

**THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS OF
PAKISTAN (ICPAP)**

**Fundamental Stage/Module 1
Course F-103 Quantitative Methods and Techniques
Assignment No 1**

Notes:

1. All questions are to be attempted.
2. Answers are expected to be precise, to the point and well written.
3. Neatness and style will be taken into account in marking the assignments for which four marks are awarded.

Question No 1

- (a) The sum of a geometric series is 364 times its first term. If the common ratio is 3, find the number of terms in the series.
- (b) For positive integers x and y , find all the possible set of values satisfying the following equation:

$$2xy(xy - 11) = 420$$

Question No 2

- (a) Imran deposited Rs. 3,000 per month into a saving account for a year. He would deposit Rs. 5,000, Rs. 8,000 and Rs. 10,000 per month during second, third and fourth year respectively. If the bank offers 6% interest compounded monthly, find the total amount Imran would have saved at the end of four years.
- (b) Noshawan Builders have launched an apartment project. Price of each apartment is Rs. 1,628,000. The buyer has to pay Rs. 200,000 at the time of booking and Rs. 34,000 per month for $3\frac{1}{2}$ years to the builder. Possession will be given to buyers six months after the payment of last installment. If the amount of interest included in the price payable to the builder is Rs. 628,000, using logarithm, determine the annual rate of interest compounded monthly.

Question No 3

- (a) The cost and demand functions for manufacturing x units of a product per month are:

$$C(x) = 6x + 95,000$$

$$D(x) = 1680 - 3x$$

You are required to calculate:

- (i) the number of units that should be produced per month to maximize the profit;
- (ii) price per unit; and
- (iii) maximum profit per month

Question No 4

(a) Sketch the following inequalities and analyze the feasible region:

$$2x \leq 3y \leq 12$$

$$3x \leq 2y \leq 6$$

$$x, y \geq 0$$

(b) Solve the following system of equations using Cramer's rule:

$$4x + 2y + z = 6$$

$$3x + 5y - 2z = 4$$

$$-x - 2y + z = -1$$

Question No 5

(a) A missile radar detection system consists of two radar screens. The probability that any of the radar screens will detect an incoming missile is 0.95. If a missile enters the detection space of this radar, what is the probability that at least one of the radar screens will detect it? (Assume that the radar detections are independent events.)

(b) Cool Tel is a large mobile service provider. It has conducted a study on 10,000 customers about the length of time they have to wait, at its customer care centres, before being facilitated by the Cool's officer. The results of the study are as follows:

Waiting Time (min) 0 1 2 3 4 5 6 7

No. of customers 380 1120 1680 1780 1960 1550 1200 330

You are required to:

- (i) Construct the probability distribution for the above study.
- (ii) Draw a histogram for the constructed probability distribution.
- (iii) Determine the mean of the constructed probability distribution.
- (iv) Calculate the probability that a customer must wait before being facilitated.
- (v) What is the probability that a customer has to wait for less than two minutes before being facilitated?

Question No 6

The following data shows the price and demand of a product at different points in time:

Price (Rs.) 33 55 50 42 48 61 53 33

Demand (1000 kg) 91 60 59 65 61 49 42 91

- (a) Determine the regression equation for the demand on price.
- (b) Find the coefficient of correlation and coefficient of determination.
- (c) Interpret the results obtained in (b) above.

Question No 7

(a) Tara Electronics claims that its energy saver bulbs have an average life of 6500 hours. A consumer rights protection agency tested 15 such bulbs to check this claim. It found that the mean life of 15 bulbs was 6300 hours with a standard deviation of 200 hours. At the 5% significance level, assess the claim of Tara Electronics. Assume that life of such bulbs has an approximately normal distribution.

(b) In measuring reaction time, a psychologist estimated that the standard deviation is 0.05 second. How large a sample of measurements must he take in order to be 95% confident that the error in his estimate of mean reaction time will not exceed 0.01 second?

Question No 8

(a) A local news channel has conducted an opinion poll for constructing more dams in the country. The poll result indicates that 70% of the participating viewers support the idea, 15% are against the idea and 15% are undecided. If a sample of six participating viewers is selected at random, determine the probability that:

- (i) at least five viewers will support the idea.
- (ii) less than two viewers will not support the idea.

(b) A group of people was surveyed about their favourite car. The following results were obtained:

Gender Frequency

Civic Corolla Liana

Male 27 37 11

Female 26 14 5

At 5% level of significance, test the hypothesis that the choice of favourite car is independent of one's gender.

(THE END)