443C (SM)

[16–HDGKACRM–M2]

MA 2nd Semester Exam., 2016

ECONOMICS

(Code : MEC/MAEC–07)

Statistical Methods

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer any *five* from the following questions (each in around *50* words) : 2×5=10

(a) Distinguish between causation and correlation.

(b) Define random experiment.

(c) What is meant by random variable?

(d) When is a function defined as a moment-generating function?

(e) What does an estimator mean?

(f) When is a random variable said to follow a binomial distribution?

2. Answer any *three* from the following questions : 4×3=12

(a) Discuss the properties of regression coefficients.

(b) What is mathematical expectation? Discuss its properties.

(c) If 5% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 100 bulbs—

(i) none is defective;

(ii) 5 bulbs will be defective.

[Given : $e^{-5} = 0{\cdot}007$]

(d) Distinguish between population and sample. Why is sampling preferable over complete enumeration? Discuss.

3. Answer any *three* from the following questions : 6×3=18

(a) From the following data, obtain both the regression equations, Y on X and X on Y :

X	2	3	4	5	6
Y	60	80	50	60	130

(b) What is meant by normal distribution? A variable X is normally distributed with mean $m = 1$ and SD = 3. Find the probability that $3{\cdot}43 < x < 6{\cdot}10$.

(c) What is stratified random sampling? Why is stratified random sampling more preferable to simple random sampling?

(d) Why should an estimator be unbiased, consistent and efficient?

4. Answer any *four* from the following questions : 10×4=40

(a) The productions of rice, milk, cloth, wheat and meat are given below :

Commodities	*Unit*	*Quantity Produced*	
		2000	*2010*
Rice	kilogram	400000	700000
Milk	litre	800000	905000
Cloth	metre	100000	105000
Wheat	kilogram	140000	160000
Meat	kilogram	30500	40000

Taking 2000 as the base year, compute the quantity index number using—

(i) simple aggregate method;

(ii) method of simple aggregate of quantity relatives.

(b) Define the relationship among mean, median and mode. Find the values of mean, median and mode from the following data : 2+8=10

Marks	5–14	15–24	25–34	35–44	45–54	55–64
No. of Students	10	18	32	26	14	10

(c) What is meant by dispersion? Discuss the different methods of dispersion.

(d) What is meant by zero correlation? Discuss the properties of correlation coefficient. Calculate the rank correlation coefficient from the following data of seven students who have obtained the following marks in History and Geography : 1+3+6=10

Rank in History	7	1	4	6	5	3	2
Rank in Geography	5	1	2	3·5	3·5	7	6

(e) Mention Bayes' theorem. In a group of 1000 persons, 650 can speak Hindi, 400 can speak English and 150 can speak both. If a person is selected at random, what is the probability that he speaks—

(i) only Hindi;

(ii) only English;

(iii) both the languages? 3+7=10

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