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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Dec 2019

Program: MBA LSCM
Semester – III
Subject (Course): Supply Chain Analytics **Max. Marks : 100**
Course Code : LSCM 8020 **Duration : 3 Hrs**
No. of page/s: 6

SECTION A (Attempt all)	**[10x2 = 20 marks]**	
Q1. Explain the concept of transitivity in ISM.	2	CO4
Q2. Write down only one difference between consistency index (CI) and consistency ratio (CR) used in AHP method.	2	CO3
Q3. Why we use SPSS software and stands for?	2	CO1
Q4. What are the assumptions in correlation.	2	CO2
Q5. What is the other name of reliability test_____. Its value ranges from ___ to ___.	2	CO2
Q6. Null hypothesis is opposite to Alternate Hypothesis. Why and how?	2	CO1
Q7. According to Hair (1998), name any two major orthogonal approaches used in Factor analysis.	2	CO2
Q8. Name four different types of Supply Chain Analytics.	2	CO1
Q9. Write down one difference between supervised learning and unsupervised learning.	2	CO1
Q10. Give an example to elaborate that how companies are using IDIC model.	2	CO5
SECTION B (Attempt all)	**[4x5 = 20 marks]**	
Q11. How KNN approach works? Draw the flowchart.	5	CO3
Q12. Draw the forecasting hierarchy. **OR** **Q12.** What is the purpose of ARIMA model?	5	CO2
Q13. How analytics can improve the supply chain performance? Support with an example.	5	CO1
Q14. What are the types of inventory models? Relate the concept of EOQ with any industry and explain.	5	CO4

SECTION C (Attempt all)	[3x10 = 30 marks]	

Q15. SMC, a vendor wants to determine from Berger Paints (customer), how important each attribute is to them. Also, they want to know the utility they derive from a given combination of levels of attributes. SMC thinks that machinery and product are important to the consumer. These are:

1. Machinery setup time: 1 hour; 6 hour; 12 hour; 24 hour
2. Machinery Delivery: 7 days; 30 days; 45 days
3. Number of products: 2, 4, 7

Using the SPSS output for Conjoint Analysis through Regression Model tables below to answer the following questions:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.988	.976	.970	1.837

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3790.500	7	541.500	160.444	.000
	Residual	94.500	28	3.375		
	Total	3885.000	35			

Coefficients

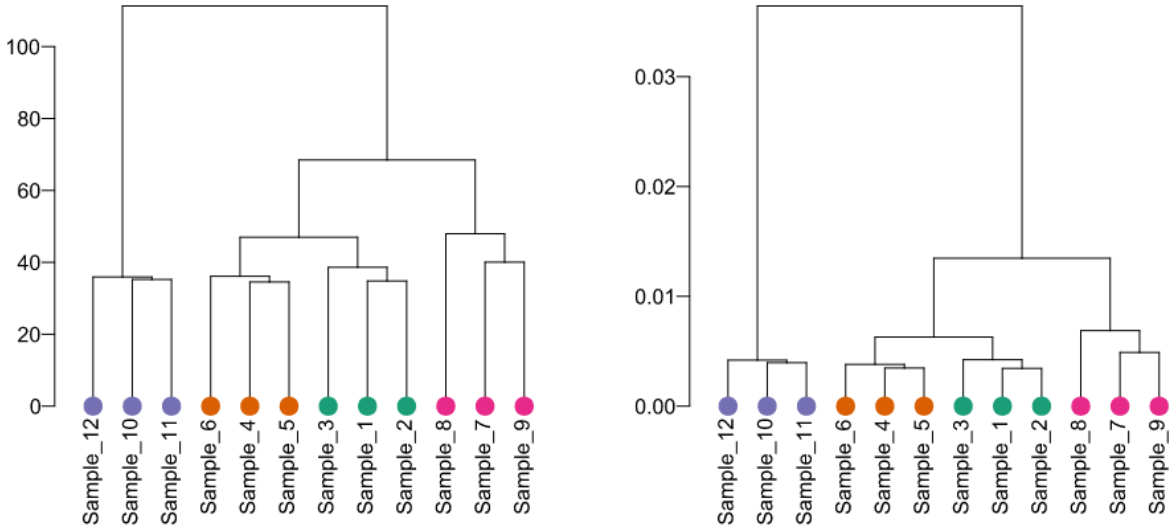
Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	18.500	.306		60.421	.000
VAR1	6.500	.530	.422	12.257	.000
VAR2	3.500	.530	.238	6.600	.000
VAR3	-2.500	.530	-.170	-4.714	.000
VAR4	1.000	.433	.079	2.309	.029
VAR5	.000	.433	.000	.000	1.000
VAR6	-12.000	.433	-.943	-27.713	.000
VAR7	3.750	.433	.295	8.660	.000

a) How many attributes and levels observed? (2 marks)

b) How many different possible combinations obtained? (1 mark)

