



JAIN COLLEGE, J C Road Bangalore
Mock Paper -1, January - 2017
II PUC – Statistics (31)

SECTION-A

I. Answer ALL the questions.

1. Define vital statistics.
2. Index number for the year 1995 is 230 with respect to the base year 1990. What is your conclusion?
3. Define CLI.
4. Which component of time series is associated with the following statement “deaths of 100 people due to earthquake”?
5. Define Bernoulli trial.
6. Mention the range of hyper geometric distribution.
7. What is standard error?
8. Define type 2 error.
9. What is statistic?
10. What are control charts?
11. If in a game the pay off at saddle point is 4, what is the value of minimax?
12. Write the formula of EOQ for model 2.

SECTION-B

II. Answer ALL the questions.

13. In a community in a specific year 4000 births occurred. In the case of 40 of the above, the mother died due to child birth complications. Calculate MMR.
14. Why Fisher's index number is called as ideal index number?
15. Mention 2 uses of Consumer price index numbers.
16. Mention a merit and demerit of measuring trend by the method of moving averages.
17. Mention the differences between interpolation and extrapolation.
18. In a P.D, $p(X=2)=p(X=4)$. Find $P(X=4)$
19. Mention the conditions under which binomial distribution tends to Poisson distribution.
20. Define size of a test and level of significance.
21. A lot contains 2% defective items. 40 items chosen from it. Another lot contains 1% defective items. 60 items are chosen from it. Find $SE(p_1-p_2)$.
22. Mention differences between SSP and DSP.
23. Mention the steps involved in formulation of LPP
24. Mention 2 disadvantages of inventory.

SECTION-C

III. Answer ALL the questions

25. Calculate net reproduction rates for the following data and comment.

AGE GROUP	15-19	20-24	25-29	30-34	35-39	40-44	45-49
FEMALE POPULATION	1390	1420	1521	1756	1451	1689	1667
FEMALE BIRTHS	15	95	103	75	32	11	1
SURVIVAL RATES	0.96	0.96	0.96	0.95	0.95	0.94	0.92

26. Explain the characteristics and limitations of index numbers.
27. Calculate weighted AM and comment.

ITEMS	WEIGHTS	2005 PRICE	2010 PRICE
A	5	6	18
B	4	15	27
C	8	8	12
D	2	12	24

28. Calculate 3 yearly moving averages and comment

Years	2002	2003	2004	2005	2006	2007	2008	2009	2010
Profits	12	16	8	20	24	36	32	40	42

29. interpolate the production for the years 1989 and 1991 with the help of the following data

Year	1986	1987	1988	1989	1990	1991
Production	120	122	126	?	135	?

30. Explain the properties of normal distribution with examples.

31. There are 20 fruits in a basket, out of which 8 are mangoes and rest are oranges. A girl picks 5 fruits at random from the basket, find the probability that she gets 3 mangoes.

32. A specified brand of automobile tire is known to average life of 10000 km with a SD of 500 Km. A random sample of 36 tires of this brand, when tested resulted in the average life of 9800 km. regarding quality what is your conclusion at 1% level of significance.

33. The marks scored by 9 students in tests conducted before and after coaching are as follows, verify whether there is a significant difference between the marks.

Marks before coaching	37	76	54	43	84	53	67	13	35
Marks after coaching	48	82	71	56	89	58	63	17	30

34. Construct x and R charts for the following data (sample size n=4).

Sub groups	1	2	3	4	5	6	7	8
Mean	52	48	53	49	50	48	53	48
Range	10	11	8	12	9	10	9	11

35. For the following transportation problem obtain the initial basic feasible solution by matrix minima method

		D1	D2	D3	Availability
Factories	O1	2	17	27	5
	O2	3	3	9	8
	O3	5	9	7	7
	O4	1	6	2	14
	Requirement	7	9	18	34

36. The demand for a commodity is at a constant rate of 200 units per year. There is an inventory in which the set up cost is Rs.800 per production run, holding cost is Rs. 10 per unit per year. Determine an optimum inventory policy.

