

Name:

Enrolment No:



**UNIVERSITY OF PETROLEUM & ENERGY STUDIES  
DEHRADUN**

**End-Semester Examination 2021**

**Program/course : MA Economics**

**Semester : I**

**Subject : Statistics for Economics**

**Max. Marks : 100**

**Code : ECON 7019**

**Duration : 3 Hrs**

**No. of page/s : 3**

**SECTION A**

1. Each Question will carry 5 Marks

2. Instruction: Select the correct answer

Q1	The selling prices (in \$1,000) of a new popular compact automobile are given here. <table style="margin-left: auto; margin-right: auto;"><tbody><tr><td>26.6</td><td>25.3</td><td>23.8</td><td>24.0</td><td>27.5</td></tr><tr><td>21.1</td><td>25.9</td><td>22.6</td><td>23.8</td><td>25.1</td></tr><tr><td>22.6</td><td>27.5</td><td>26.8</td><td>23.4</td><td>27.5</td></tr><tr><td>20.8</td><td>20.4</td><td>22.4</td><td>27.5</td><td>23.7</td></tr><tr><td>22.2</td><td>23.8</td><td>23.2</td><td>28.7</td><td>27.5</td></tr></tbody></table> <p>The modal selling price is:</p> <p>A. 27.5 B. 26.6 C. 22.4 D. 15.2</p>	26.6	25.3	23.8	24.0	27.5	21.1	25.9	22.6	23.8	25.1	22.6	27.5	26.8	23.4	27.5	20.8	20.4	22.4	27.5	23.7	22.2	23.8	23.2	28.7	27.5	[5]	CO1
26.6	25.3	23.8	24.0	27.5																								
21.1	25.9	22.6	23.8	25.1																								
22.6	27.5	26.8	23.4	27.5																								
20.8	20.4	22.4	27.5	23.7																								
22.2	23.8	23.2	28.7	27.5																								
Q2	$\sum(x - \mu)^2 = 1\,001\,772\,261.83$ ; $\sum f = 17\,636$ ; $\sigma = ?$ <p>A. 238.333 B. 237.333 C. 236.333 D. 235.333</p>	[5]	CO1																									
Q3	An experiment is an action such as flipping a coin, which has a number of possible _____, such as heads or tails. <p>A. outcomes or events B. sample or events C. outcomes or function D. cases or elements</p>	[5]	CO1																									

Q4	<p>Select the combination of answer for the following questions:</p> <p>Given a standard pack of cards, calculate the following probabilities: (a) drawing an ace; (b) drawing a court card (i.e. jack, queen or king); (c) drawing a red card; (d) drawing three aces without replacement; (e) drawing three aces with replacement.</p> <p>A. (a) 1/13; (b) 3/13; (c) 1/2; (d) 0.00017069; (e) 0.000455</p> <p>B. (a) 2/13; (b) 3/13; (c) 1/2; (d) 0.0017069; (e) 0.00455</p> <p>C. (a) 2/13; (b) 4/13; (c) 1/3; (d) 0.17069; (e) 0.455</p> <p>D. (a) 1/13; (b) 1/13; (c) 1/3; (d) 0.17; (e) 0.48</p>	[5]	CO1																					
Q5	<p>The following table gives the joint PDF of the discrete variables <math>X</math> and <math>Y</math>.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="4" style="border-bottom: 1px solid black;"><math>X</math></th> </tr> <tr> <th style="border-bottom: 1px solid black;">-2</th> <th style="border-bottom: 1px solid black;">0</th> <th style="border-bottom: 1px solid black;">2</th> <th style="border-bottom: 1px solid black;">3</th> </tr> </thead> <tbody> <tr> <th rowspan="2" style="border-right: 1px solid black;"><math>Y</math></th> <th style="border-right: 1px solid black;">3</th> <td>0.27</td> <td>0.08</td> <td>0.16</td> <td>0</td> </tr> <tr> <th style="border-right: 1px solid black;">6</th> <td>0</td> <td>0.04</td> <td>0.10</td> <td>0.35</td> </tr> </tbody> </table> <p>The conditional probability of <math>f(X = -2   Y = 3)</math> is</p> <p>A. 0.53</p> <p>B. 0.58</p> <p>C. 0.83</p> <p>D. 0.88</p>			$X$				-2	0	2	3	$Y$	3	0.27	0.08	0.16	0	6	0	0.04	0.10	0.35	[5]	CO1
				$X$																				
		-2	0	2	3																			
$Y$	3	0.27	0.08	0.16	0																			
	6	0	0.04	0.10	0.35																			
Q6	<p>If</p> <table border="0" style="margin-left: 20px;"> <tr> <td style="padding-right: 10px;"><math>x</math></td> <td style="padding-right: 10px;">-2</td> <td style="padding-right: 10px;">0</td> <td style="padding-right: 10px;">2</td> <td>3</td> </tr> <tr> <td><math>f(x)</math></td> <td>0.27</td> <td>0.12</td> <td>0.26</td> <td>0.35</td> </tr> </table> <p>then,</p> <p>A. <math>E(X) = 1.03</math></p> <p>B. <math>E(X) = 2.03</math></p> <p>C. <math>E(X) = 3.03</math></p> <p>D. <math>E(X) = 3.05</math></p>	$x$	-2	0	2	3	$f(x)$	0.27	0.12	0.26	0.35	[5]	CO1											
$x$	-2	0	2	3																				
$f(x)$	0.27	0.12	0.26	0.35																				

