



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

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**SECTION-A**

**I. Answer ALL the questions.**

1. Define COHORT.
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 trail.
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 S E( $p_1-p_2$ ).
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. Test whether the coaching is effective.

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 charts for mean and range 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 id 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  $x, y \geq 0$



**JAIN COLLEGE, J C Road Bangalore**  
**Mock Paper -2, December - 2017**  
**II PUC – Statistics (31)**

**SECTION-A**

**I. Answer ALL the questions:**

1. Define longevity
2. If the current year price index is 175, what is the index number of base year?
3. Which price of commodities are used in the construction of CPI?
4. Mention a cause for cyclical variation.
5. Write down the PDF of normal distribution.
6. If  $n=4$  for a students' t distribution, find its variance
7. Mention the formula for standard error for difference of proportions when  $P_1=P_2$ .
8. What is null distribution?
9. In a chi square test for goodness of fit, if there are 8 classes and 2 parameters are estimated, then find the values of degrees of freedom of test statistic.
10. Mention a merit of DSP.
11. In an LPP define objective function.
12. In the context of Inventory theory ,give an example of uncontrolled variable.

**SECTION-B**

**II. Answer ALL the questions:**

13. The Quinquennial ASFR's for women of child bearing age of a community are 26, 63,65,46,24,13 and 7. Calculate the average number of children born per women.
14. Briefly explain circular tests.
15. Show that paasche's index number does not satisfy TRT.
16. Diagrammatically represent the stages of business cycle.
17. Write down 2 conditions for application of binomial expansion method of interpolation.
18. The mean and SD of binomial distribution are 8 and 2 respectively. Find the parameters.
19. Find the QD and MD of the ND with mean 30 and SD 6.
20. Define sample space and parameter space.
21. What is power of a test and confidence interval.
22. Differentiate between product control and process control.
23. Differentiate between pure and mixed strategy.
24. Differentiate between balanced TP and unbalanced TP.

**SECTION – C**

**III. Answer ALL the questions:**

25. Calculate GRR for the following data and draw suitable conclusions.

AGE GROUP	15-19	20-24	25-29	30-34	35-39	40-44	45-49
FEMALE POPULATION	1390000	1422000	1521000	1756000	1451000	1689000	1667000
FEMALE LIVE BIRTHS	15133	94155	102676	72490	31402	10640	700

26. Explain the steps of construction of cost of living index numbers.
27. Calculate suitable price index numbers and comment.

Commodity	unit	1990 quantity	1995 quantity	Price in 1990

A	Kg	150	160	10
B	Kg	90	100	12
C	Metre	60	60	15
D	Packets	50	40	9

28. Calculate 4 yearly moving averages and comment

YEARS	2001	2002	2003	2004	2005	2006	2007	2008	2009
PROFITS	796	628	602	583	519	499	451	384	210

29. For the following data interpolate the value for the year 1998

YEARS	1996	2000	2004	2008	2012
SALES	47	84	105	111	114

30. Out of experience, it is known that 1% of the screws manufactured by a firm are defective. Screws are supplied in packets of 100 each. What is the probability that a randomly selected packet has 2 defective screws? Among 3000 packets, in how many packets would you expect defective screws?

31. In a college there are 2100 students. Among them 900 are girls. A computer training centre in the city offers free computer training to 5 randomly selected students of a college. Find the mean and SD of the number of girls selected for computer training.

32. In a random sample of 100 2<sup>nd</sup> puc students 9 are distinction holders. Can we conclude that 10% of 2<sup>nd</sup> puc students are distinction holders?

33. A random sample of size 25 taken from a population gives the sample S.D 8.5. Test the hypothesis that the population SD is 10.

34. The following table gives the number of defectives found during inspection of 8 samples of size 100 each. Draw suitable control chart.

SAMPLE NO.	1	2	3	4	5	6	7	8
NO. OF DEFECTIVES	1	3	2	2	1	0	2	1

35. Solve the following game by principle of dominance

	B1	B2	B3	B4
A1	2	4	1	3
A2	-1	-2	0	-2
A3	-3	5	-2	0

36. The cost of the machine is Rs.6600 and its resale value is Rs. 600 . If the maintence cost is Rs.1000 for the 1<sup>st</sup> year and increases by Rs.500 then when the machine should be replaced.

#### SECTION-D

#### IV. Answer ALL the questions:

37. Calculate STDR for the following data and comment which village is healthier.

Age yrs	Standard population	Village a		Village b	
		population	Deaths	population	Deaths
0-20	20000	8000	128	4000	72
20-50	30000	13000	65	9000	54
50-70	35000	10000	140	7000	98
70 and above	15000	4000	252	3000	129

38. Verify whether fishers index number satisfies TRT and FRT.

Commodity	Base year	Base year	Current year	Current year
	price	quantity	Price	Quantity
A	5	25	6	30
B	10	5	15	4
C	3	40	2	50
D	6	30	8	35

39. Fit a parabolic trend for the following data and estimate production for the year 2009.

Years	2001	2002	2003	2004	2005	2006
Production	18	23	40	67	87	100

40. Fit a binomial distribution for the following data and test for goodness of fit at 5% Level of significance.

X	0	1	2	3	4
F	31	34	21	12	2

**SECTION-E**

**V. Answer ALL the questions:**

41. If X is a normal distribution with mean  $\mu$  and SD  $\sigma$ , find the probability that X takes a value in the  $3\sigma$  neighbourhood of  $\mu$ .

42. Following is the data regarding five students administered for an IQ test before and after treatment of yoga.

I Q BEFORE	118	120	116	115	125
I Q AFTER	125	118	125	120	130

Is treatment effective?

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 at 5% LOS.

44. Solve the following LPP graphically :

Minimize  $Z=5x+8y$

Subject to  $3x+2y \leq 18$

$4x+3y \geq 12$

And  $x \geq 0, y \geq 0$