

END TERM EXAMINATION

SECOND SEMESTER [BBA] MAY-JUNE 2012

Paper Code: BBA106**BBA(B&I)106****BBA(TTM)106****BBA(MOM)106****Subject: Quantitative Techniques & Operation
Research in Management****Time : 3 Hours****Maximum Marks :75****Note: Q.no.1 is compulsory. Attempt one question from each unit.**

- Q1 Write short notes on **any three** of the following:- (5x3=15)
- Absolute and relative variation
 - Lorenz curve
 - Vogel's approximation method
 - Spearman's rank correlation coefficient
 - Infeasibility in an LPP

UNIT-I

- Q2 (a) The following data relate to salaries of the employees of a factory: (10)

	Morning shift	Evening shift
Mean salary per month (Rs.)	14,300	18,600
Standard deviation (Rs.)	1,250	1,320
No. of employees	40	30

- For which factory is the total salary higher?
 - In which factory is the variability in salaries greater?
 - Calculate the combined mean salary of the two shifts.
- (b) Represent the following distribution by a histogram:- (5)

Class interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	6	8	12	10	4	2

- Q3 (a) Given the following distribution of marks of students of a class: (10)

Marks	20-30	30-40	40-50	50-60	60-70
No. of students	12	20	48	16	4

- Calculate median marks.
 - If 80% of the students pass the test, determine the minimum pass marks.
- (b) Find combined mean for the two sets of data from the given information: (5)

	Set 1	Set 2
Size	20	40
Mean	110	105

UNIT-II

- Q4 (a) Calculate Karl Pearson's co-efficient of correlation between age and playing habits of students using the following data: (10)

Age (years)	15	16	17	18	19	20
No. of students	300	250	200	150	100	80
No. of regular players	240	180	126	60	30	12

- (b) Calculate mean value of variables X and Y from the following regression equations-
 $6x - 7y + 33 = 0$ and $9x + 5y - 69 = 0$. (5)

- Q5 (a) Obtain the two regression equations from the following data:-

	X	Y
Mean	28	42
Standard deviation	10	8
Coefficient correlation, r	-0.8	

Using the equations, estimate the value of Y when X=30 and the value of X when Y=42. (10)

(b) Calculate coefficient of rank correlation from the following data:-

(5)

X	8	14	9	20	24	18
Y	26	18	12	12	9	2

UNIT-IIIQ6 Given the following LPP: minimize $Z = 3000x_1 + 6000x_2 + 3000x_3$.

Subject to $60x_1 + 100x_2 + 80x_3 \geq 7500$, $100x_1 + 240x_2 + 100x_3 \geq 15000$,
 $200x_1 + 360x_2 + 160x_3 \geq 30000$, $x_1, x_2, x_3 \geq 0$. (15)

- (a) Write the dual to the given LPP.
 (b) Solve the dual for optimal solution.
 (c) Read from the dual the answer to the primal problem.

Q7 (a) A sport club is engaged in development of their players by feeding them certain minimum amount of vitamins, say A, B and C in addition to their normal diet. In view of this two types of products X and Y are purchased from the market. The contents of vitamin constituents per unit are shown in the following table:

Vitamin constituents	Vitamin constituents in Products		Minimum requirement for each player
	X	Y	
A	36	06	108
B	03	12	36
C	20	10	100

The cost product X is Rs. 20 while that of product Y is Rs.40. Formulate the linear programming problem for the above to minimize the total cost and solve the problem by using graphic method. (8)

(b) Write dual to the following LPP: minimize $Z = 28x_1 + 7x_2 + 5x_3$.

Subject to $4x_1 - 6x_2 - 8x_3 \leq 12$, $7x_1 + 3x_2 + 2x_3 \geq 38$, $4x_1 + 5x_2 + 7x_3 \geq 30$,
 $x_1, x_2, x_3 \geq 0$. (7)

UNIT-IV

Q8 Solve the following transportation problem for minimum cost.

(15)

Source	Destination				Supply
	M ₁	M ₂	M ₃	M ₄	
P1	8	5	7	5	110
P2	9	6	9	3	34
P3	4	8	6	7	31
Demand	72	15	69	19	175

Q9 (a) Solve the following assignment problem where time (in hours) required by different workers in performing different jobs is given. What is the total time taken? (8)

Worker	Job			
	1	2	3	4
A	9	11	12	15
B	11	8	13	17
C	12	12	10	11
D	11	9	11	10

(b) Six jobs are to be processed on three machines A, B and C in that order. The table below gives the processing times taken by various jobs on the three machines. Obtain the sequence of processing of jobs that minimizes the total elapsed time to complete the jobs. Also, calculate idle time on machines. (7)

Job	1	2	3	4	5	6
Machine A	11	6	10	5	8	4
Machine B	6	7	8	5	4	9
Machine C	11	10	9	12	13	12