DECEMBER MONTHLY TEST-2022 **MARKS: 50**

STD: 12 **Businessmaths and Statistics** **TIME:1hr 30 min**

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PART-A

I. Choose the best answer from the following options: **(10 x 1 = 10)**

1. A time series consists of

(a) Five components (b) Four components (c) Three components (d)Two components

2. Th e additive model of the time series with the components T, S, C and I is

(a) y=T+S+C×I (b) y=T+S×C×I (c) y=T+S+C+I (d) y=T+S×C+I

3. The component of a time series attached to long term variation is trended as

(a) Cyclic variation (b) Secular variations (c) Irregular variation (d) Seasonal variations

4. Laspeyre's index = 110, Paasche's index = 108, then Fisher's Ideal index is equal to:

(a) 110 (b) 108 (c) 100 (d) 109

5. The LCL for R chart is given by (a) $D_2\bar{R}$ (b) $D_2\bar{\bar{R}}$ (c) $D_3\bar{\bar{R}}$ (d) $D_3\bar{R}$

6. The transportation problem is said to be unbalanced if _____

(a) Total supply = Total demand (b) Total supply = Total demand (c) m = n (d) m+n+1

7. North-West Corner refers to _____

(a) top left corner (b) top right corner (c) bottom right corner (d) bottom left corner

8. Solution for transportation problem using _____method is nearer to an optimal solution.

(a) NWCM (b) LCM (c) VAM (d) Row Minima

9. Decision theory is concerned with

(a) analysis of information that is available (b) decision making under certainty

(c) selecting optimal decisions sequential problem (d) All of the above

10. A type of decision –making environment is

(a) certainty (b) uncertainty (c) risk (d) all of the above

PART -B

Ⅱ. Two mark Questions : **(5 X 2 = 10)**

(Answer any 5,Qno:17 is compulsory)

11. Define Time series.

12. Fit a trend line by the method of freehand method for the given data.

Year	2000	2001	2002	2003	2004	2005	2006	2007
Sales	30	46	25	59	40	60	38	65

13. State the two normal equations used in fitting a straight line.

14. A machine drills hole in a pipe with a mean diameter of 0.532 cm and a standard deviation of 0.002 cm. Calculate the control limits for mean of samples 5.

15. What is transportation problem?

16 . Write mathematical form of transportation problem.

17. Consider the following pay-off (profit) matrix Action States

Action	states (s_1)	(s_2)	(s_3)	(s_4)
A_1	5	10	18	25
A_2	8	7	8	23
A_3	21	18	12	21
A_4	30	22	19	15

PART - C.

III . Three mark Questions : (5 x 3=15)

(Answer any 5, Qno:24 is compulsory)

18. Fit a trend line by the method of semi-averages for the given data.

Year	2000	2001	2002	2003	2004	2005	2006
Production	105	115	120	100	110	125	135

19. Calculate three-yearly moving averages of number of students studying in a higher secondary school in a particular village from the following data.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of students	332	317	357	392	402	405	410	427	435	438

20. Calculate the cost of living index by aggregate expenditure method:

Commodities	Weights 2010	Price (Rs.)	
		2010	2015
P	80	22	25
Q	30	30	45
R	25	42	50
S	40	25	35
T	50	36	52

21. Construct the cost of living Index number for 2015 on the basis of 2012 from the following data using family budget method.

Commodities	Price		Weights
	2012	2015	
Rice	250	280	10
Wheat	70	85	5
Corn	150	170	6
Oil	25	35	4
Dhal	85	90	3

22. Given the following pay-off matrix(in rupees) for three strategies and two states of nature.

Strategy	States-of-nature	
	E_1	E_2
S_1	40	60
S_2	10	- 20
S_3	- 40	150

Select a strategy using each of the following rule (i) Maximin (ii) Minimax.

23. Th e research department of Hindustan Ltd. has recommended to pay marketing department to launch a shampoo of three different types. Th e marketing types of shampoo to be launched under the following estimated pay-off s for various level of sales.

Types of shampoo	Estimated Sales (in Units)		
	15000	10000	5000
Egg shampoo	30	10	10
Clinic Shampoo	40	15	5
Deluxe Shampoo	55	20	3

What will be the marketing manager's decision if (i) Maximin and (ii) Minimax principle applied?

24. What do you mean by balanced transportation problem?

PART – D

Ⅳ. Five mark Questions : (Answer all the Questions) (3 X 5 = 15)

25.(a) Calculate the seasonal indices from the following data using the average from the following data using the average method:

	I Quarter	II Quarter	III Quarter	IV Quarter
2008	72	68	62	76
2009	78	74	78	72
2010	74	70	72	76
2011	76	74	74	72
2012	72	72	76	68

[OR]

25.(b) Obtain the initial solution for the following problem.

		Destinations A	B	C	Supply
Source	1	2	7	4	5
	2	3	3	1	8
	3	5	4	7	7
	4	1	6	2	14
	Demand	7	9	18	

26.(a) Find an initial basic feasible solution of the following problem using North West Corner rule.

	D_1	D_2	D_3	D_4	Supply
O_1	5	3	6	2	**19**
O_2	4	7	9	1	**37**
O_3	3	4	7	5	**34**
Demand	**16**	**18**	**31**	**25**	

[OR]

26.(b) Using the following data, construct Fisher's Ideal index and show how it satisfies Factor Reversal Test and Time Reversal Test?

Commodity	Price in Rupees per unit		Number of units	
	Base year	Current year	Base year	Current year
A	6	10	50	56
B	2	2	100	120
C	4	6	60	60
D	10	12	50	24
E	8	12	40	36

27.(a) . Compute (i) Laspeyre's (ii) Paasche's (iii) Fisher's Index numbers for the 2010 from the following data.

Commodity	Price		Quantity	
	2000	**2010**	**2000**	**2010**
A	12	14	18	16
B	15	16	20	15
C	14	15	24	20
D	12	12	29	23

[OR]

27.(b) Determine how much quantity should be stepped from factory to various destinations for the following transportation problem using the least cost method.

Cost are expressed in terms of rupees per unit shipped

		Designation				
		C	**H**	**K**	**P**	**Capacity**
Factory	**T**	6	8	8	5	**30**
	B	5	11	9	7	**40**
	M	8	9	7	13	**50**
	Demand	**35**	**28**	**32**	**25**	