10

CO2

c) Name all the VAR1 to VAR7 from the output. (1 mark) **d)** Based on output, interpret the results. Also, calculate part utility, range of utilities, and sensitivity. (5 marks) **e)** Which gives the best combination? Rank them all. (1 mark)		
Q16. Answer the following questions:  **a)** What this figure represents? (2 marks) **b)** Write down the three-cluster solution for both figures. (4 marks) **c)** Write down the steps taken up for Hierarchical cluster analysis using SPSS. (4 marks)	10	CO3
Q17. You manage a team that sells computer hardware to software development companies. At each company, your representatives have a primary contact. You have categorized these contacts by the department of the company in which they work (Development, Computer Services, Finance, Other, Don't Know). Use frequencies to study the distribution of departments to see if it meshes with your goals. **a)** Write down the steps taken up with a frequency distribution in SPSS. (4 marks) **b)** On running the frequency distribution you got the following, interpret your findings. (6 marks)	10	CO4

Department					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Development	16	22.9	25.8	25.8
	Computer Science	30	42.9	48.4	74.2
	Finance	13	18.6	21.0	95.2
	Other	3	4.3	4.8	100.0
	Total	62	88.6	100	
Missing	Don't know	8	11.4		
Total		70	100.0		

SECTION D (Compulsory) **[2x15 = 30 marks]**

Q18. Using the SPSS output for Linear Regression tables below to answer the following questions: 15 CO2, CO5

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	1.878	.322		5.825	.000
Availability of Updated Information	.545	.088	.767	6.212	.000

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.767	.588	.573	.506

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.859	1	9.859	38.583	.000
	Residual	6.899	27	.256		
	Total	16.759	28			

a) Write down the linear regression equation indicating what each letter represents in the equation. (3 marks)

b) What is the value of the standard error of the estimate? (2 marks)

c) How many degrees of freedom are associated with the t-value for the line of regression? (2 marks)

d) Whether the result is significant or not at 95% confidence interval? Why? (2 marks)

e) What is the value of correlation coefficient? (2 marks)

f) What is the purpose of ANOVA and its full form? (2 marks)

g) Write down the steps taken up for linear regression in SPSS. (2 marks)

Q19. Using the SPSS output for principal component factor analysis method, below to answer the following questions:

KMO and Bartlett's Test		
KMO		.574
Bartlett's Test of Sphericity	Approx. Chi-Square	144.127
	df	21
	Sig.	.000

Total Variance Explained

	Initial Eigen Values			Extraction sums of squared loadings			Rotation Sums of squared loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.020	28.850	28.850	2.020	28.850	28.850	1.767	25.244	25.244
2	1.341	19.153	48.003	1.341	19.153	48.003	1.502	21.457	46.701
3	1.251	17.877	65.880	1.251	17.877	65.880	1.343	19.179	65.880
4	0.816	11.652	77.532						
5	0.628	8.968	86.500						
6	0.549	7.839	94.340						
7	0.396	5.660	100.000						

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CO4, CO2

VARIMAX-rotated Component Analysis Factor Matrix				
	Component Factors			Communalities
Component	1	2	3	
1	0.047	0.222	-0.796	0.685
2	0.852	0.065	-0.174	0.760
3	0.096	0.815	-0.190	0.710
4	0.102	0.833	0.179	0.737
5	0.836	0.142	0.054	0.722
6	0.108	0.195	0.750	0.612
7	0.556	0.176	0.212	0.385

a) What is the full form of KMO? How much is the acceptable range of MSA level? (2 marks)

b) Define communalities. (2 marks)

c) How many reduced factors you have obtained from the output? (2 marks)

d) How much is the percentage of trace for each factors and in total? (2 marks)

e) What is the value for the sum of squared factor loadings? (2 marks)

f) Draw the scree plot for component analysis. (2 marks)

g) Draw the model using VARIMAX-rotated component analysis with their factor loadings. (3 marks)