

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Quantitative Methods

Programme: MBA(OG)

Time: 03 hrs.

Course Code: DSQT 7001

Semester: I

Max. Marks: 100

Instructions: Simple Calculator is allowed not the scientific (991-function) one. Statistical Tables and graph sheets will be provided by SRE. Try to maintain the sequence while answering.

SECTION A

S. No.		Marks	CO
Q 1	Answer the following MCQs with relevant explanation:	(15*2=30)	
	<p>I. Statement 1: The prices of petrol and diesel in the domestic Market have remained unchanged for the past few months.</p> <p>Statement 2: The crude oil prices in the international market have gone up substantially in the last few months.</p> <p>a) Statement 1 is the cause and statement II is its effect b) Statement 2 is the cause and statement I is its effect c) Both the statements 1 and 2 are independent causes d) Both the statements 1 and 2 are effects of independent causes</p> <p>II. A normal distribution has mean 40 and standard deviation 5 , 68% area lies between the below mentioned range.</p> <p>a) 30-50 b) 0-45 c) 0-68 d) 35-45</p> <p>III. A set of test score is normally distributed with mean 100 and standard deviation 20. These scores are converted to standard normal Z-scores. What would be the mean and median of this distribution?</p> <p>a) 0 b) 50 c) 1 d) 5</p> <p>IV. Many studies show that advertising expenditure and sales have a high degree of positive association. Which of the following correlation coefficient is consistent with the above statement?</p> <p>a) -0.8</p>		<p>CO1</p> <p>CO4</p> <p>CO5</p> <p>CO1</p>

	<p>b) 0.4 c) -0.3 d) 0.75</p> <p>V. If the expected profit of a business firm for January 2016 is Rs. 10 lakh, then the profit for February will be</p> <p>a) Rs. 10 lakh b) Less than Rs. 10 lakh c) More than Rs. 10 Lakh d) None of the above</p> <p>VI. In the context of a binomial distribution, if on an average 8 ships out of 10 arrive safely at ports and 150 ships have returned safely, the mean is</p> <p>a) 80 b) 100 c) 120 d) 150</p> <p>VII. In which situation of the following situations , the Poisson distribution can be a good approximation of the binomial distribution?</p> <p>a) $n=300$ and $p=0.04$ b) $n=60$ and $p=0.52$ c) $n=60$ and $p=0.35$ d) <i>all of these</i></p> <p>VIII. which of the following normal curves look very similar to the curve for $\mu = 12$ and $\sigma = 4$?</p> <p>a) curve for $\mu = 24$ and $\sigma = 8$ b) curve for $\mu = 12$ and $\sigma = 8$ c) curve for $\mu = 20$ and $\sigma = 9$ d) curve for $\mu = 24$ and $\sigma = 4$</p> <p>IX. Which of the following is true if the estimating equation has to be a perfect estimator of the dependent variable?</p> <p>a) The coefficient of determination is -1 b) All the data points are on the regression line c) The standard error of the estimate is zero d) 'b' and 'c' both</p> <p>X. The model for the number of cars on road without pollution check 'y' for a given pollution index 'x' is $y=9.607x + 111.958$. what is the meaning of the slope?</p> <p>a) This value tells that for every increase by 1 in (pollution index) input variable 'x', we get an increase approximately 9 cars without pollution check on road b) This value tells that for every increase by 9 in (pollution index) input variable 'x', we get an increase approximately 1 car without pollution check on road</p>		<p>CO3</p> <p>CO3</p> <p>CO4</p> <p>CO5</p> <p>CO5</p>
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	<p>c) This value tells that for every increase by 1 in (pollution index) input variable 'x', we get an increase approximately 112 cars without pollution check on road</p> <p>d) This value tells that for every increase by 112 in (pollution index) input variable 'x', we get an increase approximately 9 cars without pollution check on road</p> <p>XI. Coefficient of determination r^2 can be written is</p> <p>a) SST/SSR</p> <p>b) 1-(SSE/SST)</p> <p>c) SSR/SST</p> <p>d) 'b' and 'c' both</p> <p>XII. Assuming a normal curve with curve for $\mu = 40$ and $\sigma = 8$, how much area the curve will have to the right of the value 40?</p> <p>a) 0.25</p> <p>b) 1.0</p> <p>c) 0.75</p> <p>d) 0.5</p> <p>XIII. Which of the following is most likely to be an inverse relationship?</p> <p>a) Between income and expenditure on education</p> <p>b) Between price increase and demand for a certain product</p> <p>c) Between average number of hours studied per day and performance of the students in the examination</p> <p>d) Between advertising expenditure and sales of a product</p> <p>XIV. Regression Coefficient = -4.94. Correlation coefficient=0.77 and Coefficient of determination = 0.65 are the output of a particular data. Do you think the results are correct?</p> <p>a) Yes</p> <p>b) No</p> <p>c) Can't say</p> <p>XV. Elasticity of demand measures the responsiveness of</p> <p>a) Quantity demanded as price changes</p> <p>b) Price as quantity demand changes</p> <p>c) Price as demand shifts</p> <p>d) Demand as supply shifts</p> <p>XVI. The flat distribution has more area underneath than the peaked distribution.</p> <p>a) True</p> <p>b) False</p>		<p>CO5</p> <p>CO3</p> <p>CO1</p> <p>CO5</p> <p>CO1</p> <p>CO3</p>
SECTION B			
	Attempt all 4 questions in this section:	(4*5=20)	

