



JAIN COLLEGE, J C Road Bangalore
Mock Paper -1, January - 2019
II PUC – Statistics (31)

SECTION-A

I. Answer ALL the questions each carry one mark.

1. Define expectation of life?
2. What is the value of the index number for the base year?
3. Define price relative.
4. What component of a time series is associated with: - Fall in death rate due to advance in science.
5. Write the relationship between mean and variance of a binomial distribution.
6. Name the distribution for which variance and S.D are equal.
7. What is one tailed test?
8. If $P=0.02$ and $n=64$, then find S.E (p).
9. What is critical value?
10. Which type of variation can be detected with the help of statistical quality control?
11. In a rectangular game, if saddle point exists and maximin is -4, what is the value of minimax?
12. What is an unbalanced transportation problem?

SECTION-B

II. Answer ALL the questions each carry two marks.

13. Generally what is the child bearing age for women? What is life table?
14. Why Fisher's index number is called 'Ideal Index Number'?
15. If Laspeyre's index is 92 and Fisher's index is 95, then find Paasche's index.
16. Mention the demerits of moving average.
17. Write down the conditions for application of Binomial expansion method of interpolation.
18. Mean and variance of a normal distribution are 12 and 4 respectively. Find lower and upper quartiles.
19. If the parameter of a t-distribution is 8, find the mean and median.
20. Define: (i) Point estimation. (ii) Interval estimation.
21. Define (i) Type I error. (ii) Type II error.
22. Mention two advantages of acceptance sampling.
23. In an LPP define (i) Decision variable. (ii) Objective function.
24. What are advantages and disadvantages of Inventory?

SECTION-C

III. Answer ALL the questions each carry five marks.

25. Compute the total fertility rate from the following data and give your conclusion.

Age group (in yrs)	Female Population	Birth
15-19	14,000	840
20-24	15,000	1350
25-29	14,000	2800
30-34	12,000	1,200
35-39	13,000	1040
40-44	12,000	960
45-49	11,000	550

26. Define index number. Mention three limitation of index number.
27. A family budget enquiry revealed that the average expenditure of the families on food, clothing, house rent, fuel and miscellaneous are 30%, 10%, 20%, 15% and 25% respectively. If the respective group indices are 160, 170, 150, 220 and 200. Find the consumer price index number.
28. Find 3 yearly moving averages for the following time series. Give your conclusion.

year	2001	2002	2003	2004	2005	2006	2007	2008
value	100	120	150	160	170	190	200	210

29. Using Newton's forward difference method find the number of employees earning wages more than Rs. 450/-per day.

Wages	<300	<400	<500	<600
No. employees	75	120	175	250

30. The incidence of an occupational disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of 6 workers 4 or more contract the disease?
31. Write any five properties of a normal distribution.
32. A machine is designed to fill 500 ml of milk to polythene bags. A randomly selected 100 milk bags filled by this machine are inspected. The mean milk is found to be 498 ml and S.D is 10 ml . Is the machine functioning properly at 5% level of significance?
33. A random sample of 100 workers from South India shows that their mean wage is Rs.146 per day with S.D Rs.20. A random sample of 150 workers from North India shows that their mean wage is Rs.150 per day with S.D Rs.30. Test at 1% level of significance that mean wages of South Indian is less than mean wages of North Indian.
34. In a palm oil packaging company, the palm oil is filled in tins. Sample of 4 tins are selected at regular intervals. The following data reveals the mean and range of weight of tins. Construct suitable chart.

Sub group	1	2	3	4	5	6
Sample mean	10	18	11	14	9	19
Sample range	8	7	4	10	8	5

35. A small manufacturer employs 5 skilled men and 10 semi- skilled men for making a product of two qualities, a special material and an ordinary material. The production of a special model requires 2 hours of a skilled man and 3 hours of a semi-skilled man. The ordinary model requires 1 hour of a skilled man and 2 hours of a semi-skilled man. According to worker union rules, no man can work more than 8 hours per day. The profit of each special model is Rs.10 and that of each ordinary model is Rs.8. Formulate a L.P.P. such that the total profit is maximised.
36. The purchase price of machine B is Rs.8000. Its salvage rates and maintenance costs are as below. What would be the optimum replacement period? What would be the annual average cost?

