(i) Printed Pages : 7]

(ii) Questions : 14]

Roll No. .....

Sub. Code : 0 8 2 8

Exam. Code : 0 0 1 4

Bachelor of Commerce 4th Semester Examination

1047

QUANTITATIVE TECHNIQUES AND METHODS

Paper : BCM-406

Time : 3 Hours] [Max. Marks : 80

Section–A 5 each

Note : Attempt any *four* questions.

1. Using suitable diagrams, explain correlation, +ve correlation and –ve correlation between two variables.

2. Write the uses of Quantitative Techniques in Business and Industry.

3. Using concurrent deviation method to calculate correlation between the X and Y variables given as :

Prices X	Supply Y
10	90
25	95
20	115
30	125
33	140
40	139
37	125

4. Find missing value in the data given below by using an appropriate formula :

X	Y
1971	17
1981	25
1991	45
2001	?
2011	95

Also extrapolate value of Y for 2021.

5. Solve graphically the linear programming problem :

Maximize $Z = 2x + 4y$

Subject to : $x + 3y \leq 42$

$2x + y \leq 21$

where $x, y \geq 0$.

6. In a sample of 120 workers in a factory, the mean and standard deviation of wages were Rs. 11.35 and Rs. 3.03 respectively. Find the percentage of workers getting wages between Rs. 9 and 17 in whole factory assuming that wages are normally distributed. (Given that area under the normal curve for $z = 0.78$ is 0.2823 and for $z = 1.86$ is 0.4686).

Section–B

Note : Attempt any *two* questions.

7. At a pig breeding farm pigs are fed on various products grown in the farm. Because of the need to ensure nutrient constituents, it is necessary to buy additional one or two products which we shall call A and B. The nutrient constituents in each unit of the product are given below :

Nutrient constituents	Nutrients in the product		Minimum requirement of nutrient constituent
	A	B	
x	36	6	108
y	3	12	36
z	20	10	100

Product A costs Rs. 20 per unit and product B costs Rs. 40 per unit. Determine how much of products A and B must be purchased so as to provide the pigs nutrients not less than the minimum required, at the lowest possible cost. 15

8. What do you mean by Linear Programming ? Write short notes on the following :

(i) Feasible solution

(ii) Objective function

(iii) Infeasible solution

(iv) Unbounded solution

(v) Multiple optimum solution 15

9. (a) What are the assumptions of Binomial Distribution ?

(b) A train arrives at a commuting station in time on an average of 8 out of 10 days. What is the probability that in a given week of 5 working days, the train will not arrive in time 2 of the 5 days ? 15

10. (a) Write a note on Poisson distribution.

(b) If the proportion of defectives in a bulk is 4%. Find the probability of not more than 2 defectives in a sample of 10. (Given, $e^{-0.4} = 0.6703$.) 15

Section–C

Note : Attempt any *two* questions.

11. Find Karl Pearson's co-efficient of correlation from the following data of seven students :

Marks in Mathematics	Marks in Accountancy
48	40
73	92

68	75
33	45
93	95
43	45
53	65

If later on 5 marks are added in mathematics and 2 are added in Accountancy marks of each student, what is the new correlation co-efficient ? 15

12. Two regression lines for X and Y series are given as $5x - 6y + 90 = 0$ and $15x - 8y - 130 = 0$, which of these is regression line of Y on X. Also find out the means of two series and correlation co-efficient between them. Predict the value of X if Y = 18. 15

13. Calculate rank correlation for the following data :

X	Y
74	10
73	11

71	13
71	12
62	12
60	18
54	12
51	26

Also write merits and limitations of rank correlation. 15

14. Define regression, write short notes on different types of regression. Also prove that regression co-efficient are independent of origin. 15