CLASS: BTECH                                                    SEMESTER : V
BRANCH: BT/CHEMICAL/CS/IT/ECE/MECH/PIE                          SESSION : MO/2022

**SUBJECT: MA407 SURVEY SAMPLING**

TIME:    3:00 Hours                                             FULL MARKS: 50

**INSTRUCTIONS:**
**1. The question paper contains 5 questions each of 10 marks and total 50 marks.**
**2. Attempt all questions.**
**3. The missing data, if any, may be assumed suitably.**
*4.* Before attempting the question paper, be sure that you have got the correct question paper.
**5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.**

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| Q.1(a) | Define population and sample. | [2] | CO=2 | BT=1.11 |
| Q.1(b) | When does a sample represent a population? Mention any two advantages of sampling over census. | [3] | CO=2 | BT=1.1 |
| Q.1(c) | Critically compare sampling and non-sampling errors. | [5] | CO=1 | BT=1.23 |
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| Q.2(a) | Point out one advantage and one disadvantage of systematic random sampling. | [2] | CO=3 | BT=1.12 |
| Q.2(b) | Out of 500 voters in a village, a simple random sample without replacement of 100 voters revealed that 35 were shown with wrong ages in the voter's list. Estimate the total number of voters in this village with wrong age shown in the voter's list. Also find the standard error of the estimate. | [3] | CO=3 | BT=1.20 |
| Q.2(c) | What are the advantages of stratification? How is the sample size determined in stratified random sampling under proportional allocation and under Neyman allocation? | [5] | CO=3 | BT=1.12 |
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| Q.3(a) | If T is an unbiased estimator of θ, verify whether $T^2$ will be an unbiased estimator of $\theta^2$ or not. | [2] | CO=4 | BT=1.11 |
| Q.3(b) | Critically compare an unbiased estimator and a consistent estimator. | [3] | CO=4 | BT=1.23 |
| Q.3(c) | For a random sample $(X_1, X_2, \dots X_n)$ from a population with mean θ and variance $\sigma^2$, define estimators r, s and t as follows: r = sample mean; s = $X_1$; t= $(2X_1+X_2+\dots X_n)/n$. Examine r, s and t over unbiasedness and consistency. | [5] | CO=4 | BT=1.25 |
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| Q.4(a) | Explain briefly how information on an auxiliary variate is useful in ratio method of estimation. | [2] | CO=3 | BT=1.10 |
| Q.4(b) | Write a short note on cluster sampling. How is it different from stratified sampling? | [3] | CO=3 | BT=1.12 |
| Q.4(c) | What is multi stage sampling? Suggest an unbiased estimator for the population mean and standard error of the estimate in this scheme of sampling. | [5] | CO=3 | BT=1.25 |
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| Q.5(a) | Explain Lahiri's method of drawing a pps sample. | [2] | CO=5 | BT=1.25 |
| Q.5(b) | Why are there two regression lines? | [3] | CO=5 | BT=1.32 |
| Q.5(c) | From the following data, estimate Y for X=5 and also estimate X for Y=12;- | [5] | CO=4 | BT=1.25 |

Mean of X = 52; Standard deviation of X=18
Mean of Y =44; Standard deviation of Y = 10
Correlation Coefficient between X and Y=0.8