



Date: 11-11-2024

Dept. No.

Max. : 100 Marks

Time: 09:00 am-12:00 pm

SECTION A - K1 (CO1)

	Answer ALL the Questions	(10 x 1 = 10)
1.	Define the following	
a)	Odds ratio.	
b)	Point Estimation.	
c)	ICH.	
d)	Gamma distribution.	
e)	Censoring.	
2.	Multiple Choice Question	
a)	_____ are used to report case control study. a) Odds Ratio b) Split plot design c) Logistic regression d) None of the above	
b)	_____ test is used to test the independence of attributes. a) t test b) F test c) z test d) Chi-square test	
c)	_____ is a complex risky, expensive and time consuming process. a) Clinical test b) Drug discovery c) Phase I trial d) Phase III trial	
d)	Hazard rate is constant for _____. a) Weibull Distribution b) Gamma Distribution c) Exponential Distribution d) Lognormal Distribution	
e)	_____ is a statistical technique that analyzes and illustrates survival rates over time. a) Life table b) Kaplan-Meier Method c) Censoring d) None of the above	

SECTION A - K2 (CO1)

	Answer ALL the Questions	(10 x 1 = 10)
3.	Fill in the blanks	
a)	_____ is the ratio of the probability of an event occurring in the exposed group versus the probability of the event occurring in the non-exposed group.	
b)	_____ is used to compare two independent groups when the data is not normally distributed.	
c)	Survival function of exponential distribution is _____.	
d)	_____ evaluate ways to promote behavioral changes that improve health.	
e)	_____ is used to study the relationship between time and event outcome and explanatory variable	
4.	Match the following	
a)	Observational study - Edward Jenner	
b)	Non parametric test - Survival analysis	
c)	Survival function - Cohort Study	
d)	Drug Discovery - Distribution free test	
e)	Censoring - Non increasing function	

SECTION B - K3 (CO2)**Answer any TWO of the following in 100 words each.****(2 x 10 = 20)**

5. Explain different types of bias present in epidemiology

6. Obtain Kappa statistic for the following data relating to 100 patients suffering from pancreatic carcinoma underwent contrast -enhanced computed tomography abdomen and two radiologists reviewed the report:

Pancreatic cancer		Grading by Radiologist 2	
Grading by Radiologist 1		YES	NO
	YES	40	5
	NO	15	40

7. Explain in detail about Phase II and Phase III of clinical trial.

8. Obtain S(t) and h(t) for Exponential distribution and Plot S(t) and h(t) for $\lambda = 2$.**SECTION C – K4 (CO3)****Answer any TWO of the following in 100 words each.****(2 x 10 = 20)**

9. Discuss the procedure of log rank test.

10. Discuss the different types of observational studies.

11. Discuss the procedure for Median test and Wilcoxon signed rank test.

12. Discuss the contribution of Edward Salk and Alexander Fleming in the field of drug discovery.

SECTION D – K5 (CO4)**Answer any ONE of the following in 250 words (1 x 20 = 20)**

13. Rothenberg et al. investigated the effectiveness of using the Hologic Sahara Sonometer, A portable device that measures bone mineral density (BMD) in the ankle, in predicting a fracture. They estimated used a Hologic bone mineral density value of .57 as a cutoff. The results of the investigation yielded the following data:

	Confirmed Fracture	
	Present	Not Present
BMD (≤ 0.57)	214	670
BMD (> 0.57)	73	330

Calculate sensitivity, specificity of using a BMD value of .57 as a cutoff value for predicting Fracture. Also calculate False positive rate, False negative rate, Odds ratio and relative risk for the same.

14. Explain (i) clinical trial with independent concurrent control with a diagram.
(ii) Clinical trial with self control with a diagram.

SECTION E – K6 (CO5)**Answer any ONE of the following in 250 words (1 x 20 = 20)**

15. Consider a hypothetical data of a group of patients receiving standard anti-retroviral therapy. The data shows the time of survival (in days) among the patients entered in a clinical trial - 6, 12, 21, 27, 32, 39, 43, 43, 46+, 89, 115+, 139+, 181+, 211+, 217+, 261, 263, 270, 295+, 311, 335+, 346+, 365+ (+ means these patients are still surviving after mentioned days in the trial.). Another hypothetical data of a group of patients receiving new Ayurvedic therapy for HIV infection. The data shows the time of survival (in days) among the patients entered in a clinical trial 9, 13, 27, 38, 45+, 49, 49, 79+, 93, 118+, 118+, 126, 159+, 211+, 218, 229+, 263+, 298+, 301, 333, 346+, 353+, 362+. Construct Kaplan-Meier curves and find out which treatment is better?

16. 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
Analyse using Log-Rank test.

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