

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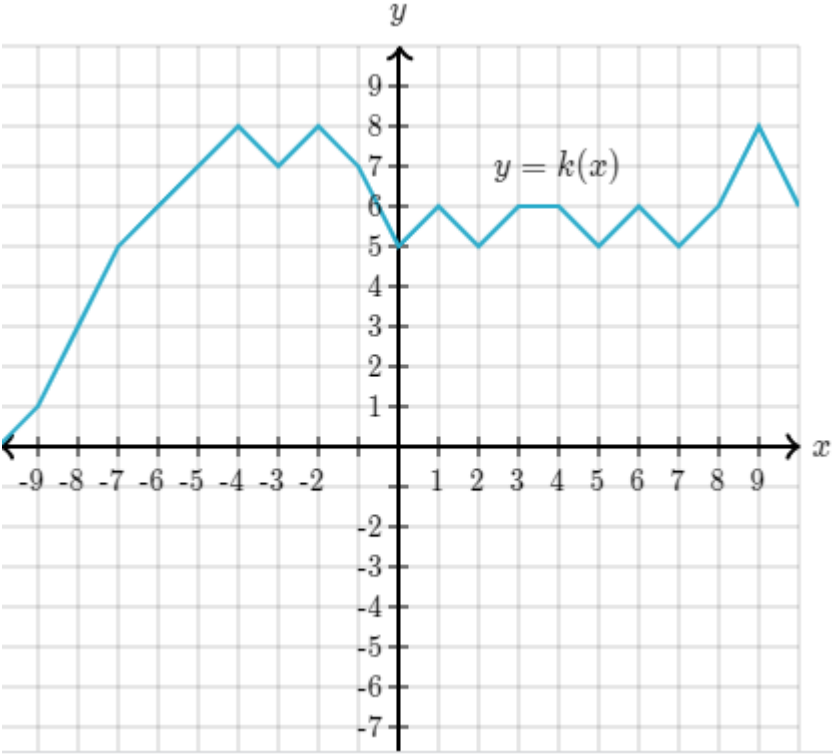
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Quantitative Methods
Programme: MBA(PM/IB/CORE/AVM/PSM)
Max. Marks: 100

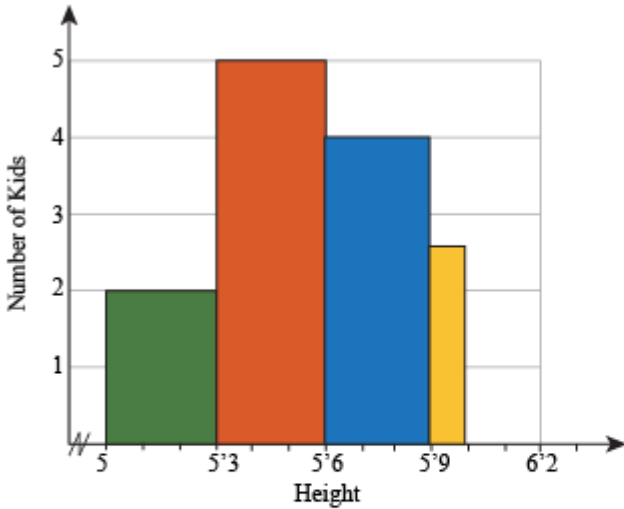
Semester: I
Time: 03 hrs.
Course Code: DSQT7001

SECTION A

S. No.		Marks	CO
Q 1	Mark the following statements as True or False	(1x14)	
	i. The mean and variance of a Poisson distribution is always equal.		CO1
	ii. The part of statistics concerned with the description and summarization of data is called descriptive statistics.		CO1
	iii. Two events are said to be mutually exclusive if the happening of one does not affect the probability of happening of the other.		CO1
	iv. Kurtosis is a measure of whether the data are heavy-tailed or light-tailed relative to a normal distribution.		CO1
	v. Mean is used in more suitable in case of extreme values.		CO1
	vi. A function is said to be increasing function if average rate of change is negative.		CO1
	vii. Regression is used in casue and effect analysis.		CO1
	viii. Histogram is an effective graphical technique for showing both the skewness and kurtosis of data set.		CO1
	ix. Not every relation is a function.		CO1
	x. A series is something we obtain from a sequence by adding all the terms together.		CO1
	xi. Statistical inference is the process of making an estimate, prediction, or decision about a population based on a sample.		CO2
	xii. Discrete variables are usually associated with counting. If the variable cannot be further subdivided, it is a clue that you are probably dealing with a discrete variable.		CO1

