Indian Institute of Information Technology Vadodara
BTech: Semester-VI
Academic Year: 2021-2022
End-Semester Examination
Business Analytics
(CS 318)

INSTRUCTIONS:

Total Marks: 25 marks
Time: 100 minutes

1. *Read the questions carefully and answer.*
2. *No clarification shall be sought on the question paper.*
3. *This is a **CLOSED BOOK** exam. However, **Formula Sheets (handwritten/photocopied) and Statistical tables (only hard copies) are allowed.***
4. ***No electronic items except calculators are allowed.***
5. *There are five questions (5x5 marks) in this paper.*
6. *At the end of the examination you have to scan your answer-sheet and submit it to the link provided on Google Classroom of this course.*

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Q1. The marketing manager of a company believes that the non-affluent customers are sensitive to discounts compared to affluent customers. To validate this hypothesis, discount coupons were sent to non-affluent and affluent customers and the data is provided in the table given below. Use an appropriate test to check whether there is any difference in proportion of customers who use discount coupons. **(5 marks)**

Group	Sample Size	Number of customers using discount coupons
Non-Affluent	520	165
Affluent	310	52

Q2. The Department of Transportation of Gujrat State (GSRTC) has mandated that the average speed of cars on interstate highways must be no more than 67 miles per hour for state highway department to retain their central funding. Gandhinagar branch of GSRTC, in unmarked cars, clocked a sample of 186 cars and found that the average speed was 66.3 miles per hour and the standard deviation was 0.6 mph.

a) Find the standard error of the mean. **(1.5 Marks)**

b) What is the interval around the sample mean that would contain the population mean 95.5 % of the time? **(1.5 Marks)**

c) Can Gandhinagar branch truthfully report that the true mean speed on its highways is 67 mph or less with 95.5 % confidence? **(2 Marks)**

Q3. The Ever-Healthy hospital has evolved special cholesterol-free diet for reducing the cholesterol level. It wishes to find out if changes in diet alone can reduce the level of cholesterol without the aid of medicines. A random sample of 10 persons in the age group of 50 to 60 years is selected and their cholesterol level in mg/100 ml is measured. Then they are put on the special diet for 10 weeks and their cholesterol level is measured again. The results are tabulated below.

Based on the given data, can we conclude that the special diet is effective in reducing the cholesterol level? **(5 Marks)**

Person	Cholesterol levels	
	Before (Commencement of Special Diet)	After (10 weeks on Special Diet)
1	254	233
2	221	193
3	250	198
4	235	223
5	225	233
6	220	221
7	222	216
8	219	207
9	217	213
10	205	200

Q4. "Mithai-Wala" a maker of special Indian sweets has three different packet designs such as rectangular, circular, and elliptical for its sweets to be made available in shopping malls. The marketing manager wanted to explore whether number of packets sold significantly differs across different pack designs. This experiment was conducted in few retail stores with high footfall, where number of packets sold for each pack design was recorded. An appropriate statistical tool was used to analyze these data. The output of the analysis is given below.

Descriptive Statistics

No. of packets sold

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Rectangular	5	208.0000	22.80351	10.19804	179.6857	236.3143	180.00	240.00
Circular	5	274.0000	19.49359	8.71780	249.7955	298.2045	250.00	300.00
Elliptical	5	209.0000	25.34758	11.33578	177.5268	240.4732	185.00	245.00
Total	15	230.3333	38.24109	9.87381	209.1561	251.5105	180.00	300.00

ANOVA

No. of packets sold

	Sum of Squares	df	Mean Square	F	P value
Between Groups	14303.333	2	7151.667	13.909	.001
Within Groups	6170.000	12	514.167		
Total	20473.333	14			

a) Help the marketing manager to decide whether he should go with three different pack designs or not. **(1.5 Marks)**
b) Which is the best packet design? **(1.5 Marks)**
c) Discuss the output of the analysis. **(2 Marks)**

Q5. If you've ever worked in an office, attended a corporate meeting, or had a professional interview, you'll no doubt understand the challenge of dressing for business. Today, business attire is more confusing than ever before, and striking the perfect balance of professionalism and style can be tricky. Business attire is a formal dress code for many offices and corporate events. It denotes a professional style of dress that appears smart and sophisticated. For men, a suit is generally required. Women, on the other hand, can interpret business attire in a range of ways. While pantsuits and skirt suits are ideal, polished separates and business dresses can also work well. To determine how women, respond to style of business attire, "On the Job" an area boutique, surveyed groups of realtors, secretaries, entrepreneurs, and account executives about what fashion style they wore most often. The following data were collected:

Occupation	**Style**			
	Pantsuits	Skirt suits	Polished separates	Business dresses
Realtors	6	7	6	9
Secretaries	11	15	12	10
Entrepreneurs	10	12	21	24
Account executives	13	14	20	24

a) Which test will you use to find whether the style a woman prefers depends on her occupation? State the appropriateness of the test. **(1.5 Marks)**
b) State your null and alternate hypothesis in this case. **(1.5 Marks)**
c) At the 0.05 level of significance, test whether the style a woman prefers depends on her occupation. **(2 Marks)**