1604E067   Candidate's Seat No :_____

B.Sc. Sem-6 Examination
CC 308
Statistics

Time : 2-00 Hours]   April 2022   [Max. Marks : 50

Section A: Attempt any Three

Q.1 (a)   Explain Simple random sampling. Give merits and demerits of simple random sampling.   7

(b)   Show that for SRSWOR, sample variance is an unbiased estimate of population variance.   7

Q.2 (a)   Show that SRSWOR provides more efficient estimate of $\bar{Y}$ relative to SRSWR.   7

(b)   Derive variance for SRSWOR.   7

Q.3 (a)   Prove that for stratified random sampling the variance of estimate $\bar{y}st$ is   7

$$\sum_{h=1}^{l} w_h^2 \frac{s_h^2}{n_h}(1-f_h).$$

(b)   Obtain $V(\bar{y}_{st})$ under Neyman Allocation.   7

Q.4 (a)   Derive variance of systematic sampling in terms of S_w^2 and ρ_w.   7

(b)   Prove that a systematic sample has same precision as a corresponding stratified random sample with 1 unit per stratum if $\rho_{wst} = 0$.   7

Q.5 (a)   Prove that the mean of systematic sample is more précised than mean of simple random sample iff $S_{wsy}^2 > S^2$. Where S_{wsy}^2 = variance among units that lies within the systematic sample.   7

(b)   If the population consists of linear trend give the relationship between variance of stratified sampling, simple random sampling and systematic sampling.   7

Q.6 (a)   Explain stratified random sampling in detail.   7

(b)   Give relative precision of stratified random sampling and simple random sampling.   7

Q.7 (a)   ~~In two stage sampling~~ Write a note on two stage sampling.   7

(b)   If n units and m subunits from each chosen unit are selected by SRS then ,   7

$$V\overline{(\bar{y})}=\frac{N-n}{N}\frac{S_1^2}{n}+\frac{M-m}{M}\frac{S_2^2}{mn}$$

Q.8 (a)   Explain: Sub sampling is regarded as incomplete sampling.   7

(b)   Show that in two stage sampling   7

$$V(\widehat{\theta})=V_1\left[E_2(\widehat{\theta})\right]+E_1\left[V_2(\widehat{\theta})\right]$$

Section-B Attempt any 8   08

1   When an investigator wants a sample containing m units which possess a rare attribute, the appropriate sampling procedure is

(A) SRSWOR   (B) Stratified sampling   (C) Inverse sampling   (D) All the above

P.T.o

2 Simple random sample can be drawn with the help of

(A)   Random number tables   (C)   roulette wheel

(B)   Chit method   (D)   All of the above

3 Probability of drawing a unit at each selection remains same in

(A) SRSWOR   (C) SRS

(B) SRSWR   (D) all of the above

4 If we have a sample of size n from a population of N units, the finite population correction is

(A) N-1/N   (B) n-N/N

(C) N-n/N   (D) N-n/n

5 The number of all possible sample of size two from a population of 4 units as:

(A) 2   (B) 4
(C) 8   (D) 12

6 Simple random sample can be drawn with the help of

(A)   Random number tables   (C) roulette wheel

(B)   Chit method   (D)   All of the above

7 Under equal allocation in stratified sampling, the sample from each stratum is

(A) Proportional to stratum size   (B)   Of same size from each stratum

(C) In proportion to the per unit cost of survey of the stratum

(D) All the above

8 Systematic sampling means

(A)   Selection of n contagious units

(B)   Selection of n units situated at equal distances

(C)   Selection of n largest units

(D)   Selection of n middle units in a sequence

9 Greatest drawback of systematic sampling is that

(A)   One requires a large sample

(B)   Data are not easily accessible

(C)   No single reliable formula for standard error of mean is available

(D)   None of the above

10 Which of the following statement is correct

(A) Systematic sample is superior than stratified random sample

(B) Simple random sample is inferior than systematic sample

(C) Stratified random sample is better than systematic sample

(D) None of the above