

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Answer the following questions briefly:
 - a. Define null and alternate hypothesis.
 - b. Who is enumerator?
 - c. Draw a normal distribution curve showing percentage values covered in 1,2 and 3 standard deviations.
 - d. Differentiate between Type 1 and Type II error?
 - e. What is the difference between standard deviations and variance? Show mathematically.
 - f. What do you mean by $p > 0.05$?
 - g. What is the difference between dependent and independent variable? Explain using an example.
 - h. ANOVA is an acronym for _____.
 - i. Differentiate between one tailed and two tailed t test.
 - j. Name six different methods of data collection. (10x1)

SECTION-A

2. Doing research is a complex task involving various steps. Draw a flow chart showing all the steps and elaborate on the various steps involved in a research process. (10)
3. Differentiate between:
 - a) Primary data and secondary data
 - b) Research article and review article
 - c) Fundamental and applied research
 - d) Random sampling and cluster sampling (10)
4. a) Examine the merits and limitations of the interview method in collecting material. Illustrate your answer with suitable examples.
b) How is a questioner different from a schedule? What important points should be kept in mind while designing a questioner? (2x5)

(2)

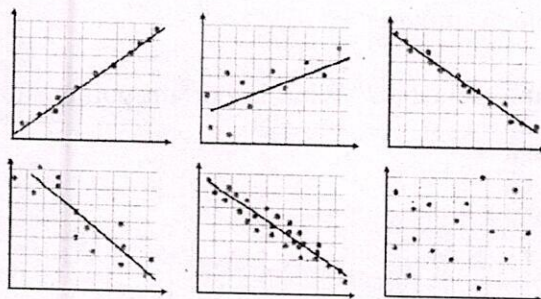
SECTION-B

5. Suppose the National Transportation Safety Board (NTSB) wants to examine the safety of compact cars, midsize cars, and full-size cars. It collects a sample of three for each of the treatments (cars types). Using the hypothetical data provided below, test whether the mean pressure applied to the driver's head during a crash test is equal for each types of car. Use $\alpha = 5\%$, F Critical=5.14. (10)

| Compact cars | Midsize cars | Full-size cars |
|--------------|--------------|----------------|
| 643 | 469 | 484 |
| 655 | 427 | 456 |
| 702 | 525 | 402 |

(10)

6. a) Three students take equivalent stress tests. Which is the highest relative score (meaning which has the largest z score value)? (i) A score of 144 on a test with a mean of 128 and a standard deviation of 34. (ii) A score of 90 on a test with a mean of 86 and a standard deviation of 18. (iii) A score of 18 on a test with a mean of 15 and a standard deviation of 5.
- b) Enlist the different components of a research proposal and discuss each of them briefly. (2x5)
7. a) A genetics engineer was attempting to cross a tiger and a cheetah. She predicted a phenotypic outcome of the traits she was observing to be in the following ratio 4 stripes only: 3 spots only: 9 both stripes and spots. When the cross was performed and she counted the individuals she found 50 with stripes only, 41 with spots only and 85 with both. According to the Chi-square test, did she get the predicted outcome?
- b) Below are graphs showing co-relation between different variable. Interpret all the graphs below and justify your answer.



(2x5)