	<p>xiii. Drawing a card from a pack of well- shuffled cards is a trial & getting either a king & a queen are events.</p> <p>iv. The statistical methods don't study the nature of phenomenon which cannot be expressed in quantitative terms.</p>		<p>CO2</p> <p>CO1</p>
<p>Q 2</p>	<p>Select the most appropriate answer</p>	<p>(1x6)</p>	
	<p>i. Which of the relations below is a function?</p> <p>a. $\{(2,3), (3,4), (5,1), (6,2), (2,4)\}$</p> <p>b. $\{(2,3), (3,4), (5,1), (6,2), (7,3)\}$</p> <p>c. $\{(2,3), (3,4), (5,1), (6,2), (3,3)\}$</p> <p>d. All</p> <p>ii. Find out the value of y if x= -1</p>  <p>iii. Given $f(x) = 2x + 3$ and $g(x) = -x^2 + 5$, find $(g \circ f)(-1)$.</p> <p>a. 20 b.-10 c.-2 d. 10 e. None</p> <p>vi. Find the 10th term of the arithmetic progression 1, 3.5, 6, 8.5,...</p> <p>a.23.5 b.22.5 c.23 d.22</p> <p>v. For agiven input value x, the function f outputs a value y to satisfy the following equation</p>		<p>CO2</p> <p>CO2</p> <p>CO2</p> <p>CO2</p> <p>CO2</p>

	<p>$y+6=5(x-4)$. Write a $f(x)$ in term of x.</p> <p>vi. Functions of statistics consists of</p> <ol style="list-style-type: none"> Collection of data Tabulation of data Analysis of data Interpretation of results <p>Which one is correct?</p> <ol style="list-style-type: none"> only c both a & c a, b & c All of the above None 		CO2																						
SECTION B																									
	Attempt any four questions	(5x4)																							
Q 3	A company has two sections with 40 and 65 employees respectively. Their average weekly wages are \$450 and \$350. The standard deviation is 7 and 9. (i) Which section has a larger wage bill?. (ii) Which section has larger variability in wages?		CO4																						
Q 4	Find correlation coefficient between the marks obtained by 10 students in the mid-term(X) & end-term(Y) examination in Quantitative Methods?		CO3																						
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>X</td> <td>23</td> <td>20</td> <td>19</td> <td>17</td> <td>16</td> <td>28</td> <td>24</td> <td>25</td> <td>27</td> <td>22</td> </tr> <tr> <td>Y</td> <td>30</td> <td>28</td> <td>27</td> <td>41</td> <td>36</td> <td>45</td> <td>46</td> <td>44</td> <td>43</td> <td>39</td> </tr> </table>	X	23	20	19	17	16	28	24	25	27	22	Y	30	28	27	41	36	45	46	44	43	39		
X	23	20	19	17	16	28	24	25	27	22															
Y	30	28	27	41	36	45	46	44	43	39															
Q 5	Assume that the chance of a traffic accident in a day in a street of Delhi is 0.006. If there are 2500 such streets in the whole city, how many days out of total of 500 days can we expect in the city,		CO4																						
	(i) No accident	(2.5)																							
	(ii) More than two accidents	(2.5)																							
Q 6	Use the histogram to answer the following questions.		CO2																						



1. How many kids are at least 5' but not more than 5'3"?
2. How many kids are at least 5' but not more than 5'6"?
3. Was there a kid of height 6' in the data set?
4. Must there have been a kid with height exactly 5' in the data set?

Q 7 The four variables shown in the data set below are set up to represent a fictitious study of gender, weight and fitness score. The variables include gender, ranking, weight and score. In this example, gender is coded as m or f (recoded as 1 or 2 for computations), weight is the participant's weight, score is a value that the participant scored in a fitness test and rank is their ranking based on that score

Gender	Ranking	Weight	Score
m	1	200	95
m	2	110	92
f	3	103	91
f	4	145	90
f	5	130	88
m	6	180	82
m	7	170	80
f	8	90	75
f	9	102	70
m	10	225	60
m	11	225	59
m	12	108	55
f	13	108	55
m	14	108	55
m	15	167	50

CO4

EACH OF THE VARIABLES IS EXAMINED IN THE CHART BELOW:

Statistics

			GENDER	RANKING	SCORE	WEIGHT
N	Valid	Statistic	15	15	15	15
	Missing	Statistic	0	0	0	0
Mean	Statistic		1.40	8.0000	73.1333	144.7333
	Std. Error		.13	1.1547	4.1928	12.0224
Median	Statistic		1.00	8.0000	75.0000	130.0000
Mode	Statistic		1	1.00 ^a	55.00	108.00
Std. Deviation	Statistic		.51	4.4721	16.2387	46.5625
Variance	Statistic		.26	20.0000	263.8952	2168.0667
Skewness	Statistic		.455	.000	-.065	.625
	Std. Error		.580	.580	.580	.580
Kurtosis	Statistic		-2.094	-1.200	-1.753	-1.037
	Std. Error		1.121	1.121	1.121	1.121
Range	Statistic		1	14.00	45.00	135.00
Minimum	Statistic		1	1.00	50.00	90.00
Maximum	Statistic		2	15.00	95.00	225.00

a. Multiple modes exist. The smallest value is shown

Answer the following questions:

- (i) What type of data does gender represent? (1)
- (ii) Is this data set skewed in each case? If so, in which direction? (2)
- (iii) What about kurtosis in each case? (2)

SECTION-C

Attempt any five questions

(12x5)

Q 8 The local authorities in Dehradun install 10,000 electric lamps in the streets of the city. If these lamps have an average life of 1,000 burnings hrs with a standard deviation of 200hrs, assume normality what number of lamps might be expected to fail,(i) in the first 600 burnings hrs and (ii) between 800 and 1200 burning hrs.

