Name: **Enrolment No:**	

UPES

End Semester Examination, May 2023

Course: Biostatistics — **Semester : IV**

Program: B.Tech Biotechnology — **Duration : 3 Hours**

Course Code: HSCC2022 — **Max. Marks: 100**

Instructions: Attempt all the questions.

S. No.	Section A Short answer questions/ MCQ/T&F/Fill in the blanks (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Explain "Etiological factors – risk factors in the population".	**1.5**	**CO1**
Q 2	What do you understand by "Natural history of diseases"?	**1.5**	**CO1**
Q 3	Define: I. Attack rates II. Morbidity rates III. Prevalence	**1.5**	**CO1**
Q 4	In an outbreak of gastroenteritis among attendees of a corporate picnic, 99 persons ate potato salad, 30 of whom developed gastroenteritis. Calculate the risk of illness among persons who ate potato salad.	**1.5**	**CO1**
Q 5	Explain the "Method for calculating incidence rate".	**1.5**	**CO1**
Q 6	Explain spectrum of disease in a specific geographical area?	**1.5**	**CO2**
Q 7	What is "Wheel theory"?	**1.5**	**CO2**
Q 8	Explain the process and importance of "descriptive epidemiology".	**1.5**	**CO2**
Q 9	What is the difference between Population (mass) strategy & High risk strategy?	**1.5**	**CO2**
Q 10	Explain Disability Limitation and Rehabilitation.	**1.5**	**CO2**
Q 11	If a constant value 5 is subtracted from each observations of a set, the mean of the set will (a) increase by 5 (b) decrease by 5 (c) remains same (d) None of these	**1.5**	**CO3**

Q 12	Correlation coefficient always lies between _____ and _____.	**1.5**	**CO3**
Q 13	A bar diagram indicates the type of correlation between two variables. (a) True (b)False	**1.5**	**CO3**
Q 14	Dispersion means (a) The scatteredness of a set of observations (b) The concentration of a set of observations (c) Both a and b (d) None of these	**1.5**	**CO3**
Q 15	If x and y satisfy the relationship $x = 6 + 12y$, the value of r is (a) 0 (b) -1 (c) 1 (d) None	**1.5**	**CO3**
Q 16	The regression coefficients b_{xy} and b_{yx} are zeros, if the correlation coefficient r = _____.	**1.5**	**CO4**
Q 17	If a random variable has a Poisson distribution such that $P(1) = P(2)$, then the mean of distribution is _____.	**1.5**	**CO4**
Q 18	Define population and sample.	**1.5**	**CO4**
Q 19	If 10% of the bolts produced by a machine are defective, determine the probability that out of 10 bolts chosen at random, none of them is defective.	**1.5**	**CO4**
Q 20	Explain the significance of the Chi-Square test.	**1.5**	**CO4**
	Section B **(4Qx5M=20 Marks)**		
Q 1	**Explain the incubation periods of selected exposures and diseases also mention their clinical effect:** I. Organophosphorus ingestion II. *Salmonella* III. SARS-associated corona virus IV. Varicella-zoster virus V. Hepatitis A virus	**5**	**CO1**

<table>
<tr><td>Q 2</td><td>Explain chain of infections epidemic disease occurrence epidemic patterns and its prevention.</td><td>5</td><td>CO2</td></tr>
<tr><td>Q 3</td><td>Draw a “less than” cumulative frequency curve (also called Ogive) for the frequency distribution.
<table><tr><th>I.Q</th><th>Frequency</th></tr><tr><td>60-70</td><td>2</td></tr><tr><td>70-80</td><td>5</td></tr><tr><td>80-90</td><td>12</td></tr><tr><td>90-100</td><td>31</td></tr><tr><td>100-110</td><td>39</td></tr></table></td><td>5</td><td>CO3</td></tr>
<tr><td>Q 4</td><td>The following table gives age (x) in years of cars and annual maintenance cost (y) in hundred rupees.
<table><tr><td>x</td><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td>y</td><td>15</td><td>18</td><td>21</td><td>23</td><td>22</td></tr></table>
Estimate the maintenance cost for a 4 year old car by obtaining the regression equation.</td><td>5</td><td>CO4</td></tr>
<tr><td colspan="4">Section C
(2Qx15M=30 Marks)</td></tr>
<tr><td>Q 1</td><td>Explain with the schematic diagram and flow chart “The Natural history of disease in a patient”.</td><td>15</td><td>CO2</td></tr>
<tr><td>Q 2</td><td>The income of a group of 10,000 persons was found to be normally distributed with mean Rs. 750 per month and standard deviation of Rs. 50. Show that, of this group, about 95% had income exceeding Rs. 668 and only 5% had income exceeding Rs. 832.
(Given $P(0 < z < 1.64) = 0.4495$ from the table).</td><td>15</td><td>CO4</td></tr>
<tr><td colspan="4">Section D
(2Qx10M=20 Marks)</td></tr>
<tr><td>Q 1</td><td>(A)Explain in detail “Census and Sample Surveys”. [5 M]

(B) Explain various study designs with “Descriptive and analytical epidemiology”. [5 M]</td><td>10</td><td>CO1</td></tr>
<tr><td>Q 2</td><td>Using Non-linear Regression, fit a second degree parabola (polynomial) to the following data.
<table><tr><td>x</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y</td><td>1</td><td>6</td><td>17</td></tr></table></td><td>10</td><td>CO3</td></tr>
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