Sampling

Practical 3

SYSTEMATIC SAMPLING

1. Below is the given data for a population of size 40 serially arranged from left to right

36	49	44	55	42	09	35	47	27	44
42	57	50	48	32	54	22	17	29	05
56	16	40	06	50	23	39	35	32	51
38	09	33	33	22	31	24	42	38	38

a) Construct all possible systematic samples of size 5

b) Estimate the population mean using systematic samples of size 5 with random start r = 6

c) Obtain variance of estimated mean of population mean

d) Compute i) S^2 ii) S^2_{wsy} iii) S^2_{wst} iv) p_w v) p_{wst}

2. Below is the data for 10 systematic samples with n = 4 and N = 10

Stratum Number	Sample Number									
	1	2	3	4	5	6	7	8	9	10
I	0	1	1	2	5	4	7	7	8	6
II	6	8	9	10	13	12	15	16	16	17
III	18	19	20	20	24	23	25	28	29	27
IV	26	30	31	31	33	32	35	37	38	38

a) Obtain the variance of the estimated mean under,

   i. Simple random sampling without replacement
   ii. Stratified random sampling
   iii. Systematic Sampling

   Compare the results and recommend the best sampling design for the problem

b) What are the consequences reversing the order of observations on the first and third strata? Is your recommended sampling scheme in i) is best? Give reason

c) Obtain efficiency of systematic sample with respect to simple random sample and stratified sample in both cases (a) and (b)