

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Sixth Semester)

Branch – STATISTICS

BIOSTATISTICS & SURVIVAL ANALYSIS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 Which of the following is not true about e-CRF?
(i) It is a digital version of a paper based case report form
(ii) It collects and reports data from patients.
(iii) It improves data security
(iv) It is a digital version of medical claim
- 2 For which of the following data, McNemer's test can be applied?
(i) Paired Nominal data (ii) Paired ordinal data
(iii) Independent nominal data. (iv) Independent ordinal data
- 3 Which of the following is true about hazard ratio?
(i) It is the ratio of hazard rate in the treatment group to control group
(ii) It is the ratio of hazard rates of control group to treatment group
(iii) It is the ratio of hazard rate of two control groups to the treatment group
(iv) It is the ratio of pdfs of two control groups to the treatment group
- 4 A steeper slope of Kaplan Meier curve indicates-----
(i) Higher event rate (ii) Lower event rate
(iii) Stable survival rate (iv) Moderate event rate
- 5 Which of the following should be parallel if the predictor satisfies the proportional hazard assumption?
(i) Survival function and survival time (ii) Hazard function and survival time
(iii) Hazard time and survival time (iv) Survival function and hazard time

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Write the advantages of e-CRFs.
OR
b Explain the importance of Meta analysis.
- 7 a Explain the significance and procedure of McNemer's test.
OR
b. Compute Cohen's Kappa for the ratings of two raters in 70 cases.

Rater 1	Rater 2		
		Yes	No
	Yes	25	10
	No	15	20

- 8 a Derive the hazard function of exponential distribution.
OR
b Explain the significance of hazard ratio and its interpretation.
- 9 a Mention the assumptions of KM survival curve.
OR
b Explain the role of life table in modelling survival data.

Cont...

- 10 a Write the benefits of Cox Proportional Hazard model .
OR
b Explain any one method for checking the proportional hazard assumption using statistical tests.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Explain the Scope of Bio Statistics.
OR
b Explain the advantages of Parallel and Cross over studies.
- 12 a Explain the terms sensitivity, Specificity and ROC analysis and their significance in medical research.
OR
b To test the effectiveness of a medication the blood pressure of 8 participants before and after medication were recorded as follows. Use Wilcoxon Signed rank test , check whether the scores provide evidence of a decrease in median blood pressure.

Participant	1	2	3	4	5	6	7	8
BP-Before	122	132	125	127	136	129	131	129
BP-After	118	130	127	127	130	135	124	126

- 13 a Derive the relationship between hazard rate, pdf and survival function.
OR
b Derive the hazard function for Weibull distribution.
- 14 a Explain the steps involved in drawing KM curve with an example.
OR
b Explain the steps to perform log rank test for two groups.
- 15 a Explain the assumptions of Cox Proportional Hazard model.
OR
b Explain any two graphical procedures to check the proportional hazards assumption.

Z-Z-Z

END