SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bengaluru. **Mock Paper-1**	**Course:** II PUC **Subject:** **Statistics** **Max. Marks:** 100 **Duration:** 3 hrs

SECTION-A

I. Answer any TEN of the following questions. **10x1=10**

1. Define expectation of life.
2. Theoretically which is the best average for the construction of index numbers?
3. What is meant by fixed base index number?
4. Give an example for random variation.
5. Give an example for a Poisson variate.
6. In the following p.d.f what is standard deviation?

$$f(x)=\frac{1}{5\sqrt{2\pi}}e^{1/2}\left(\frac{x-25}{5}\right)^2, -\infty<\times<\infty, \sigma>0$$

7. In a chi-square test for goodness of fit, if there are 5 classes and if two parameters are estimated, what are the degrees of freedom of the test statistic?
8. What is size of a test?
9. What is critical value?
10. Define Acceptance sampling.
11. What is the principle adopted for replacement of equipments which deteriorates with age?
12. What do you mean by value of a game?

SECTION-B

II. Answer any TEN of the following questions. **10x2=20**

13. The quinquennial age specific fertility rates for women of child bearing age group of a community are 20, 116, 177, 125, 130, 4 and 2.5 compute TFR.
14. Explain circular test?
15. If $\sum q_1 p_1 = 280$ and $\sum q_0 p_0 = 250$ then find a suitable index number.
16. Write down two demerits of moving averages method.
17. State the conditions for the application of binomial expansion method of interpolation and extrapolation.
18. State any two features of students't distribution.
19. What is (i) an estimator (ii) an estimate?
20. Compute S.E (p_1-p_2) given $n_1 = 80, n_2 = 40, P_1 = 0.8$ and $P_2 = 0.4$.
21. Define parameter space and sample space.
22. If $p^1 = 0.23$ and n = 100 then find the value of upper control limit for np-chart.
23. Mention any two advantages of inventory.
24. Define pure strategy and mixed strategy.

SECTION-C

III. Answer any EIGHT of the following questions. **8x5=40**

25. From the following data find which town is healthier?

Age in years	Town A (standard Population)		Town B	
	Population	Deaths per thousand	Population	Deaths per thousand
0-20	4,000	7.5	3,000	10
20-40	12,000	3.33	20,000	5
40-60	6,000	10	4,000	10
60 and above	8,000	8.75	3,000	20

26. Define 'Index Number' and write the limitations of Index numbers.

27. Calculate weighted G.M price Index number for the year 2014 from the following data.

Items		**A**	**B**	**C**	**D**	**E**	**F**
Price in Rs	**2013**	20	20	25	16	85	16
	2014	24	25	32	20	16	18
Weights		16	12	10	15	13	25

28. Calculate 5 monthly moving averages for the following data regarding the number industries in profit in India.

Months	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Number Industries	25	28	30	34	22	14	14	12	11	15	13	16

29. Interpolate the amount of premium to be paid for a policy at the age of 22 years.

Age (in years)	20	25	30	35	40	45
Premium	8	19	32	45	50	65

30. In a Poisson distribution $P(x=3)=P(x=4)$. Find its

(a) Mean and standard derivation.

(b) $P(x=1)$

31. There are 25 males and 32 females working in a government office. A committee is to be formed by selecting 5 persons at random from the office. Find the probability that committee formed has 2 males and also find the probability that committee formed has atleast 1 male.

32. Samples of two types of electric light bulbs were tested for length of life and the following data is obtained.

	Brand A	**Brand B**
Sample size	15	10
Sample means (in hrs)	1600	1700
Sample S.D (in hrs)	540	70

Is Brand A bulbs superior to Brand B bulbs regarding length of life? (use α=1%)

33. The standard deviation of height of plants is known to be 2cms. Eight randomly selected plants have heights 172, 156, 154,163,169,170,164 and170 cms. Test whether sample standard deviation differs significantly from population standard deviation.

34. For the following data find out the control limits for $\overline{X}$ – chart.

Sub group Number	1	2	3	4	5	6
Mean	50	48	49	52	50	48
Range	9	11	12	10	9	10

35. Solve the following L.P.P graphically.

Maximum $Z=2000x+4000y$

s.t $x-2y\geq 10$

$x+2y\leq 30$

and $x, y\geq 0$

OR

(For visually challenged students only)

Consider a diet problem in which a college student is interested in finding a least cost diet that provides 20 units of vitamin A and 12 units of vitamin B from the two types of foods available.

Food	**A**	**B**
Vitamin A	2	1
Vitamin B	1	2
Cost in ₹. (per unit)	12	20

Formulate the L.P.P

36. The demand for an item is ₹ 7,000 units per year. The cost of placing an order is ₹ 300 per year. The holding cost is ₹ 10 per unit per year. The shortage cost is ₹ 3 per unit per year. Find
(i) Economic order quantity
(ii) Minimum annual average inventory cost
(iii) Maximum shortage level.

SECTION-D

IV. Answer any TWO of the following questions. **2x10=20**

37. Calculate GRR and NRR for the following data and comment on the result.

Age group (in years)	**Female**	**Female**	**Survival**
15-19	10,000	200	0.91
20-24	9,000	360	0.90
25-29	8,000	480	0.89
30-34	7,000	280	0.88
35-39	6,000	180	0.87
40-44	5,000	100	0.86
45-49	4,000	40	0.85

38. For the following data, compute Fisher's price Index number. Show that Fisher's Index number satisfies TRT and FRT.

Items	**Base year**		**Current Year**	
	Price	**Expenditure**	**Price**	**Expenditure**
A	96	768	90	900
B	72	432	100	500
C	90	1080	160	2400
D	100	1400	88	704

39. For the following data fit a straight line trend, find trend values also estimate the production of 2017 and plot the trend values.

Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Production (in tons)	79	83	90	94	90	95	99

40. (a) Five unbiased coins are tossed 128 times. Calculate the expected frequencies for the number of heads obtained.
(b) Seventy accidents that have occurred in a state in a week are tabulated as follows.

Day	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Accidents	7	8	11	12	5	13	14

Test whether accidents occur uniformly throughout the week. [Given K_2=16.8]

SECTION-E

V. Answer any Two of the following questions. **2x5=10**

41. The weights of 1000 Karnataka youths are normally distributed with mean 62 kgs and standard deviation 8.2 kg find the number of Karnataka youths with weight (i) Less than 68 kgs (ii) between 65 and 72kgs.

42. The CEO of a large electric company claims that 80% of his customers are very satisfied with the service they receive. To test this claim the local newspaper surveyed 100 customers among the sampled customers 73 percent say they are very satisfied. Based on the findings can we reject the CEO's claim? Use 1% level of significance.

43. Following is the data regarding mean weights of randomly selected boys and girls of PUC students. Test whether mean weight of girls is more than mean weight of boys.

Sample	**Boys**	**Girls**
size	68	50
Mean	52kg	58kg
S.D	8kg	12kg

44. For the following transportation problem find initial basic feasible solution by NWCR method. Compute transportation cost. Is the solution degenerate?

		Ware house				a_i
		D_1	D_2	D_3	D_4	
Factory	**A**	19	30	50	10	7
	B	70	30	40	60	9
	C	40	8	70	20	18
b_j		7	8	5	14	34

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