Time allowed: 2 Hrs
Max Marks: 40

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means.** All other instructions on the reverse of Admit Card should be followed meticulously.

Use the tables provided for answering the questions, wherever needed.

Section A

Attempt one of each of the four questions
A1a or A1b, A2a or A2b, A3a or A3b   and   A4a or A4b

A1a.   *(CO-1; 5 marks)*

In San Francisco, 30% of workers take public transportation daily (USA Today, December 21, 2005).
a. In a sample of 10 workers, what is the probability that exactly three workers take public transportation daily?
b. In a sample of 10 workers, what is the probability that at least three workers take public transportation daily?

   or

A1b.   *(CO-1; 5 marks)*

The Census Bureau's Current Population Survey shows 30% of individuals, ages 25 and older, have completed four years of college (The New York Times Almanac, 2006). For a sample of 15 individuals, ages 25 and older, answer the following questions:
  a. What is the probability four will have completed four years of college?
  b. What is the probability three or more will have completed four years of college?

A2a.   *(CO-3; 5 marks)*

The average stock price for companies making up the S&P 500 is $30, and the standard deviation is $8.20 (BusinessWeek, Special Annual Issue, Spring 2003). Assume the stock prices are normally distributed.
a. What is the probability a company will have a stock price of at least $40?
b. What is the probability a company will have a stock price no higher than $20?

   or

A2b.   *(CO-3;   5 marks)*

In January 2003, the American worker spent an average of 77 hours logged on to the Internet while at work (CNBC, March 15, 2003). Assume the population mean is 77 hours, the times are normally distributed, and that the standard deviation is 20 hours.
a. What is the probability that in January 2003 a randomly selected worker spent fewer than 50 hours logged on to the Internet?

b. What percentage of workers spent more than 100 hours in January 2003 logged on to the Internet?

A3a. *(CO-2; 5 marks)*

Consider a finite population with five elements labeled A, B, C, D, and E. Ten possible simple random samples of size 2 can be selected.
a. List the 10 samples beginning with AB, AC, and so on.
b. Using simple random sampling, what is the probability that each sample of size 2 is selected?

or

A3b. *(CO-2; 5 marks)*

Barron's reported that the average number of weeks an individual is unemployed is 17.5 weeks (Barron's, February 18, 2008). Assume that for the population of all unemployed individuals that the population standard deviation is 4 weeks. Suppose you would like to select a random sample of 50 unemployed individuals for a follow-up study.
   a. Show the sampling distribution of $\bar{x}$, the sample mean average for a sample of 50 unemployed individuals.
   b. What is the probability that a simple random sample of 50 unemployed individuals will provide a sample mean within 1 week of the population mean?

A4a. *(CO-1; 5 marks)*

In an effort to estimate the mean amount spent per customer for dinner at a major Atlanta restaurant, data were collected for a sample of 49 customers. Assume a population standard deviation of $5. If the sample mean is $24.80, what is the 95% confidence interval for the population mean?

or

A4b. *(CO-1; 5 marks)*

The mean annual cost of automobile insurance in the USA is $900. Assume that the standard deviation, σ = $150. What is the probability that a sample of 64 automobile insurance policies will have a sample mean within $20 of the population mean?

(CO-3, 4; 20 marks)

The cost of a previously owned car depends upon factors such as make and model, model year, mileage, condition, and whether the car is purchased from a dealer or from a private seller. To investigate the relationship between the car's mileage and the sales price, data were collected on the mileage and the sale price for 8 private sales of model year 2000 Honda Accords.

Miles (1000s)	Price ($1000s)
90	7
60	7.5
65	6.5
85	7
90	7
105	5.5
90	6.5
55	7

a. Develop a scatter diagram with miles as the independent variable.
b. What does the scatter diagram developed in part (a) indicate about the relationship between the two variables?
c. Use the least squares method to develop the estimated regression equation.
d. Provide an interpretation for the slope of the estimated regression equation.
e. Predict the sales price for a 2000 Honda Accord with 100,000 miles.