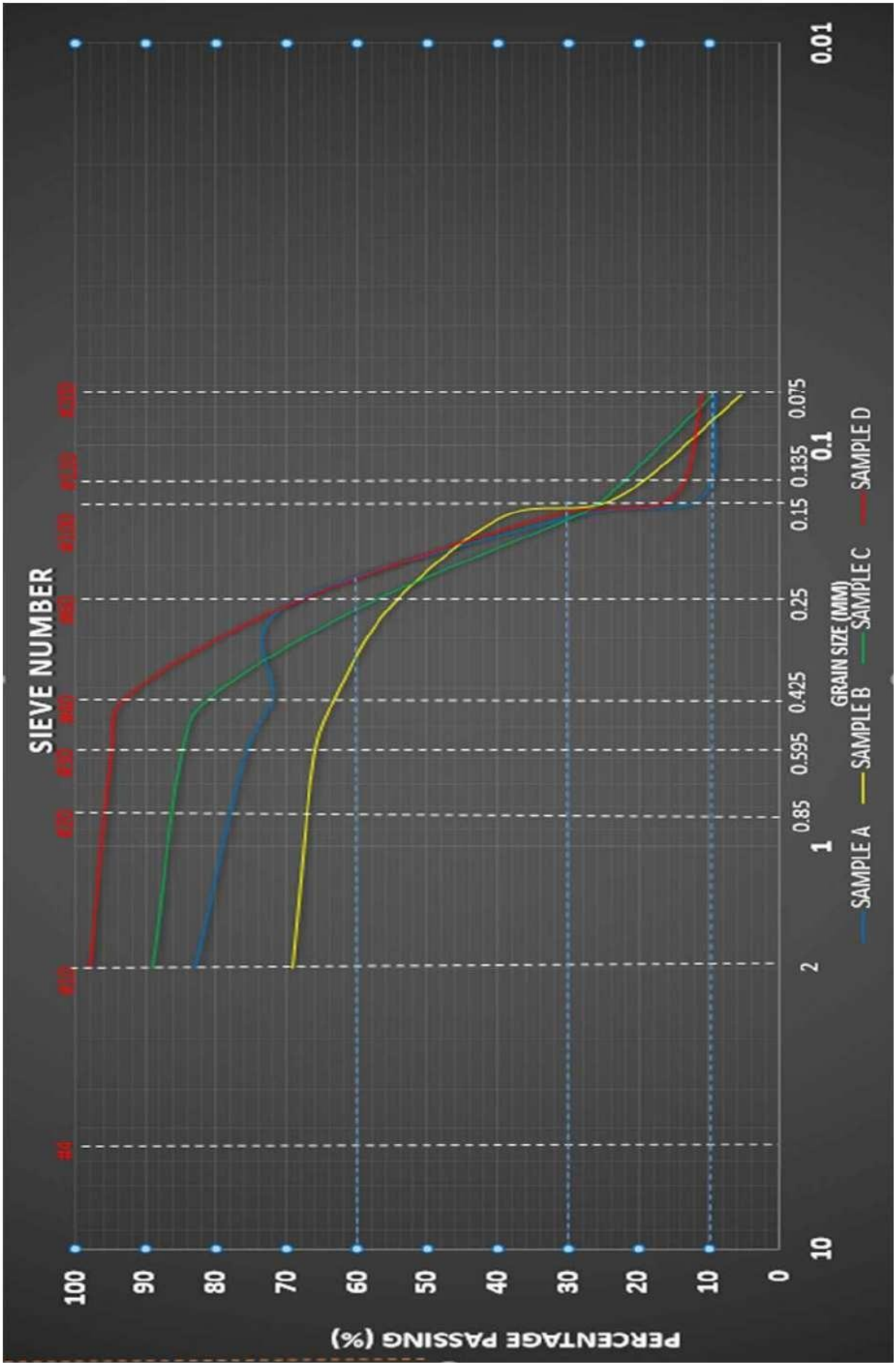


# QUESTION 1

**Classify the soil as per AASHTO & USCS.**

Sieve #	Cumulative % