BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BPHARM   SEMESTER: VIII
BRANCH: PHARMACY   SESSION: SP2022
SUBJECT: BIOSTATISTICS AND RESEARCH METHODOLOGY BP801T
TIME: 3.00 Hours   FULL MARK: 75
INSTRUCTIONS:
1. The missing data, if any, may be assumed suitably.
2. Before attempting the question paper, be sure that you have got the correct question paper.
3. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
4. This question paper consists of (03) three parts. Read the part wise instructions before attempting the questions.

PART-I
Objective type questions (Instruction: Answer all questions)

Q1.   (10 x 2 = 20 Marks)

A. From a batch of 1 Lac tablets, 20 samples are to be taken for weight variation study. Which one is sample, and which one is population?

B. Calculate the geometric mean of 500, 800, 1200, 1600.

C. Calculate the harmonic mean of 700, 900, 1200, 1500.

D. Calculate the median value of 9, 10, 12, 13, 13, 13, 15, 15, 16, 16, 18, 22, 23, 24, 24, 25

E. Calculate the mode value of 9, 10, 12, 13, 13, 13, 15, 15, 16, 16, 18, 22, 23, 24, 24, 25

F. In 3^2 factorial design, number of independent variables are ....

G. 'ab' represents:

    i.   factor 'a' and 'b' at low levels

    ii.   factor 'a' and 'b' at high levels

    iii.   factor 'a' high level and factor 'b' low levels

H. To estimate the curvature effect, minimum no of levels of factors should be........................

I. In simplex lattice design total quantity (in %) of factor levels should add to give ....

J. Research based on outcomes of history aims for

    i. Factual objective

    ii. application objective

PART-II
Short Answers
(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

Q2.   Make stem-and-leaf frequency distribution plot of serum cholesterol changes.

-35	10	19	-95	62	-84	75	-12	48	37
-48	-59	-78	26	-28	17	-49	51	-69	58

Q3. Calculate the weighted average of the potency a tablet from the frequency distribution of tablet potencies data.

Potency (mg)	Frequency
95.5-96.5	5
96.5-97.5	14
97.5-98.5	18
98.5-99.5	35
99.5-100.5	13
100.5-101.5	9
101.5-102.5	6

Q4. Describe the probability density function of normal size distribution and plot normal probability plot when a) mean is different but standard deviation is same; b) standard variation is different but mean is same.

Q5. Five tablets and seven tablets are taken for content assay test from two lots of paracetamol tablets. It is desired to determine if there is a significant difference between the two samples. The critical t value and the assay data (mg) are as follows:

Sample 1	Sample 2	DF	P 0.1 (one tail)	P 0.05 (one tail)	P 0.05 (two tail)	P 0.01 (two tail)
475.3	526.7	6	1.440	1.943	2.447	3.707
456.7	548.9	7	1.415	1.895	3.365	3.499
435.8	567.4	8	1.397	1.860	2.306	3.355
487.5	545.2	9	1.383	1.833	2.262	3.250
423.5	587.6	10	1.372	1.812	2.228	3.169
	526.7	11	1.363	1.790	2.201	3.106
	518.2	12	1.356	1.782	2.179	3.055

Q6. Write a short note on regression analysis.

Q7. Design a table for a 2^3 factorial design.

Q8. Construct a hypothetical mathematical model with two factor interaction and discuss the coefficients

Q9. Draw a design space of central composite with two factors and 5-levels.

Q10. Enumerate and briefly discuss main objectives of research.

PART-III
Long Answers
(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

Q11. Derive the value of a and b in y=a + bx, by the method of least square.
Q12. Explain with suitable example, why predictions outside the bounds of independent variables are unreliable.
Q13. Explain simplex-lattice design in optimization process with suitable example.

:::::25/04/2022:::::