level

Q. 3		Answer **Any one** from the following.			
	a.	1000 students at college level were graded according to their IQ level and the economic condition of parents **Examine** the following data by defining the null and alternative hypothesis and test the hypothesis at 5% level of significance	**6**	**Level 4**	**CO4**

Economic Condition	*IQ Level*		
	High	*Low*	**Total**
Rich	460	140	600
Poor	240	160	400
Total	700	300	1000

	b.	The business objective facing the marketing manager at OmniFoods is to develop a model to predict monthly sales volume per store of OmniPower bars and to determine what variables influence sales. Two independent variables are	**6**	**Level 4**	**CO4**

considered here: the price of an OmniPower bar, as measured in cents and the monthly budget for in-store promotional expenditures, measured in dollars In-st ore promotional expenditures typically include signs and displays, in-store coupons, and free samples. The dependent variable *Y* is the number of OmniPower bars sold in a month. Data are collected from a sample of 34 stores in a supermarket chain selected for a test-market study of OmniPower. All the stores selected have approximately the same monthly sales volume. The snap shot of the data is given below. **Examine** the equation of regression & comment on the robustness of model.

Bars	Price	Promotion
4141	59	200
3842	59	200
3056	59	200
3519	59	200
4226	59	400
4630	59	400
3507	59	400
3754	59	400
5000	59	600
5120	59	600
4011	59	600
5015	59	600

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.870[a]	.758	.742	638.065

a. Predictors: (Constant), Promotion, Price

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39472730.77	2	19736365.39	48.477	.000[b]
	Residual	12620946.67	31	407127.312		
	Total	52093677.44	33			

a. Dependent Variable: Bars

b. Predictors: (Constant), Promotion, Price

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5837.521	628.150		9.293	.000
	Price	-53.217	6.852	-.690	-7.766	.000
	Promotion	3.613	.685	.468	5.273	.000

a. Dependent Variable: Bars

Q. 4		Answer **Any two** from the following.			
	a.	A machine is set to fill a small bottle with 9.0 grams of medicine. A sample of eight bottles revealed the following amounts (grams) in each bottle. At the 5% significance level, **Construct** the null and alternative hypothesis and test the hypothesis at 5%	**6**	**Level 3**	**CO3**

		level of significance if the mean weight of medicine in the bottle is equal to 9.0 grams?			

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Grams	8	8.8000	.22678	.08018

One-Sample Test

			Grams
Test Value = 9	T		-2.494
	Df		7
	Sig. (2-tailed)		.041
	Mean Difference		-.20000
	95% Confidence Interval of the Difference	Lower	-.3896
		Upper	-.0104

	b.	The manager of a bank feels that 1/3 of branches will have enhanced yearly collection of deposits after introducing a hike in interest rate. **Solve** for the sample size to estimate the population proportion such that the proportion is within plus or minus 0.06 at a confidence level of 95%	6	**Level 3**	**CO3**
	c.	A pharmaceutical company is conducting survey on quality perception of their recently launched drug. **Make use of above** information to get the sample size for the survey for standard deviation of 0.6 if confidence level is 95% and tolerable error is 6%.	6	**Level 3**	**CO3**
Q. 5		Answer **Any two** from the following.			
	a.	**Illustrate** the business research report format in brief	6	**Level 2**	**CO2**
	b.	**Contrast** between primary and secondary research types	6	**Level 2**	**CO2**
	c.	**Explain** the significance of hypothesis testing in Business Research	6	**Level 2**	**CO2**
Q. 6		Answer **Any two** from the following.			
	a.	**Define** probability and non-probability sampling type	6	**Level 1**	**CO1**
	b.	**Relate** to the concept of type I and type II error with examples	6	**Level 1**	**CO1**
	c.	**List** exploratory, causal, and descriptive research designs with suitable examples	6	**Level 1**	**CO1**

	F-table of Critical Values of α = 0.05 for F(df1, df2)																		
	DF1=1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
DF2=1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.05	250.10	251.14	252.20	253.25	254.31
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.37
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25

t Distribution

	α					
Degrees of freedom	.005 (one tail) .01 (two tails)	.01 (one tail) .02 (two tails)	.025 (one tail) .05 (two tails)	.05 (one tail) .10 (two tails)	.10 (one tail) .20 (two tails)	.25 (one tail) .50 (two tails)
1	63.657	31.821	12.706	6.314	3.078	1.000
2	9.925	6.965	4.303	2.920	1.886	.816
3	5.841	4.541	3.182	2.353	1.638	.765
4	4.604	3.747	2.776	2.132	1.533	.741
5	4.032	3.365	2.571	2.015	1.476	.727
6	3.707	3.143	2.447	1.943	1.440	.718
7	3.500	2.998	2.365	1.895	1.415	.711
8	3.355	2.896	2.306	1.860	1.397	.706
9	3.250	2.821	2.262	1.833	1.383	.703
10	3.169	2.764	2.228	1.812	1.372	.700
11	3.106	2.718	2.201	1.796	1.363	.697
12	3.054	2.681	2.179	1.782	1.356	.696
13	3.012	2.650	2.160	1.771	1.350	.694
14	2.977	2.625	2.145	1.761	1.345	.692
15	2.947	2.602	2.132	1.753	1.341	.691
16	2.921	2.584	2.120	1.746	1.337	.690
17	2.898	2.567	2.110	1.740	1.333	.689
18	2.878	2.552	2.101	1.734	1.330	.688
19	2.861	2.540	2.093	1.729	1.328	.688
20	2.845	2.528	2.086	1.725	1.325	.687
21	2.831	2.518	2.080	1.721	1.323	.686
22	2.819	2.508	2.074	1.717	1.321	.686
23	2.807	2.500	2.069	1.714	1.320	.685
24	2.797	2.492	2.064	1.711	1.318	.685
25	2.787	2.485	2.060	1.708	1.316	.684
26	2.779	2.479	2.056	1.706	1.315	.684
27	2.771	2.473	2.052	1.703	1.314	.684
28	2.763	2.467	2.048	1.701	1.313	.683
29	2.756	2.462	2.045	1.699	1.311	.683
Large (z)	2.575	2.327	1.960	1.645	1.282	.675

Critical values of the Chi-square distribution with *d* degrees of freedom

	Probability of exceeding the critical value						
d	0.05	0.01	0.001	*d*	0.05	0.01	0.001
1	3.841	6.635	10.828	11	19.675	24.725	31.264
2	5.991	9.210	13.816	12	21.026	26.217	32.910
3	7.815	11.345	16.266	13	22.362	27.688	34.528
4	9.488	13.277	18.467	14	23.685	29.141	36.123
5	11.070	15.086	20.515	15	24.996	30.578	37.697
6	12.592	16.812	22.458	16	26.296	32.000	39.252
7	14.067	18.475	24.322	17	27.587	33.409	40.790
8	15.507	20.090	26.125	18	28.869	34.805	42.312
9	16.919	21.666	27.877	19	30.144	36.191	43.820
10	18.307	23.209	29.588	20	31.410	37.566	45.315

***INTRODUCTION TO POPULATION GENETICS*, Table D.1**

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