22MIB211

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCom (IB) DEGREE EXAMINATION MAY 2023
(Second Semester)

Branch – **INTERNATIONAL BUSINESS**

BUSINESS STATISTICS AND OPTIMIZATION TECHNIQUES

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. Which one of the following average is used to calculate the average of ratios?
   (i) Arithmetic Mean (ii) Median
   (iii) Harmonic Mean (iv) Geometric Mean

2 When the two lines are perpendicular to each other, then the correlation coefficient is
   (i) r = -1 (ii) r = +1
   (iii) r = ± 1 (iv) r = 0

3. The error is committed by accepting the null hypothesis , when it is false is
   (i) Type – I error (ii) Type – II error
   (iii) Sampling error (iv) None

4. The number of basic variables of the general transportation problem at any stage of feasible solution must be
   (i) m+n+1 (ii) m+n+2
   (iii) m+n-1 (iv) m+n-2

5. There is indefiniteness regarding which event or outcome will occur is known as
   (i) Courses of action (ii) state of nature
   (iii) Payoff (iv) Uncertainity

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. (a) Calculate the range and its coefficient from the following data:

Sales (in lakh)	60-62	63-65	66-68	69-71	72-74
No. of companies	5	18	42	27	8

OR

(b) Calculate the median from the following data:

Profit (Rs'000)	10-25	25-40	40-55	55-70	70-85	85-100
No. of companies	6	20	44	26	3	1

7. (a) Draw the scatter diagram, when : (i) r = 0 (ii) r = +1 (iii) r= -1

OR

(b) State any three properties of regression coefficients.

8. (a) Write a note on large sample test.

OR

(b) Write the test procedure of **t**-test for testing single mean.

9. (a) Consider the following transportation problem involving three sources and four destinations. The cell entries represent the cost of transportation per unit. Find the minimum cost by North-West corner rule.

		Destination 1	2	3	4	Supply
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	

OR

(b) What is an assignment problem? Give two applications.

Cont...

10 (a) List out the major steps involved in decision making process.

OR

(b) Write a note on : (i) Pure Strategy (ii) Mixed Strategy.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11. (a) Find the mean and mode from the following data.

Wage (in Rs)	:	50	75	100	150	250
No. of labourers	:	8	14	10	5	3

OR

(b) Calculate the coefficient of skewness by Karl Pearson method.

Profit (in lakh) :	10-20	20-30	30-40	40-50	50-60
No. of companies :	18	20	30	22	10

12. (a) Compute the coefficient of correlation between X (advertisement) and Y(Sales).

X :	10	12	18	8	13	20	22	15	5	17
Y :	88	90	94	86	87	92	96	94	88	85

OR

(b) From the following information on values of two variables X and Y, find the two regression lines and the correlation coefficient.

$n = 10,\ \sum x = 20,\quad \sum y = 40,\quad \sum x^2 = 240,\quad \sum y^2 = 410,\quad \sum xy = 200.$

13. (a) A man buys 50 electric bulbs of 'Phillips' and 50 electric bulbs of 'HMT' He finds that Phillips bulbs give an average life of 1500 hours with a standard deviation of 60 hours and HMT bulbs give an average life of 1512 hours with a standard deviation of 80 hours. Is there a significant difference (1%) in the mean life of the two makes of bulbs?

OR

(b) The following figures relate to the production in Kg of three varieties A , B and C of wheat cultivated in 12 plots.

A :	14	16	18		
B :	14	13	15	22	
C :	18	16	19	19	20

Is there any significant difference in production of three varieties?

14. (a) Use Vogel's Approximation Method to obtain an initial basic feasible solution of the following transportation problem:

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	255	275	250	

OR

(b) Discuss the 'Hungarian' method of solving an assignment problem.

15. (a) Indicate the difference between decision under risk and decision Under uncertainity in decision theory.

OR

(b) Give the optimum strategies for each player of the following two- person zero – sum game.

	Player A	
PlayerB	5	0
	0	2

Z-Z-Z END