Q2	According to a survey, the probability that a family owns two cars if its monthly income is greater than Rs. 45,000 is 0.7 of the household surveyed, 50% had incomes over Rs. 45,000 and 40% had two cars. What is the probability that a family has two cars and an income over Rs. 45,000.	5	CO3
Q3	A portfolio consultant firm has three advisers, Mr. Khare, Mr. Batra and Mr. Singh, to advise its clients regarding investments in secondary market. In a particular week, the numbers of clients who take the advice of Mr. Khare, Mr. Batra and Mr. Singh and invest are 200, 180 and 120 respectively. 'Mr. Khare', being higher experienced, has the reputation that 90% of his clients are benefitted. The corresponding figures for 'Mr. Batra' and 'Mr. Singh' are 80% and 75% respectively. At the end of the week, a client was selected at random, and it was found that he had not benefitted from the advice. Find the probability that he was advised by 'Mr. Batra'.	5	CO2
Q4	A flat in Metropolitan city cost somebody Rs. 60,00,000. If it appreciates in value, 15% the first year, 13.5% the next year, 12% the third year, and so on as more the time goes flat needs more maintenance, what will be its value at the end of 10 years, all percentages applying to the original cost?	5	CO1& CO2
Q5	A production manager finds that on an average, mechanics working in a machine complete a certain task in 15 minutes. The time required to complete the task is approximately normally distributed with a standard deviation of 3 minutes. Find the probabilities that the task would be completed a) less than 8 minutes, b) in more than 9 minutes, and c) between 10 and 12 minutes.	5	CO5

SECTION-C

	Attempt all questions in this section:	(2*15=30)																							
Q6	<p>M/s Standard Engineering Company manufactures various equipment required for pipeline industry. Since it undertakes turnkey projects, the manufactured items are not standardized. The Director of the company is working on a tender for an export order, and are looking at various cost factors. The component requires 4500 hours of machining. Mr. Joshi, Manager of the production unit, has been asked to submit a report on the production costs. He has estimated relevant direct costs but is facing problems while estimating indirect costs. He seeks your help based on the following data, which relate to X, machine hours ('00) and Y, indirect cost (Rs. 000'). Assess whether there exists a linear relation in X and Y, and, if yes, to what extent? Also estimate the required indirect cost when X is 5000, machine hours.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr> <td>X(hours '00)</td> <td>40</td> <td>24</td> <td>8</td> <td>40</td> <td>32</td> <td>24</td> <td>16</td> <td>48</td> <td>32</td> <td>16</td> </tr> <tr> <td>Y (Rs. '000)</td> <td>96</td> <td>88</td> <td>48</td> <td>110</td> <td>80</td> <td>64</td> <td>56</td> <td>120</td> <td>88</td> <td>54</td> </tr> </table>	X(hours '00)	40	24	8	40	32	24	16	48	32	16	Y (Rs. '000)	96	88	48	110	80	64	56	120	88	54	15	CO5
X(hours '00)	40	24	8	40	32	24	16	48	32	16															
Y (Rs. '000)	96	88	48	110	80	64	56	120	88	54															
Q7	<p>A firm that sells office supplies wants to expand. The head of the firm wants to know what sales volume can be expected in various market areas. Regression analysis with sales as the dependent variables is suggested. It is decided that effective buying income would be the best independent variable. A sample of 15 trade areas in which the firm now does business gives the following results in lakh of rupees.</p> <p>Sum of X=1385 Sum of Y=83.6 Sum of X xY=0917.60 Sum of X square=179661 Sum of Y square=681.32</p> <ol style="list-style-type: none"> a) Develop the equation that best describes the relationship between effective buying income and sales b) For a trade area with an effective buying income of Rs. 115, what is the estimated amount of sales? c) What is the coefficient of correlation for these data? Is it an appropriate measure that enables the manager to determine the proportion of variability in sales explained by the effective buying income? Explain. 	15	CO2																						

