

Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, June 2021

Course: Biostatistics and Epidemiology	Semester: 2
Program: B.Sc. F & T, B.Sc. Clinical Research and B.Sc. Microbiology	
Course Code: HSCC2006	Max. Marks: 100
Time: 03 hrs.	

Instructions:

SECTION A

S. No.	MCQs or Fill in the blanks (1.5marks each)	30 Marks	CO
1	Define sporadic disease.	1.5	CO1
2	A separate control group receives a _____ treatment which is specifically designed to have no real effect.	1.5	CO2
3	What is incidence rate?	1.5	CO1
4	Cause of a disease is studied under descriptive epidemiology. True/False.	1.5	CO1
5	What do you mean by a pandemic.	1.5	CO1
6	Fill the blank: After the disease process has been triggered, pathological changes then occur without the individual being aware of them. This stage of subclinical disease, extending from the time of exposure to onset of disease symptoms, is usually called the _____ for infectious diseases.	1.5	CO1
7	The ratio of Number of deaths among children < 28 days of age during a given time interval / Number of live births during the same time interval Gives the type of mortality rate in the above situation.	1.5	CO3
8	In COVID-19 pandemic, 2400 cases were identified on 9 th May 2021. On the same day 80 people died. Calculate the death to case ratio.	1.5	CO3
9	What do you mean by informed consent.	1.5	CO2
10	Define meta analysis.	1.5	CO2
11	Which study design should be used if both exposure and outcome is known.	1.5	CO2
12	Which type of study is also known as follow up study.	1.5	
13	If in a moderately asymmetrical frequency distribution, the values of median and mean are 72 and 78 respectively. The value of mode will be: a. 90 b. 60 c. 150	1.5	CO4

	d. 6																					
14	Lowest and highest systolic blood pressures of 8 persons in mm of Hg are 120 and 148 respectively. The range and coefficient of range is: a. 268, 9.57 b. 28, 9.57 c. 28, 0.1044 d. 268, 0.1044	1.5	CO4																			
15	The result of blood test for carcinoma of stomach yielded 12 false positive results in 120 healthy individuals. Calculate the probability that for any single positive result of this type of blood test, the subject does not have gastric cancer.	1.5	CO5																			
16	The data recorded on the number of clusters per plant in pulse crop is 10, 18, 17, 19, 10, 15, 11, 17, 12. Calculate the median.	1.5	CO4																			
17	Define positive and negative correlations with the help of an example.	1.5	CO4																			
18	What do you mean by population and sample? Give one example of each.	1.5	CO5																			
19	Mention two uses of SPSS.	1.5	CO5																			
20	Deviations which are calculated from mean, median or mode also the algebraic signs are ignored while calculation then deviation is known as: a. Mean deviation. b. Standard deviation c. Variance d. Coefficient of variation.	1.5	CO4																			
SECTION B the word limit 20 marks 4 questions 5 marks each																						
Q	Short Answer Type Question (5 marks each) Scan and Upload 4 questions 5 marks each	20 Marks	CO																			
1	Discuss analytical epidemiology	5																				
2	What do you mean by cross sectional study design	5																				
3	Use multiple bar diagram to represent the total production of wheat, rice, and maize for three years in Haryana state. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Years</th> <th colspan="3">Total production (in thousand metric tons)</th> </tr> <tr> <th>Wheat</th> <th>Rice</th> <th>Maize</th> </tr> </thead> <tbody> <tr> <td>1996-97</td> <td>1916</td> <td>293</td> <td>643</td> </tr> <tr> <td>1997-98</td> <td>2444</td> <td>338</td> <td>614</td> </tr> <tr> <td>1998-99</td> <td>3335</td> <td>415</td> <td>774</td> </tr> </tbody> </table>	Years	Total production (in thousand metric tons)			Wheat	Rice	Maize	1996-97	1916	293	643	1997-98	2444	338	614	1998-99	3335	415	774	5	CO4
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4	Mean serum vitamin A level of 10 students was 22.0 ($\mu\text{g/dl}$) with a variance of 40. Does this mean value differ from a mean value of 25 ($\mu\text{g/dl}$) observed in another study? Tabulated value of t for 9 degree of freedom at 5% level of significance is 2.26	5	CO5																			
SECTION C 30 marks																						