SECTION-D

IV. Answer ALL the questions

37. Calculate GFR, TFR and number of children born per women for the following data.

AGE (IN YEARS)	FEMALE POPULATION	LIVE BIRTHS
15-19	1500	100
20-24	2000	400
25-29	1800	560
30-34	2500	350
35-39	1500	50
40-44	2400	20
45-49	1800	8

38. Calculate all price index numbers for the following data.

ITEMS	1995 QUANTITY	1996 QUANTITY	1995 VALUE	1996 VALUE
A	100	150	500	900
B	80	100	320	500
C	60	72	120	360
D	30	33	360	297

39. (a) Explain the components of time series with examples.

(b) draw a trend line by the method of semi moving averages.

YEARS	2002	2004	2006	2008	2010	2012	2014	2016
SALES	412	438	444	454	470	480	490	500

40. A group of 5 patients treated with medicine A weighs 42,39,48,60 and 41 kgs. Second group of 7 patients from the same hospital treated with medicine B weighs 38,42,56,61,69,68 and 67 kgs. Do you agree the claim that medicine B increases the weights significantly.

SECTION-E

V. Answer ALL the questions

41. Daily wages of 60 workers are normally distributed with mean Rs 500 and SD Rs 40. Find the number of workers getting wages between
 (i) below Rs.530
 (ii) between Rs 380 to Rs460
42. A random sample of 400 tins of vanaspati has mean weight of 4.96 kgs and standard deviation of 0.4kgs. test at 1% level of significance that the average weight of tins of vanaspati is 5 kgs.?
43. 70 accidents that have occurred in a state in a week are tabulated as follows:

Day	sun	mon	tue	wed	thu	fri	Sat
Accidents	7	8	11	12	5	13	14

Test whether accident occurs uniformly throughout the week.

44. Graphically solve the following L.P.P.

Maximize : $Z = 50x + 30y$

Subject to : $5x + 4y \geq 40$

$2x + 5y \geq 10$

and $x, y \geq 0$



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Mock Paper -2, January - 2017
II PUC – Statistics (31)

SECTION-A

I. Answer ALL the questions

1. Define fecundity.
2. Mention one limitation of index numbers.
3. If the cost of living index for a current period is 90, then what would you conclude?
4. What is chance cause of variation?
5. Define a poisson variate.
6. A Bernoulli variate has parameter 0.5, what is the probability that the variable takes value 0?
7. What is the probability that a normal variate take value more than its mean?
8. Define level of significance.
9. Define linear programming problem.
10. What do you mean by a non degenerate solution in TP?
11. What is meant by lead time?
12. Name the chart used for number of defects?

SECTION-B

II. Answer ALL the questions

13. Mention any two methods of obtaining vital statistics.
14. In a life table, if $l_0=100000$ and $T_0=6500000$ years then, find longevity.
15. If Laspeyres index is 142.3 and paasches is 144.1, Calculate dorbish bowley index .
16. Diagrammatically represent 'Business Cycle' with stages.
17. Explain interpolation and extrapolation.
18. In a Normal distribution. If $SD = 09$, then find QD and MD.
19. The first two frequency terms of a Poisson distribution are 150 and 180 find the find the next frequency term,
20. Define Null and Alternative hypothesis.
21. What do you understand by unbounded solution ?
22. Mention two situations when replacement is carried out.
23. Write the formula for minimum shortage level in EOQ model with shortage, giving meaning of notations.
24. Give one example each for controlled variables and uncontrolled variables.

SECTION – C

III. Answer ALL the questions

25. Compute the gross reproduction rate from the following data.

Age group	Female population	Female births
15-19	1600	200
20-24	1100	700
25-29	1700	200
30-34	1600	704
35-39	1600	305
40-44	1500	101
45-49	1400	0

26. Explain briefly the steps involved in the construction of consumer price index number.
27. Compute suitable quantity index number from the following data.

