
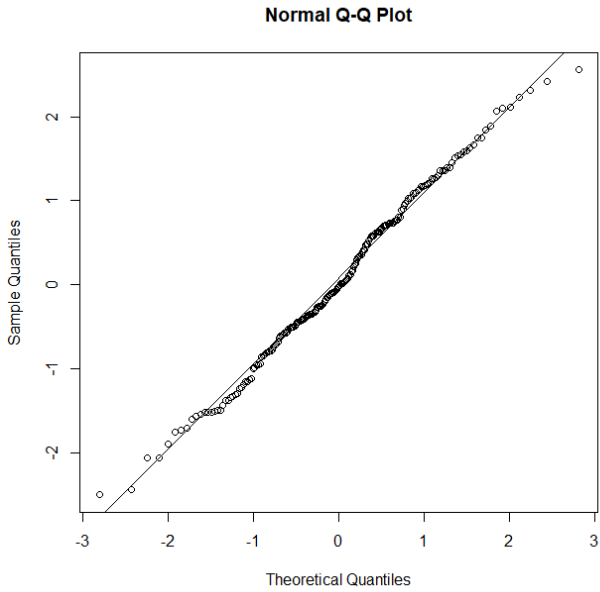
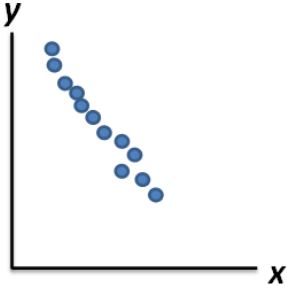


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, December 2022			
Course: Research Methodology and Biostatistics Program: M.Sc. Nutrition and Dietetics / Microbiology Course Code: HSCC7005		Semester: I Time : 03 hrs. Max. Marks: 100	
Instructions: Attempt all questions.			
SECTION A (20Qx1.5M=30Marks)			
S. No.		Marks	CO
Q01	Authenticity of a research finding is its: a. Validity b. Objectivity c. Originality d. All the above	1.5	CO1
Q02	What is the main aim of interdisciplinary research? a. To oversimplify the problem of research b. To bring out the holistic approach to research c. To create a new trend in research methodology d. To reduce the emphasis on a single subject in the research domain	1.5	CO1
Q03	How to judge the depth of any research? a. By research title b. By research duration c. By research objectives d. By total expenditure on research	1.5	CO1
Q04	Which one of the following is the main feature of qualitative research? a. Avoids positivist assumptions and data analysis b. Subscribes to pre-existing categories c. Collects data in numerical form d. Uses the empirical method of data analysis	1.5	CO1
Q05	In which of the following research methods, process of hypothesis testing optimally safeguards the role of extraneous variables? a. Expost Facto method b. Experimental method c. Historical method d. Descriptive survey method	1.5	CO1

Q06	<p>What are the conditions in which Type-II error occurs?</p> <ul style="list-style-type: none"> a. The null hypothesis gets accepted even if it is false b. The null hypothesis gets rejected even if it is true c. Both the null hypothesis as well as alternative hypothesis are rejected d. None of the above 	1.5	CO2
Q07	<p>What does the longitudinal research approach deal with?</p> <ul style="list-style-type: none"> a. Long-term research b. Short-term research c. Horizontal research d. None of the above 	1.5	CO2
Q08	<p>In which of the following research methods, manipulation and control of variables, and randomization of sample are two of the basic requirements?</p> <ul style="list-style-type: none"> a. Ex-post facto research b. Descriptive research c. Case study research d. Experimental research 	1.5	CO2
Q09	<p>Consider an experiment of the drawing balls from a lot which are numbered as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. The complement of the event that only even number balls are drawn is defined by</p> <ul style="list-style-type: none"> a. {1, 3, 5, 7, 9} b. {All orderings of (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)} c. {2, 4, 6, 8, 10} d. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} 	1.5	CO3
Q10	<p>A random experiment can result in one of the outcomes {a, b, c, d} with probabilities 0.1, 0.3, 0.5, and 0.1, respectively. Let A denote the event {a, b}, and B the event {b, c, d}. Then</p> <ul style="list-style-type: none"> a. $P(A \cap B) = 0.3, P(A \cup B) = 1$ b. $P(A \cap B) = 0, P(A \cup B) = 1$ c. $P(A \cap B) = 1, P(A \cup B) = 0.3$ d. $P(A \cap B) = 0.3, P(A \cup B) = 0$ 	1.5	CO3
Q11	<p>Consider a bank credit card with a three-digit personal identification number (PIN) code. The total number of possible combinations for the PIN is</p> <ul style="list-style-type: none"> a. 1000 b. 10000 c. 100 d. 6 	1.5	CO3

