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| **Name:**<br>**Enrolment No:** | |

**UPES**

**End Semester Examination, May 2023**

**Course: Biostatistics and Epidemiology** — **Semester: V Semester**

**Program: Int ( B.Sc+M.Sc ( Nutrition and Dietetics)** — **Duration: 3 Hours**

**Course Code: HSCC 3016** — **Max. Marks: 100**

**Instructions: Read all the questions carefully**

| S. No. | Section A<br>Short answer questions/ MCQ/T&F<br>(20Qx1.5M= 30 Marks) | Marks | COs |
|---|---|---|---|
| Q 1 | Enumerate the stages of the research process. | 1.5 | CO4 |
| Q 2 | Which of the following best describes the main purpose of epidemiology?<br>a) Studying the distribution and determinants of health-related states or events in specified populations<br>b) Studying the effect of medicines on individuals with specific diseases<br>c) Providing healthcare services to populations<br>d) Developing new vaccines and medications | 1.5 | CO1 |
| Q 3 | If the values of two variables move in the same direction the correlation is said to be _____. | 1.5 | CO3 |
| Q 4 | Define statistical inference. | 1.5 | CO3 |
| Q 5 | Explain the contingency table with the help of an example. | 1.5 | CO3 |
| Q 6 | In an epidemiological study, the term 'population at risk' refers to:<br>a) All individuals in a specified group<br>b) Individuals who have been exposed to the risk factor being studied<br>c) Individuals who have the potential to develop the disease being studied<br>d) Individuals who have already developed the disease being studied | 1.5 | CO4 |
| Q 7 | Which of the following study designs is best suited to investigate the causality of a rare disease?<br>a) Cohort study<br>b) Case-control study<br>c) Cross-sectional study<br>d) Randomized controlled trial | 1.5 | CO5 |
| Q 8 | Randomization in a clinical trial helps to control confounding.<br>a) True<br>b) False | 1.5 | CO2 |
| Q 9 | Differentiate between incidence and prevalence. | 1.5 | CO2 |
| Q10 | The term epidemiology is derived from which language?<br>a) Latin<br>b) Greek<br>c) French<br>d) English | 1.5 | CO4 |

<table>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Q 11</td><td>Modern epidemiology incorporates elements from both biological and social sciences.<br>a) True<br>b) False</td><td>1.5</td><td>CO2</td></tr>
<tr><td>Q 12</td><td>The study of the distribution of diseases and health outcomes within a population is referred to as ……epidemiology.</td><td>1.5</td><td>CO5</td></tr>
<tr><td>Q 13</td><td>Match the following<br><table><tr><td>a) Descriptive Epidemiology</td><td>1) Identifying specific health events or determinants</td></tr><tr><td>b) Analytical Epidemiology</td><td>2) Focused on the analysis of disease determinants</td></tr><tr><td>c) Applied Epidemiology</td><td>3) Putting epidemiological findings into practice</td></tr><tr><td>d) Field Epidemiology</td><td>4) Documenting the patterns, types, and causes of health outcomes</td></tr></table></td><td>1.5</td><td>CO4</td></tr>
<tr><td>Q 14</td><td>Define the degree of freedom and critical values.</td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 15</td><td>Mention two applications of Chi-square distribution.</td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 16</td><td>Assign the ranks to variable $x$ $and$ $y$:<br><table><tr><td>$x$</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr><tr><td>$y$</td><td>12</td><td>9</td><td>6</td><td>10</td><td>3</td><td>5</td><td>4</td><td>5</td><td>4</td><td>7</td><td>8</td><td>2</td></tr></table></td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 17</td><td>Mention the importance of survival analysis.</td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 18</td><td>Differentiate between correlation and regression.</td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 19</td><td>Explain hazard functions.</td><td>1.5</td><td>CO3</td></tr>
<tr><td>Q 20</td><td>The distribution of survival time is known as:<br>a) Parametric<br>b) Non-Parametric<br>c) Exponential<br>d) None of these</td><td>1.5</td><td>CO3</td></tr>
<tr><td colspan="4">Section B<br>(4Qx5M=20 Marks)</td></tr>
<tr><td>Q 1</td><td>What are Epidemiological studies? Enumerate the different types of analytical and descriptive studies.</td><td>2+3</td><td>CO1</td></tr>
<tr><td>Q 2</td><td>What are the ethical issues considered while planning Epidemiological studies?</td><td>5</td><td>CO2</td></tr>
<tr><td>Q 3</td><td>For the height and weight, conduct a test for correlation with a significance level of 5% if the coefficient of correlation is 0.711 and $P$ value for 26 degree of freedom is 0.035.</td><td>5</td><td>CO3</td></tr>
<tr><td>Q 4</td><td>Based on observations made on 39 cotton plants, the total correlation of yield cotton $x_1$, the number of bolls i.e., seed vessels $x_2$ and height $x_3$ are found to be $r_{12} = 0.8, r_{13} = 0.65, and\ r_{23} = 0.7$. Calculate the coefficient of partial correlation between yields of cotton and number of bolls eliminating the effect of height.</td><td>5</td><td>CO2</td></tr>
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**Section C**
**(2Qx15M=30 Marks)**

| | | | |
|---|---|---|---|
| Q 1 | Explain rank correlation and mention the formula of coefficient of rank correlation for equal or tied ranks. From the following data calculate the coefficient of rank correlation after making adjustment for tied ranks: | 5+10 | CO3 |

| $X$ | 48 | 33 | 40 | 9 | 16 | 66 | 65 | 24 | 16 | 57 |
|---|---|---|---|---|---|---|---|---|---|---|
| $Y$ | 13 | 13 | 24 | 6 | 15 | 4 | 20 | 9 | 6 | 19 |

| | | | |
|---|---|---|---|
| Q 2 | Define sampling and the need for it with the help of various methods of probability and non-probability sampling methods. Enlist the characteristics of a good sample. | 5+5+5 | CO4 |

**Section D**
**(2Qx10M=20 Marks)**

| | | | |
|---|---|---|---|
| Q 1 | What are observational studies? Differentiate between the cohort, case-control, and cross-sectional studies with the help of a suitable example. | 2+8 | CO2 |
| Q 2 | From the following table test the colour of son's eye is associated with that of fathers | 10 | CO3 |

| | Eye colour of sons | | | |
|---|---|---|---|---|
| | | Not light | light | Total |
| Eye colour of fathers | Not Light | 230 | 148 | 378 |
| | Light | 151 | 471 | 622 |
| | Total | 381 | 619 | 1000 |

Given that table value of $\chi^2_{0.05}$ for 1 d.f. is 3.841