University of Ruhuna

Faculty of Graduate Studies

Master of Arts in Economics - Academic Year 2019/2020

1st Semester End Examination September 2020

MAE5102– Economic Statistics

Time: 03 Hours

This paper contains THREE parts

Answer four (04) questions by selecting at least one (01) question in each part.

Use of calculators are allowed.

Part - I

(1).

(i). Define the concept of "economic statistics" in your own terms. (05 marks)

(ii). Differentiate primary data from secondary data. (04 marks)

(iii). Explainthe following terms with appropriate examples.

a) Characteristics

b) Variables

c) Raw data

(06 marks)

(2).

(i). Following are the monthly wages of 12 graduates who are working for the private sector.

34500	33550	35400	35500
33100	39250	36500	34900
35200	34800	37300	34800

a) What is the average monthly wage of a graduate? What is the main reason that this measure would be less reliable? (04 marks)

b) Compute the median salary of the data provided. what is the major limitation of median as a measure of central tendency (03 marks)

c) Given that the standard deviation of the monthly salary of graduate is 165. 65.

i. Compute the coefficient of skewness of wages and interpret the coefficient.

ii. Compute the coefficient of variation and interpret the value.

(04 marks)

(ii). The marks obtained by the candidates in an interview conducted to select a trainee manager for an institution are summarized as follows in the form of a frequency distribution. For this data, calculate the cumulative frequencies of "less than" and "or more". Name one of their benefits.

Marks	02	04	07	10	16	08	03
Number of Candidates	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79

(04 marks)

Part - II

(03).

(i). Mr. Sumith can go to the bus stand before the scheduled time in the morning 80% of the days. The bus arrived on time on 30% of the days he could get to the bus stop before on time and the bus arrived on time on 60% of the days he could not get to the bus stop before on time.

What is the probability that Mr. Sumith will be able to reach the bus stop before on time on the day the bus arrived on time? (07 marks)

(ii).A research team at a bank examined 52 randomly selected accounts from that bank's business accounts and their monthly average deposit amount was 64.53 million rupees and the standard deviation was 6.72 million. The research team wants to ascertain whether the median deposit in the bank's business accounts is more than Rs. 62 million. They selected

5% as the significant level and intended to perform a statistical significant test for the information obtained above.

a) What are the assumptions used to perform a significant test on this data? (01 mark)

b) Write the hypothesis of the possible significant test for this data. (01 mark)

c) Calculate the test statistics of the significant test. (03 marks)

d) State with reasons whether the median deposit in the bank's business accounts is varies from Rs. 62 million. (03 marks)

(4).

(i). Four males and four females candidates participated in the selection interview to fill 6 vacancies. Women and men are numbered 1 to 4 separately.

a) If the selection of the woman and man who got No. 1 is mandatory and at least two women and two men have to be selected, how many different ways can the vacancies be filled? (03 marks)

b) How many different ways can vacancies be filled if at least three women have to be selected? (02 marks)

c) If the selection of the two men given numbers 1 and 2 is mandatory, how many different ways can the vacancies be filled? (03 marks)

(ii). The table below shows the quantities of COVID-19 tests performed on people from six areas with approximately the same population.

Areas	**Area 1**	**Area 2**	**Area 3**	**Area 4**	**Area 5**	**Area 6**
No. of Tests	157	165	145	185	120	128

A statistical significant test ($\alpha = 0.05$) should be performed to confirm that the number of individuals selected from each area for the COVID-19 tests is in the same proportion.

a) Write hypotheses for the significant testing. (01 mark)

b) Calculate the test statistics of the significant test. (03 marks)

c) State with reasons whether the number of persons selected from each area for the COVID-19 tests is in the same proportion. (03 marks)

Part - III

05.

(i). The following table illustrates the probability distribution of a discrete random variable X.

X	P(X)
0	0.35
1	0.20
2	0.20
3	B

a) Find the value of B. (01Mark)

b) Construct the communicative probability table of X. (02 Marks)

c) Find the expected value of X. 03 Marks)

d) Find the variance of X. (04 Marks)

(ii). A discrete random variable X follows a Binomial Distribution which has six trials. If it is given that the probability of a success is 0.25, find the following probability values.

a) $P(X=3)$

b) $P(X\leq5)$

(05 Marks)

06.

(i). Given that $X \sim P(5)$, find the following probability values.

a) $P(X=3)$

b) $P(X>1)$

c) $P(X\leq2)$ (05 Marks)

(ii). The number of customers who visit a certain bank counter follows a Poisson distribution with a mean value of 4 per hour. What is the expected number of customers who visit the particular bank counter per two and half hours? (05 Marks)

(iii). Differentiate "Simple Linear Regression" from "Multiple Linear Regression'.

(05 Marks)

The following equations can be used when needed

$$P(A|B) = \frac{P(A)P(B|A)}{P(B)}$$

$$t* = \frac{\bar{x} - \mu_0}{\frac{S}{\sqrt{n}}}$$

$$Z^* = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

$$x^2 = \frac{(O_i - E_i)^2}{E_i}$$