Q. 1

1. A sample consists of
   (a) All units of the population
   (b) 5% units of the population
   (c) 10% units of the population
   (d) Any fraction of the population

2. Sampling is used in the situations
   (a) Blood test of the patients
   (b) Cooking rice in an utensil
   (c) Purchase of food commodity from shopkeeper
   (d) All the above

3. The number of possible samples of size n out of N population size in SRSWOR is equal to
   (a) Ncn
   (b) Nn
   (c) (N-n)/N
   (d) n/N

4. Which of the following is the expression for $Var(\bar{y}_{st})$ under proportional allocation?
   a. a) $\left(\frac{1}{n}-\frac{1}{N}\right)\sum W_i S_i^2$
       b) $\sum \left(\frac{1}{n_i}-\frac{1}{N_i}\right) W_i S_i^2$
   b. c) $\sum \left(\frac{1}{n_i}-\frac{1}{N_i}\right) W_i S_i$
       d) $\sum \left(\frac{1}{n}-\frac{1}{N}\right) W_i^2 S_i^2$

5. The number of possible samples of size n out of N population size in SRSWR is equal to
   (a) $n Nc$
   (b) N^n
   (c) (N-n)/N
   (e) n/N

6. The number of possible samples of size 2 out of 5 population size in SRSWOR is equal to
   (a) 10
   (b) 4
   (c) 2
   (d) 12

7. The number of possible samples of size 2 out of 5 population size in SRSWR is equal to
   (a) 25
   (b) 20
   (c) 2
   (d) 12

8. Probability of a drawing unit at each subsequent draw remains same in
   (a) SRSWOR
   (b) SRSWR
   (c) Both (a) &(b)
   (d) None

9. The sampling fraction in usual notation is expressed as
   (a) n/N
   (b) N/n
   (c) 1-n/N
   (d) None.

10. The finite population correction in usual notation is expressed as
    (a) (N-n)/N
    (b) 1-(n/N)
    (c) Both(a)&(b)
    (d) None

11. 10.A selection procedure of sampling having no involvement of probability is known as
    (a) SRSWOR
    (b) Purposive sampling
    (c) SRSWR
    (d) None

12. For gathering information on rare events, sampling is used
    (a) SRSWOR
    (b) Stratified random sampling
    (c) Inverse sampling
    (d) None

13. 12. If a larger units have more probability of their inclusion in the sample, the sampling is known as

    (a) SRSWOR   (b) PPS sampling

    (c) Stratified random sampling   (d) None

14. Simple random samples can be drawn with of help of

    (a) Random numbers table   (b) Chit Method

    (c) Roulette wheel   (d) All the above

15. Sampling frame is a list of

    a) A list of units of a population

    b) A list of random numbers

    c) A list of natural numbers

    d) None

16. In SRSWR, the same sampling unit may be included in the sample

    (a)   Only once   (b) Two times   (c) More than once   (d) None

17. 16.The discrepancies between the estimate and the population parameter is known as

    (a) Sampling error (b) Non-sampling error (c) Formula error (d) None

18. The error in a survey other than sampling error is known as

    (a) Sampling error   (b) Non-sampling error   (c) Formula error (d) None

19. A function of sample observations is known as

    (a) Statistic (b) Estimator (c) Both (a)&(b) (d) None

20. If the sample sizes are large from the population, then which error will contribute more errors

    (a) Sampling error   (b) Non-sampling error   (c) Both(a)&(b)   (d) None

21. If the sample sizes are large from the population, then which error will contribute less errors

    (a) Sampling error (b) Non-sampling error (c) Both (a)&(b) (d) None

22. Simple random sample can be drawn with the help of

    (a)random number tables(b)Chit method (c) roulette wheel (d) all the above

23. If each and every unit of a population has an equal chance of being included in the sample, it is called

    (a) restricted sampling   (b) unrestricted sampling

    c) purpsive sampling   (d) subjective sampling

24. If a sample of n items is selected from a population of N items, the sampling fraction is ......

    a) $\frac{1}{n}$ b) $\frac{1}{N}$ c) $\frac{N}{n}$ d) $\frac{n}{N}$

25. If the observations recorded on five sampled items are 3,4,5,6,7,then sample variance is equal to

(a)0   (b) 1   (c)2   (d) 2.5

26. If all the observations in a set of observations are the same, then variance of set of values is

(a) 0   (b) 2   (c) infinite   (d) none

27. If the sample values are 1,3,5,7,9 then S.E. of sample mean is

(a) 2   (b) $\sqrt{2}$ (c) 3   (d) $\sqrt{3}$ ħ ( )

