SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **Mock Exam -1 Feb.2016**	**Course:** II PUC **Subject:** **Statistics** **Max. Marks:** 100 **Duration:** 3:15 Hrs.

Instructions:

DO NOT write or mark anything on the question paper

i) All working steps should be shown clearly

ii) Scientific calculators may be used.

iii) Statistical tables and graph sheets will be supplied on request.

PART – A

I. Answer any TEN of the following questions. 10 x 1 = 10

1. Define Survival rate.
2. Write the formula for unweighted geometric mean index number.
3. Name the index number which satisfier circular test.
4. Give an example for 'Secular trend' in the time series Analysis.
5. What is the range of Poisson variate?
6. What is the median of the normal distribution?
7. What is point estimate?
8. When is the pooling done in testing of goodness of fit?
9. When will t-variate tends to standard Normal Variate?
10. What is pure strategy?
11. Define feasible solution in L.P.P.
12. In $\bar{X}$ chart if one of the sample mean lies outside the control limits, what would you conclude?

PART – B

II. Answer any TEN of the following questions. 2 x 10 = 20

13. Write the two sources of vital statistics.
14. Write the two norms for selecting the base year in the construction of index number.
15. If Laspeyre's and Fisher's indices are 110 and 110.5 respectively, then find Paasche's index number.
16. Mention the components of time series.
17. Write down the conditions for application of Binomial expansion method of interpolation.
18. Under what conditions does the binomial distribution tends to Poisson distribution.
19. If Q_1= 30 and Q_3 = 70, find mode of the Normal distribution.
20. Size of two samples are 40 and 54, population standard deviations are 10 and 9 compute S.E $\left(\bar{x}_1 - \bar{x}_2\right)$.
21. If $\left(\bar{x}_1 - \bar{x}_2\right)$=2.6 and S.E $\left(\bar{x}_1 - \bar{x}_2\right)$=1.3, find test statistic.
22. Write LCL and UCL for np-chart when standards are given.
23. Write two characteristics of a competitive game.

24. Which of these two feasible solutions (12,10) and (14,4) of an L.P.P maximizes the objective function Z= 5x+4y .

Section - C

III. Answer any EIGHT of the following questions. 8 x 5 = 40

25. Compute NRR and TFR from the following data.

Age (in years)	Female Population	No. of live births to Women
15 - 19	12,000	500
20 - 24	18,000	800
25 - 29	13,000	1,200
30 - 34	17,000	1,100
35 - 39	9,000	400
40 - 44	7,000	150
45 - 49	4,000	40

26. Explain the steps in the construction Price Index Number.

27. Compute the cost of living index number for the data given below.

Items	Price in (₹)		Weights
	Base year	Current year	
A	100	125	50
B	45	135	5
C	50	200	10
D	20	75	10
E	40	40	15
F	50	300	10

28. Find five yearly moving averages for the following time series.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Value	10	15	18	21	25	30	33	40	50

29. From the following table find out the number of workers earning wages below ₹ 25 (00's)

Wages (00's)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of workers	50	80	100	75	40	25

30. In a city on an average 12 accidents take place in 30 days. Find the number of days in a year in which
(i) 2 accidents takes place
(ii) at least 3 accident takes place

31. On 60 different days the number of passengers in a bus were noted. The mean and S.D of the number of passengers was found to be 40 and 5 respectively. At 5% level of significance, test the hypothesis that the average number of passengers in the bus is more than 38.

32. Following are the points scored by five students in competition 1,13,9,5,7.
Test at 5% level of significance that the population variance is less than 15.

33. Mean and Standard deviation of heights of two localities regarding persons gave the following results.

Sample	Locality A	Locality B
Size	12	8
Mean (cms)	175.3	177.7
S.D (cms)	4.2	3.7

Can we conclude at 5% level of significance that the population of locality A on an average are shorter than locality B?

34. Ten samples each of size 50 items were inspected and the numbers of the defectives in each of them were as follows.

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	1	3	4	2	3	4	1	2	3	2

Draw control chart for the above data and interpret the same.

35. A firm is considering replacement of a machine whose purchase cost is ₹ 5000. Its resale value ad running costs for successive years are given below.

Year	1	2	3	4	5	6	7	8
Running Cost (₹)	1500	1600	1800	2100	2500	2900	3400	4000
Resale value (₹)	3500	2500	1700	1200	800	500	500	500

Suggest the optimal replacement period.

36. Solve the following game using minimax - maximin principle. Is the game fair?

		Company Y		
		A	B	C
Company X	P	1	-1	3
	Q	2	-1	2
	R	-1	0	0
	S	2	0	4

Section -D

IV. Answer any Two of the following. **2 x 10 = 20**

37. The following table gives the age and sex composition of a population along with the number of live births in a year. Compute CBR, GFR and ASFRs.

Age (years)	Population		No. of live births to women
	Male	Female	
0 - 4	9850	8970	0
14 - 19	3150	3010	115
20 - 24	3350	3113	455
25 - 29	3425	3200	596
30 - 34	3315	3115	355
35 - 39	3012	2810	105
40 - 44	2010	1878	12
45 - 49	1815	1695	5
50 and above	1900	1800	0

38. Calculate Laspeyer's, Marshall-Edgeworth, Fisher's and Dorbish- Bowley's quantity index numbers.

Item	Base year		Current year	
	Price	Quantity	Price	Quantity
A	30	40	50	45
B	25	20	35	25
C	35	30	45	30
D	40	50	50	60
E	45	10	55	15

39. Fit a second degree equation of the form $y = a + bx + cx^2$ to the following data regarding profits and estimate the profit for 1990.

Years	1985	1986	1987	1988	1989
Profits (In '000s ₹)	10	12	13	10	8

40. The following data were obtained for number of defective items for a sample of size 500 samples during a week.

No. of defective items	0	1	2	3	4	5
No. of Samples	170	180	120	20	8	2

Test at 5% level of significance that the Binomial distribution is a good fit.

Section - E

V. Answer any Two of the following **2 x 5 = 10**

41. If X is normally distributed with mean 50 and variance 25, then find (i) $P(X \leq 48)$ ii)$P(X \geq 54)$

42. It is required to test whether those who practice yoga have average blood sugar less than 120. A sample consisting of 35 persons who practice yoga is observed. If their mean sugar is 114 and S.D is 8 what would you conclude? (use 1% level of significance)

43. Among 64 offspring of certain cross breed of guinea pigs, 34 were red, 10 were black and 20 were white. According to genetic model these numbers should be in the ratio of 9:3:4. Are the data consistent with model at 5% level of significance ?

44. Find the Initial basic feasible solution to the transportation problem given below by matrix minima method.

		Destination			
		P	Q	R	Supply
Origin	A	5	7	8	70
	B	4	4	6	30
	C	6	7	7	50
	Demand	65	42	43	150

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