20MIB10

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCom (IB) DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – **INTERNATIONAL BUSINESS**

BUSINESS STATISTICS AND MATHEMATICAL 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 In a symmetrical distribution, the coefficient of skewness is
(i) negative (ii) positive
(iii) zero (iv) either positive or negative

2 If the sum of the product of deviations of X and Y series from their means is zero then the coefficient of correlation is
(i) +1 (ii) 0
(iii) -1 (iv) none of these

3 The mean difference between 9 paired observations is 15 and the standard 4 deviation of differences is 5. The value of t-statistic is
(i) 27 (ii) 9
(iii) 3 (iv) 15

4 An optimization model
(i) provides the best solution
(ii) provides decision within its limited context
(iii) helps in evaluating various alternatives
(iv) all the above

5 A saddle point exists when
(i) maximin value = maximax value (ii) minimax value = minimum value
(iii) minimax value = maximin value (iv) none of the above

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

6 a Give the names of one dimensional diagrams.

OR

b The average of 7 numbers 7, 9, 12, x, 5, 4, 11 is 9. Find the missing number x.

7 a What is positive correlation? Give example.

OR

b If the two lines of regression are: $x + 2y - 5 = 0$ and $2x + 3y - 8 = 0$, calculate the mean values of x and y.

8 a What is ANOVA?

OR

b Write the test statistic for testing the significance of difference of means for large samples.

Cont...

9 a What is transportation problem?

OR

b Solve the following problems:

	Machines		
Jobs	120	100	80
	80	90	110
	110	140	120

10 a What is two person's zero sum game?

OR

b Solve the following game:

Player A	Player B		
	B_1	B_2	B_3
A_1	- 2	15	- 2
A_2	- 5	- 6	- 4
A_3	-5	20	- 8

SECTION -C (30 Marks)

Answer **ALL** questions

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

11 a From the following data calculate the mean and mode.

Wages	110	112	113	117	120	125
No. of workers	26	17	13	15	14	8

OR

b Find the coefficient of skewness from the following information:
Difference of two quartiles = 8, mode = 11, sum of two quartiles =22, mean = 8

12 a Write the procedure for testing the significance of single mean for large samples

OR

b Find the most likely production corresponding to a rainfall 40^0 from the following data:

	Rainfall	Production
Average	30^0	500 kg
Standard deviation	5^0	100 kg

Coefficient of correlation = 0.5

13 a Two types of batteries A and B are tested for their length the life and the following results are obtained:

Battery	sample size	mean (hrs)	variance (hrs)
A	10	500	110
B	12	560	121

Is there any significant difference between the two sample means?

OR

b The following table gives the classification of 100 workers according to sex and the nature of work. Test whether the nature of work is independent of the sex of the worker.

	Skilled	Unskilled
Males	40	20
Females	10	30

14 a Obtain the initial basic feasible solution for the following transportation problem by Vogel's approximation method.

	D_1	D_2	D3	D_4	Supply
S_1	19	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

OR

b A department of a company has five employees with five jobs to be performed. The time (in hours) that makes to perform each job is given in the effectiveness matrix.

Jobs	Employees				
	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	2	12
E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total man hours?

15 a Explain the decision environment under uncertainty.

OR

b Solve the following game using dominance principle

Player A	Player B			
	B_1	B_2	B_3	B_4
A_1	3	2	4	0
A_2	3	4	2	4
A_3	4	2	4	0
A_4	0	4	0	8

Z-Z-Z END