Exam.Code:0308
Sub. Code: 2664

2071

M.A. (Economics) Second Semester

MAECO-203 : Quantitative Methods - II

Time allowed: 3 Hours Max. Marks: 80

NOTE: *Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting one question from each Unit. Use of simple non-programmable calculator is allowed. Students may be provided statistical tables.*

x-x-x

I. Attempt <u>any ten</u> of the following:-

a) Evaluate $\int\left(x^2+2x^3+\frac{x^6}{7}\right)dx$

b) Evaluate $\int_2^3\left(x^2+4x+5\right)dx$

c) Define degree and order of a differential equation.

d) What do you mean by consumer's surplus?

e) Define order and degree of a difference equation.

f) Solve the following difference equation:-

$y_{n+1} - 4\,y_n = 0$

g) What are the assumptions of linear programming?

h) Find the area to the left of z = +1.58

i) In relation to binomial distribution, a fair coin is tossed thrice. Find the probability of getting exactly 2 heads.

j) Write down the properties of an ideal estimator.

k) Consider a hypothetical population consisting three values: 1,2,3. List all possible samples of size 2 with replacement.

l) Define sampling and non-sampling errors.

m) Define statistic and parameter.

n) Define level of significance.

o) Write down application / uses of t-test. (10x2)

P.T.O.

UNIT – I

II. a) Evaluate $\int \frac{1}{x^2+5x+6} dx$

b) Evaluate $\int (x^3+5)^2 3x^2 dx$

c) The demand and supply laws for a commodity are

$p_d = 18 - 2x - x^2$ and

$p_s = 2x - 3$

Find the consumer's surplus at equilibrium price. (6,3,6)

III. a) Solve the following differential equation:-

$$\frac{dy}{dx} = e^{x-y} + x^2 . e^{-y}$$

b) Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} - 5y = e^{3x}$

c) Obtain the demand function for a commodity for which elasticity of demand is constant 'α' throughout. (3x5)

UNIT – II

IV. a) Solve the following difference equation:-

$y_x - 5y_{x-1} + 6\, y_{x-2} = 0$, given $y_0 = 3$, $y_1 = 5$

b) Solve $\Delta y_n = -7y_n$ by iterative method.

c) Solve the following equation:-

$y_{x+2} - 7y_{x+1} + 12y_n = 0$ (3x5)

V. a) Write down the applications of linear programming.

b) Solve graphically the following LPP:

Maximize, $Z = 4x + 5y$

Subject to constraints

$2x + 3y \leq 12$

$2x + y \leq 8$

and $x, y \geq 0$ (5,10)

UNIT – III

VI. a) An aptitude test for selecting officers in a bank was conducted on 1000 candidates, the average score is 42 and the standard deviation of scores is 24.

Assume normal distribution for the scores, find

i) The numbers of candidates whose score exceed 60.

ii) The number of candidates whose score lie between 30 and 66.

b) In a town 10 accidents take place in a period of 50 days. Assume that the number of accidents per day follows Poisson distribution, find the probability that there will be three or more accidents per day (Given: $e^{-0.2} = 0.8187$) (9,7)

VII. a) A population consists of five values:-

3,4,5,6, and 7. List all possible samples of size 3 without replacement from this population and calculate the mean, $\overline{X}$, of each sample. Verify that statistic $(\overline{X})$is an unbiased estimate of the population mean

b) A random sample of 900 workers in a steel plant showed an average height of 67 inches with a standard deviation of 5 inches.

i) Establish a 95% confidence interval estimate of the mean height of all the workers at the steel plant.

ii) Establish a 99% confidence interval estimate of the mean height of all the workers at the steel plant. (8,7)

UNIT – IV

VIII. a) The mean of two large samples of sizes 1000 and 2000 are 168.75 cms and 170 cms respectively. Can the samples be regarded as drawn from a population with some mean and standard deviation of 6.25 cms at 5% level of significance?

b) 10 persons were appointed in a clerical position in an office. Their performance was noted giving a test and marks were recorded out of 50. They were given 6 months training and again they were given a test and marks were recorded out of 50.

Employees	A	B	C	D	E	F	G	H	I	J
Before Training	25	20	35	15	42	28	26	44	35	48
After Training	26	20	34	13	43	40	29	41	36	46

By applying the t-test, can it be concluded that the employees have been benefitted by training. (Given for d.f. = 9, $t_{0.05} = 2.262$) (7,8)

IX. a) The number of automobiles accidents per week in a certain city were as follow:-

12, 8, 20, 2, 14, 10, 15, 6, 9, 4

All these frequencies in agreement with the belief that accident's numbers were the same during these 10 week period. (for v = 9, $\chi^2_{0.05} = 16.92$)

b) Two investigators study the income of group of persons by the method of sampling. Following results were obtained by them:-

Investigators	Poor	Middle-class	Well to do	Total
A	160	30	10	200
B	140	120	40	300
Total	300	150	50	500

show that the sampling technique of at least one of the investigator is suspected. (Given the value of $\chi^2_{0.05}$ for 2 d.f. = 5.991) (7,8)

x-x-x