(i) **Printed Pages: 4** **Roll No. .....**

(ii) **Questions : 9** **Sub. Code : 0828**

Exam. Code : 0014

Bachelor of Commerce 4th Semester

(2054)

QUANTITATIVE TECHNIQUES AND METHODS

Paper : BCM-406

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :—Attempt **FOUR** short answer type questions from Section A. Attempt **TWO** questions each from Sections B and C respectively.

SECTION—A

1. Attempt any **FOUR** of the following :—

(a) Two supervisors ranked as follows 12 workers under them in order of efficiency :

Worker	1	2	3	4	5	6	7	8	9	10	11	12
Supervisor - I	5	6	1	2	3	8½	8½	4	7	11	10	12
Supervisor - II	5½	5½	2	2	2	9	7	4	8	10½	12	10½

(b) The sale of a firm is given below. Estimate the sale of the industry for the year 2007 :

Year	2002	2003	2004	2005	2006
Sales (Million)	125	163	204	238	282

(c) What are the important functions of Quantitative Techniques ?

(d) Old hens can be bought at Rs. 2 each and young ones at Rs. 5 each. The old hens lay 3 eggs per week and the young ones lay 5 eggs per week, each egg being worth 30 paise. A hen costs Re. 1 per week to feed. Mr. Ram has only Rs. 80 to spend on hens. How many of each kind should Mr. Ram buy to give a profit of at least Rs. 6 per week, assuming that Mr. Ram cannot have more than 20 hens. Formulate the linear programming problem.

(e) Discuss the various properties/characteristics of Normal Distribution.

(f) Using the usual notations, find p for a binomial distribution random variable m, if n = 6, and $9p(m = 4) = p(m = 2)$.

4×5

SECTION—B

2. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of an accident involving a scooter driver, car driver and a truck driver is 0.01, 0.03 and 0.15 respectively. One of the insured drivers met with an accident. What is the probability that he is a car driver ? 15

3. Explain :

(a) Differentiate between Binomial, Poisson and Normal Distribution. 9

(b) Unbounded Solution. 3

(c) Redundant Constraints. 3

4. Solve the problem with LPP :

Maximize $Z = 3X_1 + 4X_2$

Subject to : $5X_1 + 4X_2 \leq 200$

$3X_1 + 5X_2 \leq 150$

$5X_1 + 4X_2 \geq 100$

$8X_1 + 4X_2 \geq 80$

$X_1, X_2 \geq 0$

15

5. A telephone exchange receives on an average 4 calls per minute. Find out the probability on the basis of Poisson distribution, if :

(a) 2 or less calls per minute.

(b) Upto 4 calls per minute and

(c) More than 4 calls per minute received.

(Given $e^{-4} = 0.01837$)

5,5,5

SECTION—C

6. Given that regression equations are :

$X = Y$ and $4X - Y - 3 = 0$ and mean of squared $X = 2$, find coefficient of correlation; S.D. (y) and Covariance of X and Y.

15

7. Calculate the Coefficient of Correlation by Karl Pearson's method between density of population and death rate :

Cities	A	B	C	D	E	F
Area (In Square miles)	75	90	50	30	60	40
Population	15000	45000	20000	21000	36000	12000
Deaths	150	720	280	420	612	156

15

8. The following frequency distribution shows the amounts of commission earned by 200 salesmen in a company.

Commission Earned	0 – 100	100 – 200	200 – 300	300 – 400	400 – 500
No. of Salesmen	12	35	50	66	37

Estimate the number of salesmen whose commission amounted to less than Rs. 250. 15

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