

List I	List II
A. Binomial distribution	i. mean = median = mode
B. Poisson distribution	ii. mean = variance
C. Normal distribution	iii. mean = q/p , var = q / p^2
D. Geometric distribution	iv. mean = np , var = npq

Codes :

	A	B	C	D
a)	i	ii	iii	iv
b)	iv	ii	i	iii
c)	iii	ii	i	iv
d)	iv	iii	ii	i

7. Consider the following statements

[K₂]

- i. Frame null and alternate hypothesis.
- ii. Decide whether null hypothesis is accepted or not.
- iii. Pick the table value corresponding to LOS of the particular distribution.
- iv. Find the test static using the formula.

The correct sequence in testing of hypothesis is _____

- | | |
|----------------|------------------|
| a) i-iv-iii-ii | b) i – ii-iii-iv |
| c) i-iii-ii-iv | d) iii-iv-ii-i |

8. Your investment executive claims that the average yearly rate of return on the stocks she recommends is more than 10.0%. You plan on taking a sample to test her claim. The correct set of hypotheses is

[K₄]

- | | |
|---|---|
| a) Ho: $\mu < 10.0\%$ Ha: $\mu \geq 10.0\%$ | b) Ho: $\mu \leq 10.0\%$ Ha: $\mu > 10.0\%$ |
| c) Ho: $\mu > 10.0\%$ Ha: $\mu \leq 10.0\%$ | d) Ho: $\mu \geq 10.0\%$ Ha: $\mu < 10.0\%$ |

9. Assertion (A): 2 X 2 Latin square is not possible

[K₄]

Reason (R): For $n = 2$, degrees of freedom of SSE = 0 and hence MSE is not defined

- | | |
|---|---|
| a) Both A and R are individually true and R is the correct explanation of A | b) Both A and R are individually true but R is not the correct explanation of A |
| c) A is true but R is false | d) A is False but R is true |

10. Match List I (control chart) with List II and select the correct answer using the code given below:

[K₂]

List I	List II
A. p chart	i. quality variations of the item
B. c chart	ii. number of defectives
C. np chart	iii. proportion of defectives
D. \bar{X} chart	iv. number of defectives in a unit

Codes :

- | | | | | |
|----|-----|-----|-----|-----|
| | A | B | C | D |
| a) | i | ii | iii | iv |
| b) | iv | ii | i | iii |
| c) | iii | ii | i | iv |
| d) | iv | iii | ii | i |

PART B (10 x 2 = 20 Marks)

11. Mean of 20 values is 45. If one of these values is to be taken 64 instead of 46. Compute the corrected mean. [K₃]
12. If $r = 0.8$ and $b_{xy} = 1.2$ $SD_x = 2.4$, evaluate SD_y & b_{yx} . [K₃]
13. Two events A and B are independent with $P(A) = 0.5$, $P(B) = 0.8$. Find the probability that neither of the event occurs. [K₂]
14. A continuous random variable X has a p.d.f $f(x) = 3x^2$ $0 \leq x \leq 1$. Find 'a' such that $P(X \leq a) = P(X > a)$. [K₃]
15. If a Poisson variable X is such that $P(X = 1) = 2P(X = 2)$. Calculate $P(X = 0)$ and $V(X)$. [K₃]
16. Let X and Y be independent normal variate with means 1 and 2 and variance 4 and 3. Find mean and variance of $X + 2Y$. [K₂]
17. In a city, a sample of 500 people, 280 are tea drinkers and the rest are coffee drinkers. Can we assume that both coffee and tea are equally popular in this city at 5% level of significance? [K₄]
18. In a paired t – test for difference of means, $\bar{d} = -4$, $S = 8.94$, $n = 10$, find the value of the test statistic? [K₃]
19. Discuss the uses of analysis of variance? [K₂]
20. When will you say that the process is in control? [K₃]

PART C (6 x 5 = 30 Marks)

21. Calculate the standard deviation for the following data: [K₄]
14, 22, 9, 15, 20, 17, 12, 11
22. A discrete Random Variable has the following probability distribution. [K₃]

x :	0	1	2	3	4	5	6	7	8
P(x) :	a	3a	5a	7a	9a	11a	13a	15a	17a

Find (i) The value of a (ii) variance of X (iii) distribution function of X.
23. Identify a binomial distribution for the following data [K₂]

x :	0	1	2	3	4	5	6	Total
f :	5	18	28	12	7	6	4	80
24. Two researchers adopted different sampling techniques while investigating the same group of students to find the number of students falling into different intelligence level. The results are as follows: [K₄]

Research	Below average	Average	Above average	Excellent	Total
X	86	60	44	10	200
Y	40	33	25	2	100
Total	126	93	69	12	300

Would you say that the sampling techniques adopted by the two researchers are significantly different?

25. Given below are the values of sample mean \bar{X} and sample range R for 10 samples, each of size 5. Draw the mean chart and comment on the state of control of the process. [K₄]

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

26. Two independent samples are chosen from two schools A and B and a common test is given in a subject. The scores of the students are as follows: [K₃]

School A : 76 68 70 43 94 68 33
 School B : 40 48 92 85 70 76 68 22

Can we conclude that students of school A perform better than students of school B.

PART D (4 x 10 = 40 Marks)

27. From the following regression equations $8X - 10Y = -66$, $40X - 18Y = 214$ [K₄]

Calculate (i) Average values of X and Y

(ii) Correlation coefficient between the two variables

(iii) Standard deviation of Y

28. Compute the moment generating function (M.G.F) of the distribution: [K₄]

$$f(x) = \begin{cases} K e^{-Kx}, & x > 0 \\ 0 & \text{otherwise} \end{cases}$$

Hence find (i) Mean (ii) Variance (iii) μ'_3 (iv) μ'_4

29. In a test on 2000 electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and S.D of 60 hours. Estimate the number of bulbs likely to burn for (i) more than 2150 bulbs (ii) less than 1950 hours (iii) more than 1950 hours but less than 2160 hours. [K₅]

30. A tea company appoints four salesmen A, B, C and D observes their sales in three seasons – 'Summer', 'Winter' and 'Monsoon'. The observed figures (Rs. in lakhs) of their sales are given below: [K₅]

	A	B	C	D
Summer	13.2	20.3	15.4	16.7
Winter	10.7	18.2	12.6	14.2
Monsoon	15.6	24.8	16.4	18.3

Carry out suitable analysis of variance and judge the best salesman if any at 5% level of significance.