<p>Q12</p>	<p>Which of the following is the correct statement from the following quantile-quantile plot?</p> <div style="text-align: center;">  <p>Normal Q-Q Plot</p> </div> <p>a. The parent population from where the sample is drawn is reasonably normal.</p> <p>b. The parent population from where the sample is drawn is positively skewed.</p> <p>c. The parent population from where the sample is drawn is negatively normal.</p> <p>d. Nothing can be said about the normality of the parent population from where the sample is drawn.</p>	<p>1.5</p>	<p>CO3</p>
<p>Q13</p>	<p>The nature of variables defined by “temperature of a place in Uttarakhand” and “number of people living in a town in Uttarakhand” are</p> <p>a. discrete and continuous variables, respectively.</p> <p>b. continuous and discrete variables, respectively.</p> <p>c. both are discrete variables.</p> <p>d. both are continuous variables.</p>	<p>1.5</p>	<p>CO3</p>
<p>Q14</p>	<p>Consider a class where students have some choices for a subject. The probability that a randomly chosen student chooses mathematics is 0.50, chooses biology is 0.40 and chooses mathematics and biology is 0.30. The probability that a student chooses either or both subjects is</p> <p>a. 0.80</p> <p>b. 0.90</p> <p>c. 0.20</p> <p>d. 0.60</p>	<p>1.5</p>	<p>CO3</p>

Q15	<p>Suppose a discrete random variable X has a probability mass function $P(x = 0) = 0.2, P(x = 1) = 0.5, P(x = 2) = 0.3$. The value of $E(X + 3)$ is</p> <ol style="list-style-type: none"> 4.1 1.1 3.1 2.1 	1.5	CO4
Q16	<p>If X is uniformly distributed over the interval $[0, 10]$, the probability that $1 < X < 4$ is</p> <ol style="list-style-type: none"> 0.3 0.4 0.6 0.7 	1.5	CO4
Q17	<p>The sum of square of grouped data is minimum when it is measured around</p> <ol style="list-style-type: none"> Median of the data. Arithmetic mean of the data. Mode of the data. Geometric mean of the data. 	1.5	CO4
Q18	<p>The limits of the Carl Pearson correlation coefficient are</p> <ol style="list-style-type: none"> $(-1, 1)$ $(0, 1)$ $(-\infty, \infty)$ $(0, 100)$ 	1.5	CO4
Q19	<p>The coefficients of kurtosis of a frequency distribution are $\beta_2 = 4, \gamma_2 = 1$. The frequency distribution is</p> <ol style="list-style-type: none"> Leptokurtic Platykurtic Mesokurtic Symmetric 	1.5	CO4
Q20	<p>Which of the following is the correct statement from the following scatter plot to know about the correlation coefficient of the given data?</p>  <ol style="list-style-type: none"> The correlation coefficient of the given data is -0.8. The correlation coefficient of the given data is +0.8. The correlation coefficient of the given data is +0.08. The correlation coefficient of the given data is -0.08. 	1.5	CO4

Hospital Data

ID no.	Duration of hospital stay	Age	Sex 1 = M 2 = F	First temp. following admission	First WBC ($\times 10^3$) following admission	Received antibiotic? 1 = yes 2 = no	Received bacterial culture? 1 = yes 2 = no	Service 1 = med. 2 = surg.
1	5	30	2	99.0	8	2	2	1
2	10	73	2	98.0	5	2	1	1
3	6	40	2	99.0	12	2	2	2
4	11	47	2	98.2	4	2	2	2
5	5	25	2	98.5	11	2	2	2
6	14	82	1	96.8	6	1	2	2
7	30	60	1	99.5	8	1	1	1
8	11	56	2	98.6	7	2	2	1
9	17	43	2	98.0	7	2	2	1
10	3	50	1	98.0	12	2	1	2

Nutrition Data

Baseline vitamin E intake by treatment group in a clinical trial of nutritional supplements

Subject	Group 1	Group 2	Group 3	Group 4
1	5.92	5.22	4.33	5.37
2	8.24	3.29	16.31	6.39
3	7.27	3.67	6.19	4.90
4	6.24	4.29	7.95	4.75
5	5.21	109.17	4.02	3.07
6	8.25	5.82	6.12	10.64
7	8.33	7.17	5.60	6.50
8	4.12	4.42	12.20	159.90
9	6.27	5.29	3.33	6.00
10	5.38	55.99	7.33	7.31

SECTION B (4Qx5M= 20 Marks)			
Q21	Write a short note on the “Task of defining a research problem.”	5	CO1
Q22	Plot a Histogram of data in Group 3 of Nutrition Data chart.	5	CO3
Q23	Find the CDF (cumulative distribution function) of the following data on number of episodes of Otitis media. r denotes the number of episodes and $P(X=r)$ denotes the probability of r number of episodes. $ \begin{array}{cccccccc} r & 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ P(X=r) & 0.129 & 0.264 & 0.271 & 0.185 & 0.095 & 0.039 & 0.017 \end{array} $	5	CO4
Q24	Describe all the parts of technical writing (in one or two sentences each).	5	CO5
SECTION-C (2Qx15M=30 Marks)			
Q25	What is research design? Give a detailed description of three types of research design.	15	CO2
Q26	Test the hypothesis that the average baseline vitamin E intake in Group 1 is 6 units (refer to Nutrition Data) with a 5% level of significance. (Assume that the population standard deviation is 2 units and critical value at 5% significance level is 1.645)	15	CO5
SECTION-D (2Qx10M=20 Marks)			
Q27	Find the mean, median, and variance of “duration of hospital stay” (refer to Hospital Data above). Evaluate the coefficient of correlation between “duration of hospital stay” and “age”.	10	CO3
Q28	Find the regression coefficients for “Age” as independent variable and “First WBC” as dependent variable. Hence predict the First WBC for a patient with age 35.	10	CO4