UPES
End Semester Examination, May 2023

Course: Biostatistics and Epidemiology
Program: BSC-FN&D-II, BSC-Microbiology-II, Int BMSC-Microbiology-II, Int BMSC-N&D-II, Int BMSC-Clinical Research -II, BSC- Clinical Research -II
Course Code: HSCC1022
Semester: 2

Duration : 3 Hours
Max. Marks: 100

Instructions: Attempt all questions.

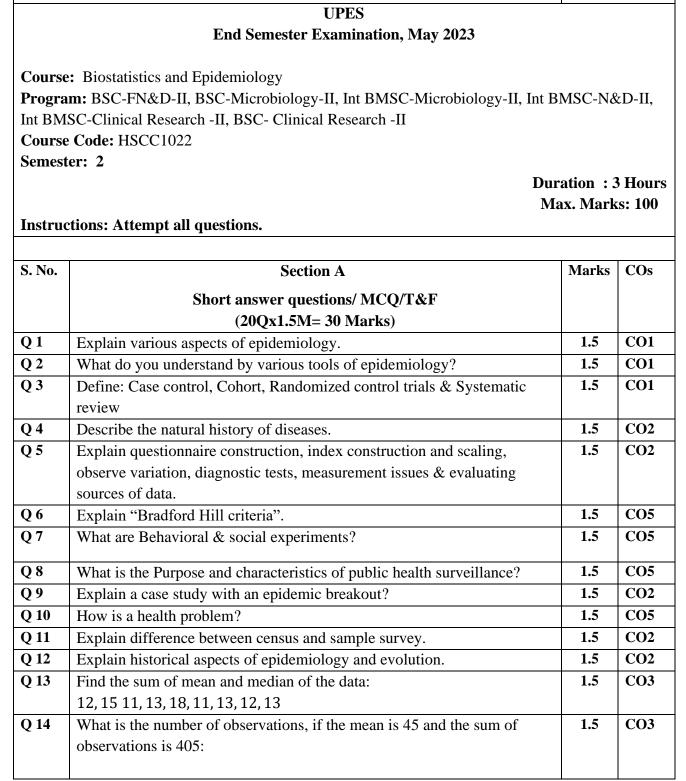| S. No.	Section A	Marks	COs
	Short answer questions/ MCQ/T&F **(20Qx1.5M= 30 Marks)**		
Q 1	Explain various aspects of epidemiology.	**1.5**	**CO1**
Q 2	What do you understand by various tools of epidemiology?	**1.5**	**CO1**
Q 3	Define: Case control, Cohort, Randomized control trials & Systematic review	**1.5**	**CO1**
Q 4	Describe the natural history of diseases.	**1.5**	**CO2**
Q 5	Explain questionnaire construction, index construction and scaling, observe variation, diagnostic tests, measurement issues & evaluating sources of data.	**1.5**	**CO2**
Q 6	Explain "Bradford Hill criteria".	**1.5**	**CO5**
Q 7	What are Behavioral & social experiments?	**1.5**	**CO5**
Q 8	What is the Purpose and characteristics of public health surveillance?	**1.5**	**CO5**
Q 9	Explain a case study with an epidemic breakout?	**1.5**	**CO2**
Q 10	How is a health problem?	**1.5**	**CO5**
Q 11	Explain difference between census and sample survey.	**1.5**	**CO2**
Q 12	Explain historical aspects of epidemiology and evolution.	**1.5**	**CO2**
Q 13	Find the sum of mean and median of the data: 12, 15 11, 13, 18, 11, 13, 12, 13	**1.5**	**CO3**
Q 14	What is the number of observations, if the mean is 45 and the sum of observations is 405:	**1.5**	**CO3**

	a. 6 b. 11 c. 9 d. 15		
Q 15	Cumulative frequency curve is also known as:	1.5	CO3
Q 16	Find the range and coefficient of range if largest item is 48 and smallest item is 24.	1.5	CO3
Q 17	Calculate the coefficient of variation if the standard deviation and mean are 21.2 and 36.6 respectively.	1.5	CO3
Q 18	Discuss the various types of correlation.	1.5	CO3
Q 19	Define the following: a. Probability b. Discrete Distribution c. Continuous Distribution d. Sampling	1.5	CO4
Q 20	Assign the ranks to the following: 	x	35	40	25	55	85	90	65	55	45	50
y	100	100	110	140	150	130	100	120	140	110		1.5	CO4

Section B
(4Qx5M=20 Marks)

Q 1	Explain in detail the Epidemiologic Triangle.	5	CO2
Q 2	Explain the various aspects of "web of causation".	5	CO5
Q 3	Apply method of least squares to find out regression line y on x and regression coefficient b_{yx} by using the values below: $$n = 7, \sum x = 113, \sum y$$ $$= 182, \sum x^2 = 1983, \sum y^2 = 151, \sum xy = 3186$$	5	CO3
Q 4	Apply shortcut method to find the standard deviation of a frequency distribution by using the values below: $A = 30,\ N = 60,\ \sum fd = 50,\ \sum fd^2 = 10,900$	5	CO3

Section C
(2Qx15M=30 Marks)

Q 1	What do you understand by meta-analysis – Hybrid designs in epidemiology – Community based epidemiologic studies?	15	CO5

Q 2	The following table gives the figures of monthly drop in acidity level and chlorine concentration in a lake water. Apply two-way classification of analysis of variance and interpret your results.	15	CO4

Chlorine Concentration	Acidity level				
	Low	Medium	High	Very High	Total
Low	22	19	9	7	57
Medium	11	11	8	4	34
High	9	10	6	4	29
Total	42	40	23	15	120

Tabulated Values $F_{0.05}$ at $(2,6)$ $d.f$ is 5.14

$F_{0.05}$ at $(3,6)$ $d.f$ is 4.76

Section D
(2Qx10M=20 Marks)

Q 1	(A) . A study assesses the association between talking on a cellular phone while driving and traffic accidents. It finds that people with cellular phones have accidents at a rate of 11.1 per 10,000 miles traveled. People who do not have cellular phones have accidents at the rate of 8.6 per 10,000 miles. Calculate the rate difference associated with cellular phone use. Then, in plain terms, interpret your results. (B) A study starts with 4,875 health people. (Think of these as the 5000 from problem 2 minus the 125 prevalent cases.) Over the next 2 years, 75 develop the disease. What is the incidence rate of disease over the study period? Show all work.	5+5	C02
Q 2	Out of 800 families with 3 children each, how many would you expect to have: (i) 1 boy and 2 girls (ii) Only girls (iii) either 1 or 2 boys (iv) at least one boy Assume equal probabilities for boys and girls.	10	CO4