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| **Name:**<br>**Enrolment No:** | UPES |

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Term Examination, Dec 2019**

**Course: Quantitative Methods** **Semester: I**
**Programme: MBA(GM))** **Time: 03 hrs**
**Max. Marks: 100** **Course Code: DSQT7001**

**SECTION A**

| S. No. | | Marks | CO |
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| Q 1 | Identify and explain each of the following as examples of nominal,ordinal, discrete, or continuous variables | **(2x5)** | **CO1** |
| | i. The length of time until a pain reliever begins to work.<br>ii.The number of chocolate chips in a cookie.<br>iii.The number of colors used in a statistics textbook.<br>iv.The brand of refrigerator in a home.<br>v. The overall satisfaction rating of a new car. | | |
| Q 2 | Select the most appropriate answer | **(1x5)** | |
| | i. Which of the relations below is a function?<br>a. {(2,3), (3,4), (5,1), (6,2), (2,4)}<br>b. {(2,3), (3,4), (5,1), (6,2), (7,3)}<br>c. {(2,3), (3,4), (5,1), (6,2), (3,3)}<br>d. All | | **CO1** |
| | ii. Given $f(x) = 2x^2 - 3x + 6$, find f (1.5)<br>a.11 b. 23.5 c.76 d. None | | **CO2** |
| | iii. Given $f(x) = 2x + 3$ and $g(x) = -x^2 + 5$, find $(g \circ f)(-3)$.<br>a. 20 b.-10 c.-2 d. 10 e. None | | **CO2** |
| | vi. Find the 10th term of the arithmetic progression 1, 3.5, 6, 8.5,...<br>a.23.5 b.22.5 c.23 d.22 | | **CO1** |
| | v. Any function is said to be increasing function if<br>a. Average rate of change is positive<br>b. Average rate of change is negative<br>c. Average rate of change is unchanged<br>d. None | | **CO1** |

<table>
<tr><td colspan="4">SECTION B</td></tr>
<tr><td></td><td>Attempt any seven questions</td><td>(5x7)</td><td></td></tr>
<tr><td>Q 3</td><td>Find the probabilities that a random variable having the standard normal distribution, will take on values,<br>(i) Between -1.2 and 1.45<br>(ii) Greater than 4.5<br>(iii) Less than 2.74<br>(iv) Greater than -2.5</td><td></td><td>CO2</td></tr>
<tr><td>Q 4</td><td>A small industry is interested in analyzing the effects of advertising on its sales. Over a 5-month period ,it finds the following results:<br><br><table><tr><td>X</td><td>5</td><td>8</td><td>10</td><td>15</td><td>22</td></tr><tr><td>Y</td><td>6</td><td>15</td><td>20</td><td>30</td><td>39</td></tr></table><br>Where X represents the money spent on advertising (in hundreds) and Y represents the total sales(in thousands) . Use these data to determine the correlation coefficient.</td><td></td><td>CO3</td></tr>
<tr><td>Q 5</td><td>The average and variance of 20 items were calculated by a student as 40 and 36 respectively.But at the time of checking it is found that an item which is 25 is wrongly copied as 30.Find the corrected mean ans standard deviation.</td><td></td><td>CO2</td></tr>
<tr><td>Q 6</td><td>Functions f and g are defined by<br><br>$f(x) = 1/x + 3x$ and $g(x) = -1/x + 6x - 4$<br><br>Find find $(f + g)(x)$ and $(f / g)(x)$. Also find $(f / g)(2)$ and $(f + g)(1)$</td><td></td><td>CO2</td></tr>
<tr><td>Q 7</td><td>The following are daily wages (in Rs) of 95 employees in a firm.<br><br><table><tr><td>Wages</td><td>No. of employees</td></tr><tr><td>0-10</td><td>5</td></tr><tr><td>10-20</td><td>4</td></tr><tr><td>20-30</td><td>8</td></tr><tr><td>30-40</td><td>12</td></tr><tr><td>40-50</td><td>16</td></tr><tr><td>50-60</td><td>25</td></tr><tr><td>60-70</td><td>10</td></tr><tr><td>70-80</td><td>8</td></tr><tr><td>80-90</td><td>5</td></tr><tr><td>90-100</td><td>2</td></tr></table><br>Draw ogive of both types and compare the median you get using ogive with the earlier one.</td><td></td><td>CO4</td></tr>
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<tr><td>Q 8</td><td>How inferential satistics is different from descriptive satatistics? Explain with example.</td><td></td><td>CO1</td></tr>
<tr><td>Q 9</td><td>Automobile travelling on the New York State Thruway are checked for speed by a state police radar system. Following is a frequency distribution of speeds:<br><br><table><tr><td>Speed(Miles per hour)</td><td>Frequency</td></tr><tr><td>45-49</td><td>12</td></tr><tr><td>50-54</td><td>43</td></tr><tr><td>5-59</td><td>155</td></tr><tr><td>60-64</td><td>180</td></tr><tr><td>65-69</td><td>75</td></tr><tr><td>70-74</td><td>20</td></tr><tr><td>75-79</td><td>15</td></tr></table><br>What is the mean speed of the automobiles travelling on the New York State Thruway? Also find any two measures of skewness and comment on the nature of data.</td><td></td><td>CO4</td></tr>
<tr><td>Q 10</td><td>A problem in QM is given to 5 students. Their chances of solving it are 1/2,1/5,1/6,1/7,1/8 . What is the probability that the problem will be solved?</td><td></td><td>CO2</td></tr>
<tr><td colspan="4">SECTION-C</td></tr>
<tr><td></td><td>Attempt any four questions</td><td>(12.5x 4)</td><td></td></tr>
<tr><td>Q 11</td><td>The relation between price and demand of a comodite is as follows:<br><table><tr><td>Demand</td><td>10</td><td>8</td><td>5</td><td>4</td><td>2</td><td>1</td></tr><tr><td>Price</td><td>4</td><td>6</td><td>5</td><td>6</td><td>8</td><td>9</td></tr></table><br>Find line of regression. And also find price when demand is 3 unit.</td><td></td><td>CO3</td></tr>
<tr><td>Q 12</td><td>In two sets of variables X and Y with 50 observations each, the following data were observed:<br><br>Mean of X= 10 , S.D. of X = 3, Mean of Y= 6, S.D. of Y = 2 and r(X,Y) =0.3<br><br>But on subsequent verification it was found that one value of X(=10) and one value of Y(=6) were inaccurate and hence weeded out.How is the orginal value of r affected?</td><td></td><td>CO3</td></tr>
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| Q 13 | The following are the time taken by the police department on receipt of the complaint to find the culprit.<br><br>5,20,23,45,123,8,2,15,74,19,110,26,5,12,20,23,68,29,25,1,14,110,79,85,92,95,62, 40,45,23,29,35,7,14,24,19,33,34,36,40,82,72,83,107,114,93,84,65,77,92,80,24,62, 72,49,62,58,60,74<br>Construct discrete and continuous frequency distribution (both inclusive and exclusive) table. | | **CO2** |
| Q 14 | Answer the followings based on output of regression<br><br>*Regression Statistics*<br>Multiple R 0.995525705<br>R Square 0.991071429<br>Adjusted R Square 0.985119048<br>Standard Error 0.263523138<br>Observations 6<br><br>ANOVA<br>*df* *SS* *MS* *F* *Significance F*<br>Regression 2 23.125 11.5625 166.5 0.000843671<br>Residual 3 0.208333333 0.069444<br>Total 5 23.33333333<br><br>*Coefficients* *Standard Error* *t Stat* *P-value* *Lower 95%* *Upper 95%* *Lower 95.0%* *Upper 95.0%*<br>Intercept 36.66666667 3.802107116 9.643775 0.002367 24.56666492 48.766668 24.56666492 48.76666841<br>x 9.875 0.972718127 10.15196 0.002036 6.779376789 12.970623 6.779376789 12.97062321<br>y -18.125 1.920738429 -9.43647 0.002522 -24.23764692 -12.01235 -24.2376469 -12.01235308<br><br>(i) What is the role of ANOVA in regression model?<br><br>(ii) Write down the regression model.<br><br>(iii)What is the role of p value in regression model? | | **CO3** |

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| Q 15 | During the year 2016, oil consumption was 30 million barrels per day. The following data represent the percentage breakdown of the sources of that consumption.<br><br>Source of consumption % Usage<br><br>Electric utilities 15<br>Highway transportation 35<br>House, industry & business 20<br>Misc. 30<br>----------<br>Total 100<br><br>i) Construct a appropriate bar chat<br>ii) Construct a pie chart<br>iii) Which of these charts is preferable and why? | | **CO2** |