CO4

<p>Q 9</p>	<p>While calculating correlation coefficient between two variables X and Y from nine pairs of observations obtained the following results:</p> <p>$\sum X = 45, \sum X^2 = 285, \sum Y = 135, \sum Y^2 = 2085, \sum XY = 731$. It was, however, later discovered at the time of checking that he had copied down two pairs as</p> <table border="1"> <tr><td>X</td><td>Y</td></tr> <tr><td>8</td><td>10</td></tr> <tr><td>6</td><td>8</td></tr> </table> <p style="text-align: center;">instead of</p> <table border="1"> <tr><td>X</td><td>Y</td></tr> <tr><td>12</td><td>6</td></tr> <tr><td>10</td><td>7</td></tr> </table> <p>Obtain the correct value of correlation coefficient?</p>	X	Y	8	10	6	8	X	Y	12	6	10	7		CO3								
X	Y																						
8	10																						
6	8																						
X	Y																						
12	6																						
10	7																						
<p>Q 10</p>	<p>A study was made by a retail merchant to determine the relation between weekly advertising expenditure and sales. The following data were recorded:</p> <table border="1"> <tr> <td>Adv. Cost</td> <td>5</td> <td>4</td> <td>8</td> <td>7</td> <td>3</td> <td>0</td> <td>2</td> <td>6</td> <td>5</td> </tr> <tr> <td>Sales</td> <td>10</td> <td>8</td> <td>12</td> <td>11</td> <td>6</td> <td>6</td> <td>10</td> <td>6</td> <td>8</td> </tr> </table> <p>(i) Plot scatter diagram. What does the scatter diagram indicate about the relationship between adv. cost and sales? (4)</p> <p>(ii) Find the regression line to predict weekly sales from adv. cost. (4)</p> <p>(iii) Estimate the weekly sales when adv. cost is 12. (4)</p>	Adv. Cost	5	4	8	7	3	0	2	6	5	Sales	10	8	12	11	6	6	10	6	8		CO3
Adv. Cost	5	4	8	7	3	0	2	6	5														
Sales	10	8	12	11	6	6	10	6	8														
<p>Q 11</p>	<p>The following are the time taken by the police department on receipt of the complaint to find the culprit.</p> <table border="1"> <tr> <td>5,20,23,45,123,8,2,15,74,19,110,26,5,12,20,23,68,29,25,1,14,110,79,85,92,95,6 2,40,45,23,29,35,7,14,24,19,33,34,36,40,82,72,83,107,114,93,84,65,77,92,80,24 ,62,72,49,62,58,60,74</td> </tr> </table> <p>(i) Construct continuous frequency distribution table. (6)</p> <p>(ii) Plot the histogram (6)</p>	5,20,23,45,123,8,2,15,74,19,110,26,5,12,20,23,68,29,25,1,14,110,79,85,92,95,6 2,40,45,23,29,35,7,14,24,19,33,34,36,40,82,72,83,107,114,93,84,65,77,92,80,24 ,62,72,49,62,58,60,74		CO4																			
5,20,23,45,123,8,2,15,74,19,110,26,5,12,20,23,68,29,25,1,14,110,79,85,92,95,6 2,40,45,23,29,35,7,14,24,19,33,34,36,40,82,72,83,107,114,93,84,65,77,92,80,24 ,62,72,49,62,58,60,74																							
<p>Q 12</p>	<p>(i) Draw a percentage bar diagram for the following data.</p>	(6)	CO4																				

Expenditure	Company A	Company B
Wages	250	300
Materials	220	270
Taxation	360	250
Profits	130	150
Administration	40	30

(ii) Thirty AA batteries were tested to determine how long they would last. The results, to the nearest minute, were recorded as follows:

423, 369, 387, 411, 393, 394, 371, 377, 389, 409, 392, 408, 431, 401, 363, 391, 405, 382, 400, 381, 399, 415, 428, 422, 396, 372, 410, 419, 386, 390

Constructing relative frequency & percentage frequency table.

(6)

Q 13 Calculate the rank correlation between the marks obtained by 10 students in internal (X) and end term (Y) examination in QM.

X	40	37	40	70	85	40	32	60	72
Y	60	45	60	72	37	60	45	73	49

CO3