**1) Define simple random sampling. Give the name of 2 methods of simple random sampling.**

* In this sampling method, each item in the population has an equal and likely possibility of getting selected in the sample.
* It is used to select a subset of individuals or items from a larger population.

Two methods of simple random sampling: -

1. Lottery Method: - This method involves assigning a unique number to each number of the population and then using random number generator or hat to select individuals for the sample. This ensures that each individual has an equal chance of being selected.
2. Random Number Table Method: - In this method assign every individual a number by using random number generator then we randomly picked a subset of the population.

**2) When do we go for stratified random sampling?**

After dividing the population into smaller group, the researcher randomly selects the sampler. In the stratified random sampling, a population is divided into sub-groups to obtain a simple random sample from each group and complete the sampling process.

**3) What are the advantages of simple random sampling?**

* The data collected through this method is well informed.
* It is easy to pick the smaller sample size from the existing larger population.
* This method does not require any technical knowledge, as it is a fundamental method of collecting the data.

**4) A diameter of a component produced on a semi-automatic machine is known to be distributed normally with a mean of 10 mm and a standard deviation of 0.1 mm. If a random sample of size 5 is picked up, what is the probability that the sample mean will be between 9.95 mm and 10.05mm.**

Mean=10mm

Sd=0.1mm

random sample mean=5

P(9.95<=Z<=10.5) = 2\* P(10<=Z<=10.5)

=2\*P{(10-mu)/sd\*sqrt(n)<= (x-mu)/sd\*sqrt(n)<= (10.05-mu)/sd\*sqrt(n)}

=2\*P(0<=Z<=((10.5-10)/sqrt(.1/5))

=2\*P(0<=Z<=1.12)

=2\*0.3686

=0.7372

**5) The time between arrival of two queuing systems is normally distributed with a mean of 2 minutes and standard deviation of 0.25 minutes. If a random sample of 36 is drawn, what is the probability that the sample mean will be greater than 2.1 minutes.**

mu=2

sd=0.25

n=36

P(x<2.21)=P(Z<(2.1-2)/(0.25\*sqrt(36)))

=P(Z<0.066)

=0.9999

**6) A company produces mobile phones of 800 mm height with a standard deviation of 300mm. A random sample of 16 items are drawn from the process. What is the probability that the sample mean will exceed 900 mm.**

Sd=300/sqrt(16)=75

z = (900 - 800) / (75) = 1.33

P(z > 1.33) = 1 - P(z < 1.33) = 1 - 0.9082 = 0.0918

7) **An auditor takes a random sample of size n = 36. From a population of 1000 accounts. Mean of the population of Rupees 260, and standard deviation is 45. What is the probability that the sample mean will be less than 250.**

Sd=45/sqrt(36)=45/6=7.5

z = (250 - 260) / (7.5) = -1.33

P(z > -1.33) = 0.0918

**8) In a particular cola company 5000 employees are on average 58 years old with a standard deviation of 8 years old. If a random sample of 50 people are taken, what is the probability that their average age will be less than 60 years.**

Sd=8/sqrt(50)=8/7.071=1.13

z = (60 – 58) / 1.13 = 1.77

P(z > 1.77) = 0.9616