

GUJARAT TECHNOLOGICAL UNIVERSITY
Pharm D – 4th Year • EXAMINATION – WINTER-2022

Subject Code: 848804**Date: 30/01/2023****Subject Name: Biostatistics & Research Methodology****Time: 02:30 PM TO 05:30 PM****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** A clinical trial is run to assess the effectiveness of a new anti-retroviral therapy for patients with HIV. Patients are randomized to receive a standard anti-retroviral therapy (usual care) or the new anti-retroviral therapy and are monitored for 3 months. The primary outcome is viral load which represents the number of HIV copies per milliliter of blood. A total of 30 participants are randomized and the data are shown below. The critical value can be found in the table of critical values based on sample sizes ($n_1=n_2=15$) and a two-sided level of significance ($\alpha=0.05$). The critical value 64. **06**

Standard Therapy	New Therapy
7500	400
8000	250
2000	800
550	1400
1250	8000
1000	7400
2250	1020
6800	6000
3400	920
6300	1420
9100	2700
970	4200
1040	5200
670	4100
400	undetectable

Is there statistical evidence of a difference in viral load in patients receiving the standard versus the new anti-retroviral therapy?

- (b) Define Sample. Brief out various methods of sample size determination. **04**
- (c) Define 't' test, give different situations in which the unpaired and paired 't' tests are applied. **04**
- Q.2 (a)** What are different types of errors and explain one with example. **06**
- (b) i) Find the sum of mode and median of the following data : **04**
 12,15,11,13,18,11,13,12,11

ii) Which are different types of data distribution? Give example of each types.

- (c) Calculate the Karl Pearson's or Correlation coefficient of correlation between age and glucose level from the following data : **04**

Subject	Age (x)	Glucose Level (y)
1	43	99
2	21	65
3	25	79
4	42	75
5	57	87
6	59	81

- Q.3** (a) Find the variance and Standard variance for the frequency distribution of the data representing number of particles droplet size of 20 droplet particles of microemulsion **06**

Class	Frequency
5- 11	1
11-17	2
17-23	3
23-29	5
29-35	4
35-41	3
41-47	2
total	20

- (b) Write a brief note on various types of clinical study designs. **04**
(c) The ratio of male and female births is expected to be 1:1. It was found in one village that the male children born were 52 and the females were 48. Calculate X^2 value and interpret your results. (The tabulated value is 3.841 at 5% level of probability for 1 d.f.) **04**

- Q.4** (a) Explain the following terminologies: **06**
i) Null hypothesis ii) Standard error of mean
(b) Write a brief note on important measurements of the spread of data. **04**
(c) Discuss the computer applications in hospital pharmacy. **04**

- Q.5 (a)** The systolic and diastolic blood pressure (mm Hg) for eight patients in hospital were as under: **06**

Systolic BP	135	148	145	138	142	150	152	144
Diastolic BP	89	91	86	88	85	83	93	85

Find b_{xy} & b_{yx} of above said data. Estimate diastolic pressure when systolic pressure is 140 mm Hg

- (b)** Give your comments on the following statements: **04**
- i) Bar and pie diagrams serve the same purpose.
 - ii) Histogram and bar diagrams are not the same.
- (c)** Give examples of parametric data and non-parametric data and enlist various statistical methods used for finding level of significance for both types of data. **04**
- Q. 6 (a)** Three group of six guinea pigs each were injected respectively with 0.5 mg, 1.0 mg and 1.5 mg of new tranquilizers and the following are the number minute, it took to fall sleep. Test at level of significance $\alpha=0.05$ the null hypothesis that difference in dose have no effect ($F_{2,15}=3.68$) **06**

0.5mg	21	23	19	24	25	33
1.0 mg	19	21	20	18	22	20
1.5 mg	15	10	13	14	11	15

- (b)** Describe briefly use of computers in pharmaceutical care in community pharmacy. **04**
- (c)** Write a brief note on level of significance. **04**
- Q.7 (a)** Define following terminologies: **06**
- i) Incidence ii) Prevalence iii) Relative risk iv) Attributable risk
- (b)** Write a brief note on contents of research report. **04**
- (c)** Find SD of hospitalization period of COVID 19 in 8 patients where it was found to be 10,13,17,22,27,20,31,32. **04**