Age	1	2	3	4	5
Salvage rates	4500	3500	2500	1500	500
Maintenance costs	500	600	800	1100	1500

SECTION-D

IV. Answer ALL the questions each carry ten marks:

37. From the following, compute the standardized death rates for locality A and locality B , taking locality A as standard and comment.

Age-group (in years)	Locality A		Locality B		Standard population
	Population	Deaths	Population	Deaths	
0-4	4000	60	8000	80	6000
5-14	9000	45	13000	65	17000
15-64	7000	70	10000	90	13000
65&above	3000	120	4000	200	4000

38. Verify whether Fisher's index number satisfies TRT and FRT.

Commodity	Base year Price	Base year Expense	Current year Price	Current year Expense
A	12	96	10	90
B	18	72	20	100
C	15	90	20	160
D	20	100	22	88
E	10	90	08	64

39. Fit a parabolic trend for the following time series data. Also estimate the value for 2011.

Year	2004	2005	2006	2007	2008	2009	2010
values	14	16	20	28	42	61	81

40. Fit a binomial distribution for the following data and test at 5% level of significance that Binomial is a good fit.

No. defective item	0	1	2	3	4	5	6	7	8	9	Total
No. samples	3	8	11	15	16	14	12	11	9	1	100

SECTION-E

V. **Answer ALL the questions each carry five marks:**

41. Heights of 360 children are normally distributed with mean 120cms and variance 4cms^2 . Find the number of children with height (1) greater than 118cms. (2) between 116cms and 119cms.
42. In a random sample of 1000 persons from a large population, 470 are women. Can we conclude that men and women are in the equal ratio in the population?
43. From the following data test whether the attribute 'smoking' and 'literacy' are independent. Using 5% level of significance.

	Smokers	Non-smokers	Total
Literate	7	18	25
Illiterate	13	12	25
Total	20	30	50

44. The demand for a commodity is at a constant rate of 200 units per year. There is an inventory in which setup cost is Rs.800 per production run, holding cost is Rs.10 per unit per year and shortage cost is Rs.12 per unit per year. Find the economic order quantity and maximum shortage level.



JAIN COLLEGE, J C Road Bangalore
Mock Paper -2, January - 2019
II PUC – Statistics (31)

SECTION-A

I. Answer ALL the questions each carry one mark:

1. Define radix?
2. Which index number shows upward bias?
3. State any one norm (consideration) for the selection of base year?
4. Which component of time series is associated with deaths due to tsunami?
5. Write an example for a Bernoulli variate.
6. If variance of chi-square distribution is 8, find its mean.
7. What is parameter?
8. Define level of significance.
9. What is interval estimation?
10. In C-chart if one of the sample mean lies outside the control lines/limits, what would you conclude?
11. Define rectangular game.
12. Write down one advantage of inventory.

SECTION-B

II. Answer ALL the questions each carry two marks:

13. In a town in a year 2000 live births occurred and of these live births in 10 cases, the mother died due to child birth, compute MMR.
14. Comment on the statement "Index numbers are economic barometer's".
15. If $\sum p_{0q} = 1400$ and $\sum p_{1q} = 1650$. Compute suitable index number.
16. Diagrammatically represent 'Business Cycle' with stages.
17. Expand $(y-1)^5 = 0$ the binomial expansion.
18. If the parameter of t-distribution is 6, then find its variance?
19. Write two features of Chi-square distribution.
20. Write down two utilities of standard error.
21. Define size and power of a test.
22. From the manufacturing process the mean fraction defectives are known to be 0.12. For a sample size of 40, write down the suitable control limits.
23. Mention two method of obtaining initial basic feasible solution for a transportation problem.
24. Given $R = 1000$ units/month, $C_3 = \text{Rs } 350$ and $C_1 = \text{Rs } 0.20/\text{unit/month}$ find Q_0 .

SECTION – C

III. Answer ALL the questions each carry five marks:

25. Calculate Net reproduction rate for the following data.

Age group	Female population	Female births	Survival ratio
15-19	50000	1250	0.90
20-24	60000	2400	0.90
25-29	60000	1500	0.90
30-34	40000	1000	0.85
35-39	30000	300	0.85
40-44	25000	250	0.75
45-49	20000	50	0.75

26. Explain the steps involved in construction of consumer price Index number.
 27. Compute the cost of living Index number by Aggregative Expenditure method.

