



QP CODE: 26019316



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Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, MARCH 2026

Fourth Semester

M Sc BIostatistics

ELECTIVE - ST860403 - STATISTICAL COMPUTING AND DATA ANALYSIS USING R AND SAS

2019 Admission Onwards

1495C1B3

Time: 3 Hours

Weightage: 30

(Answer any **three** questions. Each question carries a weight of **ten**)

1.

1. Ten female patients with breast cancer are randomized to receive either CMF (cyclic administration of cyclophosphamide, methatrexate, and fluorouracil) or no treatment after a radical mastectomy. At the end of two years, the following times to relapse (or remission times) in months are recorded:

CMF (group 1): 23, 16+, 18+, 20+, 24+

Control (group 2): 15, 18, 19, 19, 20

Test the hypothesis that CMF is more efficient than control group using Gehan test.

2. The first three columns of Table give the survival data of 40 patients with myeloma. The survival times are grouped into intervals of five months. Estimate survivorship function, density function, and hazard function and plot the graphs.

Survival Time t (months)	Number of Patients	
	Surviving at Beginning of Interval	Number of Patients Dying in Interval
0–5	40	5
5–10	35	7
10–15	28	6
15–20	22	4
20–25	18	5
25–30	13	4
30–35	9	4
35–40	5	0
40–45	5	2
45–50	3	1
≥ 50	2	2





2. (a) Given $l_{91}=871$

Age X	91	92	93	94	95	96	97	98	99	100	101
d_x	296	209	144	93	58	34	18	10	5	3	1

Find the probability that

1. A person of 93 age will die in 3 years
2. A person aged 92 will survive upto age 96
3. Three persons aged 92,93 & 94 will survive for 4 years
4. Of 3 persons aged 93, 94 & 95 atleast two will survive for 4 years.

- (b) Calculate SMAM

Age	Percentage Singles	
	Males	Females
15-19	85.12	58.83
20-24	43.66	10.06
25-29	12.67	1.40
30-34	4.00	0.55
35-39	2.29	0.42
40-44	1.88	0.31
45-49	1.62	0.23
50-54	1.76	0.30

3. (a) Suppose one has to test the nul hypothesis $H_0 : X \sim NB(1, \theta_0) VS h_1 : X \sim Pois(\theta_1)$ where $\theta_0 = \frac{1}{3}$ and $\theta_1 = 2$. Obtain the posterior odds an compute the Bayes factor in favour of H_0 . What is your decision if

1. $n=2, x_1 = x_2 = 0$
2. $n=2, x_1 = x_2 = 1$

- (b) Use Monte Carlo integration to estimate the value of π

4. Find the best local alignment between the M.leprae and M.ulcerans chorismate lyase proteins.

