Duration: 3 Hrs 15 mins   **Max.Marks: 100**

Note: 1. Statistical tables and graph sheets will be supplied.
     2. Scientific calculators are allowed.
     3. All working steps should be clearly shown.

PART – A

I. Answer any ten questions: 1×10 =10

1. Define cohort.
2. Define consumer price index number.
3. Write the expression for Marshall-Edgeworth's Quantity index number.
4. Which component of time series is associated with deaths due to Tsunami?
5. Name the distribution in which mean and variance are equal.
6. Give an example for normal variable.
7. Write down the standard error of sample proportion 'p'.
8. What is meant by 'level of significance'?
9. Mention a method of solving linear programming problem.
10. When is a game said to be 'fair'?
11. In S.Q.C. what is a 'defect'?
12. Define holding cost.

PART – B

II. Answer any 10 questions: 2×10 =20

13. Mention any two uses of vital statistics.
14. State any two limitations of index numbers.
15. Diagrammatically represent 'Business Cycle' with stages.
16. Write the mean and variance of a Bernoulli distribution.
17. What are the values of β_1 and β_2 in a normal distribution?
18. A random sample of size 25 is drawn from a population whose standard deviation is 3. Find the standard error of the sample mean.
19. Define the following:-
     i)   Point estimation   ii) interval estimation
20. Define one-tailed and two-tailed tests.
21. The degrees of freedom of a chi-square variate is 7. Find its mean and variance.
22. State any two uses of statistical quality control.
23. State two needs for replacement of capital equipment.
24. Write two advantages of maintaining an inventory.

PART – C

III. Answer any 8 questions: 5×8 = 40

25. Calculate GFR and total fertility rate.

Age group (in yrs)	Female population	Number of live births
15-19	1500	100
20-24	2000	400
25-29	1800	560
30-34	2500	350
35-39	1500	50
40-44	2200	20

45-49	1800	8

26. Mention the steps involved in the construction of an index number. Explain any one of the steps.

27. From the following data, compute consumer Price Index Number by family budget method.

Item	Base year Price(Rs)	Current year price(Rs)	Weight
A	100	120	60
B	40	50	30
C	25	25	10

28. For the following time series obtain the trend values by finding 3 yearly moving averages.

Year	2001	2002	2003	2004	2005	2006	2007	2008
Sales(rs)	100	120	150	160	170	190	200	210

29. The probability that a bomb hits the bridge is ½. Four bombs are aimed at the bridge. Three bomb-hits are enough to destroy the bridge. Find the probability that, i) the bridge is destroyed.   ii) none of the bombs hit the bridge.

30. On an average a telephone operator receives 3-telephone calls per minute. Find the probability that in a particular minute she i) does not receive any call   ii) receives more than two calls.

31. A random sample of 100 tins of Vanaspati has a mean weight 4.97 kg and S.D 0.2 kg test at 5% l.o.s that the tins, on an average, have less than 5 kg Vanaspati.

32. For the following data test whether there is any significant difference in the population proportion at 5% l.o.s

	Size	Proportion
Sample I	100	0.02
Sample II	110	0.01

33. Graphically solve the following L.P.P

Maximize $Z = 10x + 20y$

Subject to $x + 2y \geq 10$

$\qquad 2x + 5y \leq 40$

$\qquad$ & $x, y \geq 0$

34. If the standards are known to be $\bar{X}^1 = 20$ and $\sigma^1 = 6$, construct $\bar{X}$ - chart for the following data, given sample size n = 5.

Sample number	1	2	3	4	5	6
Sample mean $(\bar{X})$	19	24	22	16	18	15

35. Solve the following game using dominance principle.

Player B

$$\text{Player A} \begin{array}{c} A_1 \\ A_2 \\ A_3 \end{array} \begin{bmatrix} B_1 & B_2 & B_3 & B_4 \\ 3 & 2 & 0 & 6 \\ -3 & -1 & 0 & -1 \\ -3 & 4 & -3 & 0 \end{bmatrix}$$

36. A machine costs Rs 36,000. Its resale value and maintenance cost at different years are given below.

Year	1	2	3	4	5	6
Maintenance cost (Rs)	820	1330	1940	2750	3960	5470
Resale value (Rs)	28000	22000	20000	18000	17000	15000

Find out when the machine should be replaced.

PART – D

IV. Answer any 2 questions: 10×2 =20

37. Calculate standardized death rates for the localities given below. What is your conclusion?

Age (years)	Locality A		Locality B		Standard Population
	Population	Deaths	Population	Deaths	
Less than 10	4500	135	4000	140	15000

10-20	9000	50	10000	80	12000
20-50	15000	60	20500	150	18000
50 & above	4000	100	4500	150	25000

38. For the following data, compute Fisher's Price Index Number. Show that, it satisfies Time Reversal test and factor Reversal test.

Item	Price (in Rs)		Quantity	
	2007	2008	2007	2008
A	10	15	5	6
B	20	21	9	10
C	9	9	3	6

39. Below are given the figures of production (in thousand quintals) of a sugar factory:

Year	2001	2002	2003	2004	2005	2006	2007
Production	80	90	92	83	94	99	92

   a) Fit a straight line trend.
   b) Plot the original and trend values on a graph.
   c) Estimate the production for the year 2008.

40. Seven coins are tossed 128 times and the following distribution is obtained.

Number of heads (x)	0	1	2	3	4	5	6	7
Number of tosses (f)	7	7	21	30	26	20	14	3

   Fit a Binomial distribution to the data and test for goodness of fit at 5% l.o.s

PART – E

V. Answer any 2 questions: $2 \times 5 = 10$

41. The weights of 1000 students are normally distributed with mean 55 kg and S.D 3 kg. Find the number of students with weight, i) less than 48 kgs   ii) between 57 kg and 65 kg   iii) more than 60kg.

42. The following data represents the blood pressure of 5 persons before and after performing Dhyana.

Person	A	B	C	D	E
B.P berfor Dhyana	90	90	100	88	99
B.P. after Dhyana	88	90	95	86	96

   Can we conclude at 5% level of significance that Dhyana reduces Blood pressure?

43. The tensile strengths of 8 rods were 8, 3, 12, 14, 7, 13, 9 and 6 tons. Test the hypothesis that the standard deviation is more than 2 tons.

44. Obtain an initial BFS to the following T.P by matrix minima method. Also obtain the transportation cost.

		To			
		X	Y	Z	Availability
From	A	8	7	3	60
	B	3	8	9	70
	C	11	3	5	80
	Requirement	50	80	80	210

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