28. As a normal practice sampling fraction is considered to be negligible if it is

(a)more than 5%   (b) less than ≤ 5%

(c) More than 10%   (d) none

29. Systematic sampling is used when

(a) when data are on cards   (b) when the items are in row

(c) when the items are given in a sequential order   (d) all the above

30. If the population units N is multiple of n and k, then we use

(a) linear systematic sampling   (b) circular systematic sampling

(c) random systematic sampling   (d) all the above

31. What is optimum sample size for i^{th} strata in Neyman optimum allocation with equal sampling per unit cost in each stratum?

a) $ni=\dfrac{nNiSi}{N}$ b) $ni=\dfrac{nNiSi}{\sum NiSi}$

c) $ni=\dfrac{nN}{Ni}$ d) $ni=\dfrac{n\sum NiSi}{N}$

32. Circular systematic sampling is used when

(a) N is a whole number   (b) N is not divisible by n

(c) N is a multiple of n   (d) All the above.

33. Problem of non-response has

(a) no solution   (b) can be solved

(c) no meaning   (d) none

34. If sample sizes increase, then sampling error will

(a) increase   (b) decrease   (c) both (a) &(b)   (d) none

35. If sample sizes increase, then non-sampling error will

(a) increase   (b) decrease

(c) both (a) &(b)   (d) none

36. A population is divided into clusters and it has been found that all the units within a cluster are same. In this situation which sampling will be adopted

(a)SRSWOR   (b) Stratified random sampling

(c) Cluster sampling   (d) Systematic sampling

37. A population N is divided into k strata. A sample of size n is to be chosen and Ni is the size of the ith stratum. Then sample size n as per proportional allocation is given by

(a) ni=nN   (b) ni/Ni=n/N   (c) niNi=nN   (d) none

38. In case of inverse sampling, the proportion p of m units of interest contained in a sample of n units is equal to

(a) m/n   (b)(m-1)/n   (c) (m-1)/(n-1)   (d) (m-1)/(n+1)

39. In which method of estimator, the aggregate information on auxiliary variable is used?

    a) Ratio method of estimation

    b) Regression method of estimation

    c) Both ratio and regression estimator method of estimation

    d) Estimation in SRSWOR

40. If the respondents do not provide the required information to the researcher, then it is known as

(a) non-sampling error   (b) the problem of non-response

(c) both (a) &(b)   (d) none

41. The errors falling under faulty planning of survey, it is called

(a) non-sampling errors   (b) non-response errors

(c) Sampling errors   (d) Absolute error

42. If there is a certain number of very high values in the sample, it is preferable to compute

(a) Standard error   (b) Standard deviation

(c) variance   (d) all the above.

43. For estimating the population mean T, let T1 be the sample mean under SRSWOR and T2 sample mean under SRSWR, then which relationship is true

(a) Var(T1)< Var(T2)   (b) Var(T1)> Var(T2)   (c) Var(T1)≤ Var(T2)   (d) none

44. The magnitude of the standard error of an estimate is an index of its

(a) accuracy   (b) precision   (c) efficiency   (d) none

45. In case of SRS for attributes the population is divided into.....

    a) Two classes

    b) More than two classes

    c) Two mutually exclusive classes

    d) Two mutually exclusive and exhaustive classes

46. .Which of the following statement is true

(a) population mean increases with increase in sample size

(b) population mean decreases with increase in sample size

(c) population mean decreases with decrease in sample size

(d) population mean is a constant value.

47. A sample of 25 units from a population with standard deviation 10 results into a total score of 450. Then the mean of sampling distribution is equal to

(a) 45 (b) 18   (c) 50   (d) none

48. A population is perfectly homogeneous with respect to a characteristic, what size of sample would you need

(a) no sample (b) a large sample   (c) a small sample   (d) a single sample.

49. In systematic sampling, sample mean provides an unbiased estimator of population mean if...

a) N=nk   b) N<nk   c) N>nk   d) N≠nk

50. If the respondent does not supply the required information, then which of   the following errors occurs?

a) Non sampling error   b) Sampling error

c) Experimental error   d) Respondent error

51. A large city is divided into 100 non-overlapping blocks. Four blocks are selected at random and completely enumerated. Which of the following this   procedure corresponds to?

   a) systematic sampling   b) cluster sampling

   c) stratified sampling   d) partial census

Q2.

