

MBA (Sem. - 1st)

QUANTITATIVE TECHNIQUES

SUBJECT CODE : MB - 104Paper ID : [C0104]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- Section - A is Compulsory.
- Attempt any **Four** questions from Section - B.

Section - A

Q1)

(10 × 2 = 20)

- Prove that $\log 2 + 2 \log 5 - \log 3 - 2 \log 7 = \log \frac{50}{147}$.
- Find the sum of first 35 terms of an A.P. if $t_2 = 2$ and $t_7 = 22$.
- Find Geometric mean of 2, 4, 6, 8, 10.
- Find mode of the data : 3, 6, 9, 12, 15, 15, 18, 21, 12, 9, 15, 12, 6, 15.
- Give formula of Rank's coefficient of correlation.
- Show that the coefficient of correlation is G.M. of coefficient of regression.
- Give different ways in which index numbers can be constructed.
- What is the chance that a leap year will have 53 Mondays.
- Give 5 properties of Normal distribution.
- Briefly explain, F test.

Section - B

(4 × 10 = 40)

- A machine depreciates in value in a year by 6% of its value at the beginning of the year. If value of new machine is Rs. 62,500, using logarithms, find its depreciated value after 7 years.
- If α and β are the roots of $2x^2 - 3x - 6 = 0$, find the equation whose roots are $\alpha^2 + 2$ and $\beta^2 + 2$.

Q3) (a) Find the 7th term in the expansion of $\left(3x^2 - \frac{1}{x^3}\right)^{10}$.

(b) Find mean & standard deviation for the data :

Class	0-7	7-14	14-21	21-28	28-35	35-42	42-49
Frequency	19	25	36	72	51	43	28

Q4) (a) Calculate first four moments about mean of the distribution :

x	2.0	2.5	3.0	3.5	4.0	4.5	5.0
f	5	38	65	92	70	40	10

Also calculate β_1 and β_2 .

(b) Calculate the coefficient of correlation between X and Y.

X	1	3	5	7	8	10
Y	8	12	15	17	18	20

Q5) (a) If θ is the acute angle between two regression lines in case of two variables x and y, show that

$$\tan\theta = \frac{1-r^2}{r} \cdot \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}, \quad r, \sigma_x, \sigma_y \text{ have their usual meaning.}$$

(b) What are trend values? Fit a trend line by method of least squares to the following data & obtain trend values.

Year	1941	1942	1943	1944	1945	1946	1947
Sales (1000 Rs.)	80	90	92	83	94	99	92

Q6) (a) Estimate changes in cost of living figures of 1992 as compared to 1991.

Expenses on	Food	Rent	Clothing	Fuel	Miscellaneous
	35%	15%	20%	10%	20%
Prices 1991	1500	300	750	250	400
Prices 1992	2000	300	650	230	450

(b) A can hit a target 4 times in 5 shots, B 3 times in 4 shots and C 2 times in 3 shots. They fire valley. What is the probability that at least 2 shots hit the target.

Q7) (a) Fit Poisson's distribution and calculate theoretical frequencies :

Deaths	0	1	2	3	4
Frequencies	122	60	15	2	1

(b) 5 dice were thrown 96 times and the numbers 4, 5 or 6 were thrown as given below :

No. of dice throwing 4, 5 or 6	5	4	3	2	1	0
f	7	19	35	24	8	3

Calculate χ^2 .