Commodity	Quantity consumed		Price in 1990
A	160	170	15
B	90	100	18
C	60	60	13
D	70	60	5

28. Population figures for a place are as given below. Fit a curve of the type $Y = ab^x$ and estimate the population for the year 2021.

Year	1971	1981	1991	2001	2011
Population('000)	15	18	21	23	30

29. Using Newton's forward difference method find the value of 'y' when $x = 29$.

X	15	19	23	27	31
Y	17	18	22	28	35

30. Probability that the gun hitting the target is $1/3$. If 5 gun shots are aimed at the target. Find the probability that (i) 2 shots miss the target. (ii) At least 4 hit the target.
31. In a village $1/3$ of the people are literates. If 100 investigators meet 5 persons each to see if they are literate, then how many investigators would you expect to report that 2 or more were literates.
32. Nine patients, to whom a certain drug was administered, registered the following increments in blood pressure:
7, 3, -1, 4, -3, 5, 6, -4, 1
Show that the data do not indicate that the drug was responsible for these increments.
33. The standard deviation of production of paddy is assumed to be 10.6. A sample of 20 acres showed that the S.D. is 8.3. Test at 1% LOS whether the S.D. of production of paddy is less than 10.6.
34. The following data relates to the number of knitting defects in a unit length of cloth manufactured by a textile mill.

Sample no.	1	2	3	4	5	6	7	8	9	10
No. Of defects	4	5	6	6	3	2	6	7	3	4

- i. Develop control chart with $\lambda^i = 3$.
- ii. Is the process in control?
35. A company sell two different products A and B. The company makes a profit of Rs 40 & Rs 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 30,000, man-hours. It takes 3 hours 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 12,000 units. Formulate the L.P.P
36. Find an allocation of available sources by MMM and compute the transportation cost. Is the solution degenerate?

		To			
		x	Y	z	Availability
	A	8	7	3	60
From	B	3	8	9	70
	C	11	3	5	80
	Requirement	50	80	80	

SECTION-D

IV. Answer ALL the questions

37. Compute crude death rate and standardised death rates for towns X and Y. State which town is healthier taking town X as standard.

Age(years)	Town X		Town Y		Standard population
	Population	Death rates	Population	Death rates	
0-9	13500	10	8700	12	35000
10-29	8900	18	5500	20	15000
30-59	5000	20	3700	24	20000
60 & above	12000	15	6900	18	30000

38. From the following data compute.
i. Marshall-Edgeworth's Price Index number. Also show that Fisher's Price Index number satisfies TRT.

Item	Current year		Base year	
	Price	Quantity	Price	Quantity
A	39	3	58	4
B	41	5	29	2
C	28	8	25	6

D	19	4	26	6
E	15	6	47	8
F	28	2	39	2

39. Fit a first degree trend equation for the following time series and estimate the trend value for 2010.

Year	2004	2005	2006	2007	2008	2009
Sales	79	87	106	111	117	130

40. The following data shows the suicides of 1096 women in 8 Punjab cities during 14 years.

No. Suicides in a state per year	0	1	2	3	4	5	6	7
Frequency	364	376	218	89	33	13	2	1

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

SECTION-E

V. Answer ALL the questions

41. In a office 8 member are non vegetarian and 7 are vegetarian. A committee of 5 members are formed. Find the probability that among the members (i) exactly 2 are vegetarian (ii) Atleast 2 are vegetarian?
42. Mean and SD of heights of persons of two localities gave the following results.

	Locality B	Locality A
Sample	18	10
Mean(cm)	175.8	177.9
S.D.(cm)	4.1	3.8

Can we conclude at 5% L.O.S. that the population of locality A on an average is shorter than locality B?

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. A stockist has to supply 400 units of a product every Monday to his customers. He gets the product at Rs.50 per unit from the manufacturer. The cost of ordering and transportation from the manufacturer is Rs.75 per order. The cost of carrying inventory is 7.5% per year of the cost of the product. Find
- Economic lot size.
 - The minimum average cost.