1) In case of SRSWOR show that sample mean is an unbiased estimator of   mean. Also derive an expression for the variance of this estimator.

2) Define simple random sampling, show that sample mean is an unbiased estimator of population mean and find its variance

3) In case of SRSWOR show that- $E(s^2) = S^2$

4) Derive an expression for the variance of sample mean of i) SRSWR ii) SRSWOR. Also compare them and comment.

5) Describe the method of determining sample size stating the assumptions made in case of sampling for proportions for desired margin of the error and confidence coefficient.

6) What do you mean by sampling for proportion? Obtain an unbiased estimator of population proportion and standard error of this estimator under SRSSWOR

7) Describe the procedure of stratified random sampling. Obtain an unbiased estimator of population mean & find its variance under proportional allocation.

8) Describe the procedure of stratified random sampling. Obtain an unbiased estimator of population total & find its variance under proportional allocation.

9) Explain Stratified random sampling. Obtain sample size from each stratum under optimum allocation. Obtain variance of $\bar{y}_{st}$ under optimum allocation.

10) With usual notation prove that-

$$V(\bar{y}_{st})\,opt \leq V((\bar{y}_{st})_{prop} \leq Var\,(\bar{y}_n)_R$$

11) Define systematic sampling. For population with linear trend $Yi=i$ for $i=1,2....N$, Prove that $Var\,(y_{st}) \leq Var(\bar{Y}\,sys) \leq Var\,(\bar{y}_n)_R$

12) Find the variance of systematic sample mean and compare systematic sampling with

13) Explain the technique of drawing cluster sample. Give an unbiased estimator of population mean and derive the expression for standard error of the estimator.

14) Define cluster sampling. State the estimator of population total under cluster sampling with equal cluster and obtain its variance.

15) Define systematic sampling. Find variance of systematic sample mean and compare systematic sampling with SRSWOR

16) Explain Stratified random sampling. Obtain sample size from each stratum under Proportional allocation. Obtain variance of $\bar{y}_{st}$ under Proportional allocation

Q3.

1) Explain the ratio and regression methods of sampling. Compare the ratio method with regression method of estimation
2) Show that sample proportion is an unbiased estimator of population proportion.
3) Describe idea of two stage and multi stage sampling
4) Work out Neyman's Optimum allocation principle of drawing units in stratified random sampling.
5) Write note on sampling and non-sampling error
6) Give situations of systematic sampling where it is applicable
7) Give an idea about circular systematic sampling.

8) Define i) Sampling unit ii) Sampling frame.
9) In a population of 1000 units the population variance $S^2 = 100$ What should be the size of the sample taken from it, so that 95% of sample mean may differ from the population mean by not more then 0.5? (t= 1.96 at 5% level of significance)
10) Explain SRSWOR and SRSWR sampling method and compare.
11) Explain how systematic sampling can be regarded as a particular case of cluster sampling.

12) For 95% confidence coefficient and marginal error 'd', provided sample size is large, in SRSWOR show that- $n = \dfrac{N*S^2*(1.96)^2}{[(1.96)^2*S^2+N*d^2]}$
13) State briefly the advantage of sampling over census.

14) In SRSWOR show that S.E. of the sampling distribution of sample mean is

$$S.E\ (\bar{Y}_n) = \sqrt{(N-n) * s^2 / N * n}$$

15) Determine the size of sample in sampling for proportion.

16) In Simple random sampling show that probability of selecting any specified unit in the sample is $\frac{n}{N}$

17) Give an idea of circular systematic sampling

18) In Stratified sampling with usual notation show that

$$V(y_{st})_{prop} \geq V(y_{st})_{opt}$$

19) Prove that in cluster sampling with equal cluster size sample mean is an unbiased estimator of population mean.

20) What are the characteristics of good questionnaire?

21) State ratio and regression estimator of population mean and population total

22) Write note on sampling frame.

23) Write note on planning of sample survey.

24) Define Simple random sampling. Write the difference between SRSWR and SRSWOR.

25) In SRSWR show that Var $(\bar{y}_n) = \frac{N-1}{N} * \frac{s^2}{n}$