SECTION-D			
Q8	CASE STUDY - DIGIORNO PIZZA : INTRODUCING A FROZEN PIZZA TO COMPETE WITH CARRY-OUT	20	CO1,CO2 CO4 & CO5
	<p>Kraft foods successfully introduced DiGiorno Pizza into the marketplace in 1996, with first year sales of \$ 120 million, followed by \$ 200 million in sales in 1997. It was neither luck nor coincidence that DiGiorno Pizza was an instant success Kraft conducted extensive research about the product and the marketplace before introducing this product to the public. Many questions had to be answered before Kraft began production. For example, why do people eat pizza? When do they eat pizza? Do consumers believe that carry-out pizza is always more tasty/-----</p> <p>SMI-Alcott conducted a research study for Kraft in which they sent out 1,000 surveys to pizza lovers. The results indicated that people ate pizza during fun social occasions or at home when no one wanted to cook. People used frozen pizza mostly for convenience but selected carry-out pizza for a variety of other reasons, including quality and the avoidance of cooking. The Loran Marketing Group conducted focus groups for Kraft with women aged 25 to 54. Their findings showed that consumers used frozen pizza for convenience but wanted carry-out pizza taste. Kraft researchers realized that if they were to launch a successful frozen pizza that could pizza that: (a) had restaurant take-out quality, (b) possessed flavor variety, (c) was fast and easy to prepare, and (d) had the convenience of freezer storage. To satisfy these seemingly divergent goals, Kraft developed DiGiorno Pizza, which rises in the oven as it cooks. This impressed focus group members, and in a series of blind taste tests conducted</p>		

by Product Dynamics, DiGiorno Pizza beat out all frozen pizza and finished second overall behind one carry-out brand.

Through advertising, Kraft was able to overcome two concerns that were raised by marketing research; people had trouble pronouncing “DiGiorno” and people needed to be convinced that the frozen pizza actually tasted good. Kraft had the name DiGiorno repeated several times in advertisements to make certain that consumers could pronounce the name. As a by-product, the ads also generated strong brand identification. In addition, the ads emphasized “fresh-baked taste” and the rising dough aspect of the product, which helped convince people of DiGiorno’s higher quality of taste.

DiGiorno pizza has continued to grow in sales and market share over the years. By 2005, sales had topped the \$ 600 million mark and DiGiorno Pizza held nearly a quarter of the market share of frozen pizza sales. In 2004, Kraft successfully introduced DiGiorno thin, crispy-crust pizza into the market. This past year after successful research resulted in a self-rising crust, a proprietary package/susceptor, and an oven-baked taste that can be produced in about 5 minutes. Kraft launched DiGiorno Microwave Pizza, with a projected annual revenue of about \$ 75 million.

Discussion

Think about the market research that was conducted by Kraft and the fact that they used several companies. If you were in charge of conducting this research to help launch such a new product, what decisions would you make about whom to survey, where and when to survey, and what to measure?

	<p>1. What are some of the populations that Kraft might have been interested in measuring for these studies? Did Kraft actually attempt to contact entire populations? What samples were taken? In light of these two questions, how was the inferential process used by Kraft in their market research? Can you think of any descriptive statistics that might have been used by Kraft in their decision making process?</p> <p>2. In the various market research efforts made by Kraft for DiGiorno, some of the possible measurements appear in the following list. Categorize these by level of data. Think of some other measurements that Kraft researchers might have made to help them in this research effort and categorize them by level of data.</p> <ol style="list-style-type: none"> a. Number of pizzas consumed per week per household b. Age of pizza purchaser c. Zip code of the survey respondent d. Dollars spent per month on pizza per person e. Time in between purchases of pizza f. Rating of taste of a given pizza brand on a scale from 1 to 10, where 1 is very poor tasting and 10 is excellent taste g. Ranking of the taste of four pizza brands on a taste test. h. Number representing the geographic location of the survey respondent. i. Quality rating of a pizza brand as excellent, good, average below average, poor. j. Number representing the pizza brand being evaluated k. Sex of survey respondent. 		