Commodity	Base Year		Current year price(Rs.)
	Price	Expenditure	
Rice	12	240	17
Sugar	14	70	16
Tea	13	39	25
Pulses	10	40	25
Fuel	11	66	30
Others	8	72	25

28. Obtain the four yearly moving averages method for the following time series and give conclusion.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	75	60	55	60	65	70	70	75	85	70

29. The table shows that the expectation of life at different ages. Interpolate the expectation of life at the age 26

Age	15	20	25	30	35
Expectation of life	30	29	27	24	20

30. A car hire agency has two cars. On an average there is a demand for one car during a particular hour. What is the probability that (i) both the cars are free (ii) some demand is refused.
 31. In a village $\frac{1}{3}$ of the people are literates. If 100 investigators meet 5 persons each to see if they are literates, then how many investigators would you expect to report that 2 or more were literates.
 32. Two different types of drugs A and B were tried on certain patient for increasing weight. 5 persons were given drug A and 7 persons were given drug B. the increase in weight in pounds is given below.

Drug A	8	12	13	9	3		
Drug B	10	8	12	15	6	8	11

33. It is required to test whether those who practice yoga have average blood sugar less than 120. A sample consisting of 17 persons who practice yoga is observed. If their mean blood sugar is 108 and S.D. is 8. What would you conclude? (Use 5% L.O.S)
 34. 10 samples each of size 50 items were inspected and the numbers of the defectives in each of them as follows. Draw control chart for the data and interpret the same.

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

35. A company sells two different products A and B. The company makes a profit of 40 & 30 per unit of products A and B respectively. The two products are produced in a common production process. The production process has a capacity of 30000, man hours. It takes 3hrs to produce one unit of A and one hour to produce one unit of B. the company officials feel that the maximum number of units of A that can be sold is 8000 units and the maximum number of units of B that can be sold is 12000units. Formulate L.P.P.

36. Is the solution obtain by MMM for the following T.P degenerated?

Factory	Warehouse				Supply
	D1	D2	D3	D4	
O1	19	30	50	10	7
O2	70	30	40	60	9
O3	40	8	70	20	18
Requirement	7	8	5	14	34

SECTION – D

IV. Answer ALL the questions each carry ten marks:

37. Form the following data, calculate TFRs and compare the fertility of two cities..

Age group [In years]	Female population		Number of live births	
	City A	City B	City A	City B
15-19	14000	47000	1204	1222
20-24	15000	50000	2295	7400
25-29	14000	46000	2590	9660
30-34	12000	44000	1236	5544
35-39	13000	40000	936	1360
40-44	12000	39000	288	507
45-49	11000	30000	33	60

38. Find Marshall-Edgeworth's , Dorbish- Bowely's and Fisher's Price Index number for the data given below.

Items	2006		2008	
	Quantity	Value	Quantity	Value
Rice	25	750	30	960
Wheat	30	450	25	550
Dal	5	250	6	360
Sugar	6	90	7	210
Milk	10	140	10	190
Spices	4	48	5	65

39. The following figures give the annual production of a commodity. Estimate the output in 2011. Use

$$y=a+bx+cx^2$$

Years	2004	2005	2006	2007	2008	2009	2010
production	12	10	14	11	13	15	16

40. The following data is regarding number of mistake per page found in a book. Fit a Poisson distribution. Test at 5% L.O.S. that it is a good fit.

No. of mistakes	0	1	2	3	4
No. of pages	31	34	21	12	2

Fit a Poisson distribution to the data and show that the distribution is not good fit.

SECTION – E

V. Answer ALL the questions each carry five marks.

41. The weekly wages of workers are normally distributed with mean Rs. 200 and S.D. Rs. 50. Find the probability of workers whose weekly wages will be (i) more than Rs. 300 (ii) less than Rs.250
42. The standard deviation of the production of paddy is assumed to be 10.6tons. A sample of 20 acres showed that the standard deviation is8.3 tons. Test at 1% level of significant whether the standard deviation of production of paddy is less than 10.6 tons.
43. Of the 500 workers in a factory exposed to an epidemic 350 in all were attacked, 200 had been inoculated and of these 100 were attacked. Test whether inoculation and attack are independent.
44. The cost of a scooter is Rs.36000. Its maintenance cost and resale value at different age given below.

Years of service	1	2	3	4	5	6
Maintenance cost	800	1300	1900	2700	3900	5400
Resale value	28000	22000	20000	18000	17000	16000