Question Paper

Exam Date & Time: 19-Jun-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

IV Year Pharm D/ I Pharm D Post Baccalaureate
University Examination April 2023

Biostatistics and Research Methodology [PPR 4.4T-S3]

Marks: 70 **Duration: 180 mins.**

A: Long Answer Questions

Answer all the questions.

Draw diagrams wherever necessary

1) Explain the important properties of normal distribution. (6)

a)

b) Mean melting point of a compound was computed from a sample of 10 trials and was found to be 128.4 ° C. The SD for this procedure is 1.8° C . Assuming normality, compute 95% and 99% confidence interval for the population mean and compare them. (4)

2) Explain the applications of EpiInfo and SPSS software in research data analysis. (6)

a)

b) Two-way ANOVA test was conducted to evaluate the cholesterol lowering effect of a new drug with respect to gender. Two-way ANOVA table is given below. Based on the significance (p-value) of two-way ANOVA, interpret the results. (4)

Source	DF	SS	MS	F-ratio	p value
B/W Treatment	2	5446.7	2723.35	189.51	< 0.001
B/W Age group	1	8.4	8.4	0.58	0.448
Int (Treatment*Gender)	2	210.33	105.16	7.31	0.002
Error	52	747.64	14.37		
Total	57	6393.6			

3) Classify epidemiological study designs and explain cross-sectional study in detail. (10)

B: Short Answer Questions

Answer all the questions.

4) Explain the types, construction and applications of bar graphs. (5)

5) A study was conducted to assess the relationship between sexual risk factors and HHV-8 (human herpes virus-8) infection. Prevalence of HHV-8 infection in men, who had a previous history of gonorrhoea and those who did not have, is given in below table. Using suitable statistical test find out whether there is any association between history of gonorrhoea and HHV-8 infection? (5)

History of gonorrhoea	HHV-8 infection	
	Yes	No
Yes	25	37
No	38	205

Distribution of χ^2

	Probability				
d.f.	0·50	0·10	0·05	0·02	0·01

1	0·455	2·706	3·841	5·412	6·635
2	1·386	4·605	5·991	7·824	9·210
3	2·366	6·251	7·815	9·837	11·345
4	3·357	7·779	9·488	11·668	13·277
5	4·351	9·236	11·070	13·388	15·086
6	5·348	10·645	12·592	15·033	16·812
7	6·346	12·017	14·067	16·622	18·475
8	7·344	13·362	15·507	18·168	20·090
9	8·343	14·684	16·919	19·679	21·666
10	9·342	15·987	18·307	21·161	23·209
11	10·341	17·275	19·675	22·618	24·725
12	11·340	18·549	21·026	24·054	26·217
13	12·340	19·812	22·362	25·472	27·688
14	13·339	21·064	23·685	26·873	29·141
15	14·339	22·307	24·996	28·259	30·578

6) A study was conducted to assess the effectiveness of a new drug designed to reduce repetitive behaviours in children affected with autism. A total of 8 children with autism enrolled in the study and the amount of time that each child is engaged in repetitive behaviour during three-hour observation periods were measured both before treatment and then again after taking the new medication for a period of 1 week. The data are shown below. Using a suitable non-parametric test find out whether treatment is effective in reducing repetitive behaviour. (5)

Patient ID	Amount of time spent (minute)	
	Before treatment	After treatment
1	85	75
2	70	50
3	40	50
4	65	40
5	80	20
6	75	65
7	55	45
8	20	20

Critical Values of T for Wilcoxon Signed Ranks Test

The value listed in the table are the critical values of T for the specified N (left colum) and alpha level (column heading). To be significant, $T_{obt} \leq T_{crit.}$

	Level of significance for one-tailed test			
	.05	*.025*	*.01*	*.005*

	Level of significance for one-tailed test			
	.05	*.025*	*.01*	*.005*

N	Level of significance for two-tailed test .10	.05	.02	.01	N	Level of significance for two-tailed test .10	.05	.02	.01
5	0	—	—	—	28	130	116	101	91
6	2	0	—	—	29	140	126	110	100
7	3	2	0	—	30	151	137	120	109
8	5	3	1	0	31	163	147	130	118
9	8	5	3	1	32	175	159	140	128
10	10	8	5	3	33	187	170	151	138
11	13	10	7	5	34	200	182	162	148
12	17	13	9	7	35	213	195	173	159
13	21	17	12	9	36	227	208	185	171
14	25	21	15	12	37	241	221	198	182
15	30	25	19	15	38	256	235	211	194
16	35	29	23	19	39	271	249	224	207
17	41	34	27	23	40	286	264	238	220
18	47	40	32	27	41	302	279	252	233
19	53	46	37	32	42	319	294	266	247
20	60	52	43	37	43	336	310	281	261
21	67	58	49	42	44	353	327	296	276
22	75	65	55	48	45	371	343	312	291
23	83	73	62	54	46	389	361	328	307
24	91	81	69	61	47	407	378	345	322
25	100	89	76	68	48	426	396	362	339
26	110	98	84	75	49	446	415	379	355
27	119	107	92	83	50	466	434	397	373

7) Explain the aims and objectives of epidemiology. (5)

8) Explain the different types of measurements used to express disease magnitude in epidemiology. (5)

9) Explain the role of computer in hospital pharmacy functioning. (5)

C. Give Reasons for the Following

Answer all the questions.

10) Standard deviation (SD), decreases as the number of sample increases. (2)

11) Range is affected by fluctuations in sampling. (2)

12) Pie chart is useful for nominal and ordinal data. (2)

13) Case control study is considered as an analytical study design. (2)

14) Computers plays important role in the community pharmacy. (2)

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