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Your Roll No.....

Sr. No. of Question Paper : 5711  
Unique Paper code : 61013924  
Name of the Paper : Statistical Software Package  
Name of the Course : Bachelor of Management Studies (BMS),  
2022 LOCF  
Semester : IV  
Duration : 3 Hours  
Maximum Marks : 50

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Marks are indicated against each question.
3. Answer the questions based on SPSS or any other equivalent software used for instruction.

Q 1. Write a short note on any one with example:

- i. Computing and Recoding variables in data file.
- ii. Creating and editing graphs and charts.
- iii. Explain data type, decimal, label, values and measurement scale for variables in variable view. (5)

Q 2. Explain paired sample t-test. How is it different from independent sample t-test? A study was conducted to measure the empowerment score (ES) of employees in different organisations. Their score was recorded before training (ES\_BT) and after a training program (ES\_AT). Interpret the results given below and comment if there is any significant improvement in the empowerment score after training.

Paired Samples Statistics				Std. Error
		Mean	N	Mean
Pair 1	ES_AT	60.79	14	19.196
	ES_BT	39.79	14	15.567

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	ES_AT&ES_BT	14	-.311	.279

Paired Samples Test										
		Paired Differences					t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference					
			n	Mean	Lower	Upper				
Pair 1	ES_AT & ES_BT	21.000	28.227	7.544	4.702	37.298	2.784	13	.016	

(15)

Q 3 Differentiate between simple linear and multiple linear regression. A Company has taken survey from its 200 customers regarding different aspects of its marketing and operations. It further ran a multiple regression with select indicators to find out those which are relevant in predicting customer satisfaction. Set up hypotheses and interpret the tables of outputs pertaining to multiple regression provided below.

Dependent Variable: Customer Satisfaction

Model Summary

Multiple R	.889
Coefficient of Determination (R Square)	.791
Adjusted R Square	.780
Standard Error of the Estimate	.559

Analysis of Variance

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	111.205	5	22.241	71.058	.000
Residual	29.422	94	.313		
Total	140.628	99			

Coefficients

Variables entered	B	Std. error	Beta	T	Sig.
(Constant)	-1.151	.500		-2.303	.023
Complaint Resolution	.319	.061	.323	5.256	.000
Product Quality	0.369	.047	0.432	7.82	.000
Salesforce Image	0.775	.089	0.697	8.711	.000
E-Commerce	-.417	.132	-.245	-3.162	.002
Product Line	.174	.061	.192	2.860	.005

(15)

Q 4. An organization had three categories of employees, 1: Mechanical, 2: Operations Staff and 3: Technical. A survey was done and their monthly salaries were recorded. A statistical test was performed and following output tables were obtained. In reference with the given output tables, attempt the following:

- Name the statistical test executed and briefly explain its suitability in this case.
- State the steps for conducting the statistical test and formulate suitable hypotheses.
- Describe each output table highlighting the relevant values and draw inference from same.

Descriptives								
Salary of the Employee								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	150	39237.27	8217.902	744.014	37764.30	40710.24	22044	68712
2	160	47717.30	4338.442	360.288	47005.17	48429.44	37930	58365
3	164	57285.99	7576.034	526.571	56247.83	58324.14	28252	77690
Total	474	49713.41	10130.542	465.311	48799.07	50627.74	22044	77690

Test of Homogeneity of Variances			
Salary of the Employee			
Levene Statistic	df1	df2	Sig.
6.593	2	471	.075

ANOVA					
Salary of the Employee					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2.584-E10	2	1.292-E10	267.982	.000
Within Groups	2.271-E10	471	48207260.326		
Total	4.854-E10	473			

Multiple Comparisons							
Dependent Variable: Salary of the Employee							
	(I) Job Category of the Employee	(J) Job Category of the Employee	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1	2	-8480.033	852.998	.000	-10485.55	-6474.51
		3	-18048.715	792.481	.000	-19911.95	-16185.48
	2	1	8480.033	852.998	.000	6474.51	10485.55
		3	-9568.682	751.897	.000	-11336.50	-7800.86
	3	1	18048.715	792.481	.000	16185.48	19911.95
		2	9568.682	751.897	.000	7800.86	11336.50

\*. The mean difference is significant at the 0.05 level.

(15)

Q 5. A market research agency has profiled customers on 30 variables related to a product. Now it wishes to perform a dimension reduction procedure for extracting exactly 3 dimensions that can be used for identifying different clusters (if any) using k-means cluster analysis. Describe briefly procedure for:

- i. Dimension reduction, and
- ii. K-means cluster analysis for 2 clusters.

(15)

Q 6. Write short notes on any two of the following:

- i. Logistic Regression
- ii. Hierarchical Cluster analysis
- iii. Difference between Chi-square test of Independence and Chi-square test of goodness of fit.
- iv. Discriminant analysis

(15)