

**PGDM, 2020-24**  
**Statistics for Business Analysis, DM-110**  
**Trimester – I, End-Term Examination: September 2022**

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.

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**Section A**

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

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

Suppose you are sampling from a population with a mean of 30.00 and standard deviation 5. What sample size will *ensure* that

- (a) The sample mean is between 25 and 35 with 90% confidence
- (b) The standard error of the mean is 1?

Justify your answers.

**or**

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

Three different methods for assembling a product were proposed by an industrial engineer. To investigate the number of units assembled correctly with each method, 30 employees were randomly selected and randomly assigned to the three proposed methods in such a way that each method was used by 10 workers. The number of units assembled correctly was recorded, and the analysis of variance procedure was applied to the resulting data set.

The following results were obtained: The total sum of squares, SST = 10800, the sum of squares due to treatments, SSTR = 4560.

Set up the ANOVA table for this problem and using  $\alpha = .05$  test for any significant difference in the means for the three assembly methods.

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

A noted social psychologist, surveyed 150 top executives and found that 40% of them were unable to add fractions correctly.

This is indeed a sorry state of affairs.

- a) Estimate the standard error of the estimate provided by the social psychologist.
- b) Construct a 95% confidence interval for the estimate

**or**

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

Arnold Palmer and Tiger Woods are two of the best golfers to ever play the game. To show how these two golfers would compare if both were playing at the top of their

game, the following sample data provide the results of 18-hole scores during a PGA tournament competition.

Palmer's scores are from his 1960 season, while Woods' scores are from his 1999 season (Golf Magazine, February 2000).

Palmer, 1960

$n_1 = 112$

$\bar{x}_1 = 69.95$

Woods, 1999

$n_2 = 84$

$\bar{x}_2 = 69.56$

Use the sample results to test the hypothesis of no difference between the population mean 18-hole scores for the two golfers. Assume a population standard deviation of 2.5 for both golfers.

- State the hypothesis you should use in this case. What is the test statistic and what is its value?
  - At  $\alpha = .01$ , what is your conclusion?
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**A3a.**

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

According to a study by Decision Analyst, 20% of the people who have credit cards are very close to the total limit on the card(s). Suppose a random sample of 15 credit card users is taken. What is the probability that more than 10 credit card users are very close to the total limit on their card(s)?

*or*

**A3b.**

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

A beach resort hotel has 20 rooms. In the spring months, hotel room occupancy is approximately 75%.

- What is the probability that at least half of the rooms are occupied on a given day?
  - What is the probability that all the rooms are occupied on a given day?
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**A4a.**

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

Suppose that the population mean is  $\mu = 52000$  and the population standard deviation,  $\sigma = 4000$ .

- Sketch the sampling distribution of  $\bar{x}$  when simple random samples of size 60 are used.
- What happens to the sampling distribution of  $\bar{x}$  if simple random samples of size 120 are used?

*or*

**A4b.**

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

The mean annual cost of automobile insurance in the USA is \$1000 (CNBC, 2006). Assume that the standard deviation,  $\sigma = \$250$ . What is the probability that a sample of 64 automobile insurance policies will have a sample mean within \$25 of the population mean?

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**Section B ( All Questions Compulsory)**

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**(CO-3, 4; 20 marks)**

The *SportsWeek* magazine tested 10 different models of day hikers and backpacking boots. The following data show the upper support and price for each model tested. Upper support was measured using a rating from 1 to 5, with a rating of 1 denoting average upper support and a rating of 5 denoting excellent upper support.

Manufacturer and Model	Support	Price
Salomon Super Raid	2	120
Merrell Chameleon Prime	3	125
Teva Challenger	3	130
Vasque Fusion GTX	3	135
Boreal Maimo	3	150
L.L. Bean GTX Super Guide	5	189
Lowa Kibo	5	190
Asolo AFX 520 GTX	4	195
Raichle Mt. Trail GTX	4	200
Scarpa Delta SL M3	5	220

- Sketch a scatter plot (scales need not be exact) for this data.
  - Develop a regression equation modeling the price of a day hiker and backpacking boot given the upper support rating.
  - Estimate the price for a day hiker with an upper support rating of 4.
  - “Support” can be considered as a factor with four levels, 2, 3, 4 and 5. However we create just three levels – with support level 2 standing for “average”, 3 and 4 standing for “above average” and 5 standing for excellent. Test the hypothesis that the average prices are the same for these three support levels. What is your conclusion?
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