

II PUC MID-TERM EXAMINATION OCT/NOV - 2024

SUBJECT : STATISTICS (31)

Time : 3 Hours

Max Marks : 80

Instructions : * Statistical table and Graph sheets will be supplied on request.

* Scientific calculators are allowed.

* All working steps should be clearly shown.

* Only first written answers will be considered for Section-A.

SECTION-A

I Choose the correct answer from the choices given : **5x1=5**

- 1) A group of individuals who are born at the same time and who experience same mortality conditions
a) Radix b) Life Table c) Cohort d) longevity
- 2) If $\sum p_0 q_0 = 1000$ and $\sum p_1 q_1 = 1200$ then value index number is
a) 83.33 b) 120 c) 100 d) 0
- 3) An increase in employment during Harvest season is an example for
a) Secular Trend b) Seasonal variation c) cyclical variation d) Random variation
- 4) In conditions of Binomial expansion method, there should be common difference between the values of
a) dependent variable b) independent variable c) Both a) and b) d) None of these
- 5) For a Bernoulli distribution with parameter 0.2, SD is
a) 0.4 b) 0.16 c) 0.2 d) 1

II Fill in the blanks by choosing the appropriate answers from those given in the brackets : **5x1=5**

(∞ , customs, 0, yes, 3, 100)

- 6) Is GRR exceeds NRR ? _____
- 7) Index Numbers of base year is _____
- 8) _____ is a cause for seasonal variation.
- 9) Poisson distribution tends to normal when $\lambda \rightarrow$ _____
- 10) Coefficient of skewness for Normal distribution is _____

III Match the following :

A

B

- | | |
|--|---------------------|
| 11) Child bearing age group | a) unpredictable |
| 12) Kelly's Index Number | b) $X = 0, 1$ |
| 13) Random variation | c) λ |
| 14) Range of Bernoulli | d) 15 - 49 |
| 15) Variance of χ^2 (Chi-square) distribution | e) $2n$ |
| | f) Fixed quantities |

IV Answer the following questions:

5x1=5

- 16) Mention a merit of TFR.
- 17) State the relation between Laspeyre's, Paasche's and Fisher's Index Numbers.
- 18) Which Index is used for the measurement of seasonal variation ?
- 19) What is the numerical co-efficient of y_3 in the expansion $(Y-1)^5$?
- 20) Name the distribution in which variance and SD are equal.

SECTION-B

V Answer any FIVE of the following questions :

5x2=10

- 21) In a life table, if $T_0 = 67,00,000$ years then find longevity.
- 22) Given $\sum p_1 q_0 = 2000$ and $\sum p_1 q_1 = 1800$. Calculate a suitable Index Number.

(P.T.O.)

- 23) Mention any two uses of cost of living Index Number.
- 24) State two conditions of least squares method of measuring trend.
- 25) Define "Interpolation" and "Extrapolation".
- 26) Find the variance of Hyper geometric distribution with parameters $a = 10$, $b = 8$ and $n = 6$.
- 27) Mean and variance of a normal distribution are 12 and 4 respectively. Find points of inflexion.
- 28) Write any two features of t-distribution

SECTION-C

VI Answer any FOUR of the following questions :

4x5=20

- 29) From the following data, Calculate CBR, GFR and ASFR for the age group (15-39)

Age	Male population	Female population	Live births
0-14	46000	43000	-
15-24	34000	35000	6840
25-39	39000	38000	3893
40-49	30000	28000	675
50-79	27000	26000	-
80 and above	3000	4000	-

- 30) From the following data, show that Town A is healthier.

Age in years	Death Rates		Standard population
	Town A	Town B	
0-19	18	20	15000
10-29	10	12	35000
30-59	15	18	30000
60 & above	20	24	20000

- 31) Calculate the weighted AM Index Number from the following data and comment

Items		A	B	C	D	E
Expenses (%)		25	10	20	15	30
Price	2000	120	30	50	25	40
	2005*	100	30	40	20	50

- 32) Compute five yearly moving averages for the following data and write your conclusion.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sales	75	60	55	60	65	70	70	75	85

- 33) Interpolate and Extrapolate the sales for the years 2013 and 2016

Year	2011	2012	2013	2014	2015	2016
Sales	125	163	-	238	282	-
(₹ Lakhs)						

- 34) In a college 70% of the students are boys. In a random sample of 6 students. Find the probability of selecting
- (i) two boys
 - (ii) at least one boy.
- 35) On an average a box contains 2 defective items. Find the probability that a randomly selected box has
- i) No defective item
 - ii) at the most two defective items

(P.T.O.)

VII Answer any TWO of the following questions :

2x5=10

- 36) Construct consumer price index number by Aggregative expenditure method and comment.

Items	2013		2015
	Price (₹)	Expenses (₹)	Price (₹)
A	60	5	65
B	40	8	50
C	10	10	12
D	64	8	70

- 37) Fit a straight line trend for the following data by the method of least squares.

Year	2013	2014	2015	2016	2017
Value	70	74	80	86	90

- 38) Interpolate the expectation of life at the age 26.

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

- 39) If $X \sim N(100, 3^2)$ find the probability that

i) $97 \leq x \leq 106$

ii) $x \leq 102$

SECTION-D

VIII Answer any TWO of the following questions :

2x10=20

- 40) For the following data, calculate GRR and NRR. Is population increasing ?

Age (years)	Female Population	Female Births	Survival Rate
15-19	16000	480	0.91
20-24	14500	812	0.90
25-29	13000	650	0.89
30-34	11500	460	0.88
35-39	10000	300	0.87
40-44	8700	87	0.86
45-49	7500	30	0.85

- 41) For the following data, calculate Dorbish Bowley's and Marshall-Edgeworth Index Numbers.

Item	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	10	5	12	4
B	15	8	18	7
C	6	3	4	5
D	3	4	3	5

- 42) Fit a parabolic trend of the form $y = a + bx + cx^2$ for the following data. Estimate the strength for the year 2012.

Year	2006	2007	2008	2009	2010
Student strength (000's)	12	10	9	8	11