Q	Two case studies 15 marks each subsections	30 Marks	CO																									
1	<p>Case Study 1</p> <p>1. Four different drugs have been developed for the cure of a certain disease. These drugs are tried on patients of three different hospitals. The number of cases of recovery from the disease per 100 people are given below. Carry out an analysis of variance and interpret your result.</p> <table border="1" data-bbox="203 449 1291 640"> <thead> <tr> <th data-bbox="203 449 418 489">Hospital</th> <th colspan="4" data-bbox="418 449 1291 489">Drugs</th> </tr> <tr> <th data-bbox="203 489 418 525"></th> <th data-bbox="418 489 634 525">A</th> <th data-bbox="634 489 850 525">B</th> <th data-bbox="850 489 1066 525">C</th> <th data-bbox="1066 489 1291 525">D</th> </tr> </thead> <tbody> <tr> <td data-bbox="203 525 418 560">H₁</td> <td data-bbox="418 525 634 560">24</td> <td data-bbox="634 525 850 560">20</td> <td data-bbox="850 525 1066 560">24</td> <td data-bbox="1066 525 1291 560">17</td> </tr> <tr> <td data-bbox="203 560 418 596">H₂</td> <td data-bbox="418 560 634 596">20</td> <td data-bbox="634 560 850 596">25</td> <td data-bbox="850 560 1066 596">30</td> <td data-bbox="1066 560 1291 596">9</td> </tr> <tr> <td data-bbox="203 596 418 640">H₃</td> <td data-bbox="418 596 634 640">13</td> <td data-bbox="634 596 850 640">18</td> <td data-bbox="850 596 1066 640">31</td> <td data-bbox="1066 596 1291 640">13</td> </tr> </tbody> </table> <p>Tabulated values: $F_{(2,6)}=5.14$ and $F_{(3,6)}=4.76$ at 5% level of significance.</p>	Hospital	Drugs					A	B	C	D	H ₁	24	20	24	17	H ₂	20	25	30	9	H ₃	13	18	31	13	15	CO4
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2	<p>Case Study 2</p> <p>PART A. For each of the fractions shown below, indicate whether it is an incidence proportion, incidence rate, prevalence, or none of the three.</p> <ol style="list-style-type: none"> 1. Incidence proportion 2. Incidence rate 3. Prevalence 4. None of the above <ol style="list-style-type: none"> 1. $\frac{\text{number of women in Framingham Study who have died through last year from heart disease}}{\text{number of person-years contributed through last year by women initially enrolled in Framingham Study}}$ 2. $\frac{\text{number of women in town of Framingham who reported having heart disease in recent health survey}}{\text{estimated number of women residents of Framingham during same period}}$ 3. $\frac{\text{number of women in Framingham Study newly diagnosed with heart disease last year}}{\text{number of women in Framingham Study without heart disease at beginning of same year}}$ 4. $\frac{\text{number of women in State A newly diagnosed with heart disease in 2004}}{\text{estimated number of women living in State A on July 1, 2004}}$ 5. $\frac{\text{estimated number of women smokers in State A according to 2004 Behavioral Risk Factor Survey}}{\text{estimated number of women living in State A on July 1, 2004}}$ 	15	CO1																									

	<p>PART B. For each of the following situations, identify whether it reflects:</p> <ol style="list-style-type: none"> 1. Sporadic disease 2. Endemic disease 3. Hyperendemic disease 4. Pandemic disease 5. Epidemic disease <ol style="list-style-type: none"> 1. ____ 22 cases of legionellosis occurred within 3 weeks among residents of a particular neighborhood (usually 0 or 1 per year) 2. ____ Average annual incidence was 364 cases of pulmonary tuberculosis per 100,000 population in one area, compared with national average of 134 cases per 100,000 population 3. ____ Over 20 million people worldwide died from influenza in 1918–1919 4. ____ Single case of histoplasmosis was diagnosed in a community 5. ____ About 60 cases of gonorrhoea are usually reported in this region per week, slightly less than the national average 		
	SECTION- D 20 marks		
Q	Long Answer type Questions Scan and Upload (10 marks each) word limit	20 Marks	CO
1	Discuss cohort study designs. (prospective and retrospective).	10	CO2
2	<p>If the probability of an individual suffers a bad reaction from a particular injection is 0.001, apply Poisson distribution to determine the probability that out of 2,000 individuals.</p> <ol style="list-style-type: none"> (i) Exactly three (ii) More than two individuals will suffer a bad reaction. 	10	CO5