UNIVERSITY OF PETROLEUM & ENERGY STUDIES
DEHRADUN
End-Semester Examination 2021

Program/course	: BA (Hons.) Economics	Semester	: III
Subject	: Statistical Methods for Economics	Max. Marks	: 100
Code	: ECON2020	Duration	: 3 Hrs
No. of page/s	: 4		

SECTION A

Q1	Answer all the questions. Each Question will carry 2 Marks	10Qx2 M=20 Marks	CO
i.	In the weighted average: $$\bar{x}_w = \sum_i w_i x_i$$ w represents the weights, which must sum to _____. (a) 1 (b) 10 (c) 100 (d) 2i	[2]	CO1
ii.	Dispersion is the scatteredness of the data series around its_____. (a) average (b) median (c) mode (d) coefficient	[2]	CO1
iii.	_____is independent of origin, but not of scale (a) Standard Deviation (b) Mean Deviation (c) Median (d) Mean	[2]	CO1
iv.	Standard score gives us the number of standard deviations, a particular observation lies below or above the _____. (a) Mean (b) Standard Deviation (c) Mean Deviation (d) Median	[2]	CO1
v.	Two events are dependent if the outcome or occurrence of the first _____the outcome or occurrence of the second. (a) affects (b) does not affects (c) is greater than (d) is less than	[2]	CO1
vi.	Spin a spinner numbered 1 to 7, and toss a coin. What is the probability of getting an odd number on the spinner and a tail on the coin? (a) 2/7 (b) 2/5 (c) 2/3 (d) 2/9		CO1

vii.	The conditional probability of E given F, denoted by _____. (a) Pr(E|F) (b) Pr(F|E) (c) Pr(E.F) (d) Pr(E-F)	[2]	CO1
viii.	Susan took two tests. The probability of her passing both tests is 0.6. The probability of her passing the first test is 0.8. What is the probability of her passing the second test given that she has passed the first test? (a) 0.75 (b) 0.65 (c) 0.55 (d) 0.45	[2]	CO1
ix.	A _____random variable can take on any value in some interval of values. (a) continuous (b) discrete (c) mixed (d) correlated	[2]	CO1
x.	Two random variables X and Y are statistically independent if and only if_____. (a) $f(x, y) = f(x)f(y)$ (b) $f(x, y) = f(x)/f(y)$ (c) $f(x, y) = f(x) + f(y)$ (d) $f(x, y) = f(x) - f(y)$	[2]	CO1

	Section B Attempt all the questions. Each question carries equal marks.	4Qx5 M= 20 Marks	CO
Q2	The selling prices (in $1,000) of a new popular compact automobile are given here. 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 Define the modal selling price and calculate the modal selling price from the above data set.	[5]	CO2
Q3	Age of 10 subjects from a population of 169subjects are given below: 	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	 |---|---|---|---|---|---|---|---|---|---| | 42 | 28 | 28 | 61 | 31 | 23 | 50 | 34 | 32 | 37 | Calculate range and coefficient of range.	[5]	CO2
Q4	Find mean absolute deviation of confinement after delivery in the following series: 	Days of Confinement	6	7	8	9	10	 |---|---|---|---|---|---| | No. of Patients | 5 | 4 | 4 | 3 | 2 |	[5]	CO2

Q5	Weights of CEOs of 265 Energy Enterprises are given below. Calculate standard deviation of their weights.		CO2

Class Interval of weights	90-99	100-109	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189	190-199	200-2009
Frequency	1	1	9	30	42	66	47	39	15	11	1	3

[5]

Section C

Attempt all the questions. Each question carries equal marks.

3Qx10 M=30 Marks

Q7.	a) A single card is chosen at random from a standard pack of 52 playing cards. What is the probability of choosing a king or a club? b) A school survey found that 7 out of 30 students walk to school. If four students are selected at random without replacement, what is the probability that all four walk to school?	[10]	CO3

Q8.	a) On New year's Eve, the probability of a person having a car accident is 0.09. The probability of a person driving while intoxicated is 0.32 and probability of a person having a car accident while intoxicated is 0.15. What is the probability of a person driving while intoxicated or having a car accident? b) A nationwide survey showed that 65% of all children in the United States dislike eating vegetables. If 4 children are chosen at random, what is the probability that all 4 dislike eating vegetables?	[10]	CO3

Q9	Suppose that Bob is late one day. His boss wishes to estimate the probability that he traveled to work that day by car. He does not know which mode of transportation Bob usually uses, so he gives a prior probability of 1 in 3 to each of the three possibilities.	[10]	CO3

Mode of transport   Probability that Bob is late

Car   50%

Bus   20%

Train   1%

Find

From the given information calculate P(late) and P(car | late).

OR

Explain and analyze the χ^2 (Chi-Square) distribution and discuss its various properties.

	Section D	2Qx15 M= 30 Marks	CO
	Answer all questions. Each Question carries 15 Marks.		
Q12	The following table gives the joint Probability Density Function (PDF) of discrete variables X and Y.	[15]	CO4

<table>
<tr><th></th><th colspan="4">X</th></tr>
<tr><th></th><th>-2</th><th>0</th><th>2</th><th>3</th></tr>
<tr><td>Y   3</td><td>0.27</td><td>0.08</td><td>0.16</td><td>0</td></tr>
<tr><td>   6</td><td>0</td><td>0.04</td><td>0.10</td><td>0.35</td></tr>
</table>

(i) Find out all possible marginal PDF of X and Y.

(ii) Compute $E(Y/X = 2)$ and $Var(Y/X = 2)$.

| Q13. | What do you mean by a normal distribution? How to derive a standard normal variable from a normal variable? Illustrate all steps. | [15] | CO4 |

OR

Bayes' Theorem shows the relationship between a conditional probability and its inverse. Examine the statement with suitable example.