**SECTION B**

1. Each question will carry 10 marks  
 2. Instruction: Answer all questions

Q7.	<p>A Given the following data on <math>x_i</math>: {8, 12, 6, 4, 10}, evaluate</p> $\sum x_i, \sum x_i^2, (\sum x_i)^2, \sum (x_i - 3), \sum x_i - 3, \sum_{i=2}^4 x_i$ <p>B Given the pairs of observations on <math>x</math> and <math>y</math></p> <table style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr style="border-top: 1px solid black; border-bottom: 1px solid black;"> <td style="padding: 5px;"><math>x</math></td> <td style="padding: 5px; text-align: center;">3</td> <td style="padding: 5px; text-align: center;">7</td> <td style="padding: 5px; text-align: center;">4</td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">9</td> </tr> <tr style="border-bottom: 1px solid black;"> <td style="padding: 5px;"><math>y</math></td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">2</td> <td style="padding: 5px; text-align: center;">5</td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">2</td> </tr> </table> <p>evaluate <math>\sum xy, \sum x(y - 2), \sum (x - 2)(y + 1)</math>.</p>	$x$	3	7	4	1	9	$y$	1	2	5	1	2	<b>[10]</b>	<b>CO2</b>
$x$	3	7	4	1	9										
$y$	1	2	5	1	2										
Q8.	<p>Bayes' Theorem shows the relationship between a conditional probability and its inverse. Illustrate how?</p>	<b>[10]</b>	<b>CO2</b>												
Q9	<p>Prove that any linear combination of independent, normally distributed random variables is itself normally distributed.</p>	<b>[10]</b>	<b>CO2</b>												
Q10.	<p>A sample of 50 school students found that they spent 45 minutes doing homework each evening, with a standard deviation of 15 minutes. Estimate the average time spent on homework by all students. (Hints: <math>\pm 1.96</math> is the <math>z</math> score which cuts off 2.5% in each tail of the normal distribution)</p>	<b>[10]</b>	<b>CO3</b>												
Q11.	<p>Samples are drawn from two populations to see if they share a common mean. The sample data are:</p> $\begin{aligned} \bar{x}_1 &= 45 & \bar{x}_2 &= 55 \\ s_1 &= 18 & s_2 &= 21 \\ n_1 &= 15 & n_2 &= 20 \end{aligned}$ <p>Find the 95% confidence interval estimate of the difference between the two population means.</p>	<b>[10]</b>	<b>CO3</b>												

**Section C**

1. Each Question carries 20 Marks.  
 2. Instruction: Long answer type question

Q12.	<p>Describe various process of statistical estimation.</p>	<b>[20]</b>	<b>CO4</b>
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