



DGG-003-017201

Seat No. _____

M. Sc. (Sem. II) (CBCS) (Statistics) Examination

May / June – 2015

Stat. CST. : 2001

Sample Survey & Statistical Quality Control

Faculty Code : 003

Subject Code : 017201

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Q-1 Answer any seven of the following. (Any Seven)

(14 Marks)

- (1) Ratio estimation is better than SRSWOR if $C_x = C_y$ and $\rho =$ _____
- (a) $\rho = \frac{1}{2}$ (b) $\rho > \frac{1}{2}$
(c) $\rho < \frac{1}{2}$ (d) none of these
- (2) In c – chart which distribution is used _____.
- a) Normal b) Poisson
c) Exponential d) truncated poisson
- (3) \hat{V}_{YG} is always positive for $n =$ _____
- (a) 3 (b) 5
(c) 1 (d) 2
- (4) In _____ sampling plan is a procedure in which a second sample is required to accept or reject a lot.
- a) Single b) Double
c) Multiple d) none of these
- (5) The random variable is unbiased $W =$ _____ is called Relative range.
- (a) $\frac{R}{\sigma}$ (b) $\frac{R}{\rho}$
(c) $\frac{r}{\sigma}$ (d) $\frac{r}{\delta}$
- (6) Mean square error of regression estimator is
- a) $\left(\frac{1-f}{n}\right) s^2_Y (1 - \rho^2)$ b) $\left(\frac{1-f}{n}\right) s^2_Y (1 - \rho)$
c) $\left(\frac{N-n}{Nn}\right) s^2_Y (1 - \rho^2)$ d) Both (a) and (c)
- (7) Ratio estimator is unbiased if bias of $\bar{Y}_R =$ _____
- (a) 0 (b) 1
(c) 2 (d) 3
- (8) When \bar{Y}_{ir} and Y_R are equally efficient then use _____.
- (a) Y_{ir} (b) Y_R
(c) Both (d) none

- (9) As the sample size increases the sampling error will tend to _____
- (a) increase (b) decrease
(c) constant (d) a and b
- (10) When a lot is very good / very bad quality then _____.
- a) $ASN_{DSP} = ASN_{SSP}$ b) $ASN_{DSP} \neq ASN_{SSP}$
c) $ASN_{DSP} > ASN_{SSP}$ d) $ASN_{DSP} < ASN_{SSP}$

Q-2 Answer the following questions. (Any Two) (14)

1) Prove that (i) $E(\bar{Y}) = \bar{Y}_..$

$$(ii) V(\bar{Y}_{mn}) = \left(\frac{1}{n} - \frac{1}{m}\right) S_b^2 + \frac{1}{n} \left(\frac{1}{m} - \frac{1}{M}\right) S_w^2$$

- 2) Explain Regression method of estimation?
3) Estimation of population mean (PPSWOR) ?
4) Explain P-chart for variable sample size ?

Q-3 Answer the following questions. (14)

- 1) Explain Yates and Grundy method
2) Briefly explain control chart for Range

OR

Q-3 Answer the following questions. (14)

- 1) Explain Midzuno scheme of sampling
2) Explain Mean Square Error of Regression estimator

Q-4 Answer the following questions. (Any Two) (14)

- 1) Compute the variance of ratio estimator of the population mean when $N = 100$, $n = 25$, $\rho = \frac{1}{2}$, $C_x = C_y$ compute it with SRSWOR?
- 2) Explain the following terms :-
(a) AQL
(b) LTPD
(c) AOQ
- 3) Comparison of regression estimator with SRSWOR and ratio estimator .
- 4) Prove that $E = \frac{m-1}{m} \frac{E(S_w^2)}{mE(S_b^2)} + \frac{1}{M}$

Q-5 Answer the following questions. (Any Two)

(14)

- 1) what is non-sampling error ?
 - 2) Prove that Unbiased estimator $V(\bar{z}) = S_z^2/n$.
 - 3) Derive Bias of Ratio estimator ?
 - 4) Prove that (1) $E(\bar{Y}_{nm}) = \bar{Y}_{NM}$
(2) $(\frac{1}{n} - \frac{1}{N}) S_b^2$
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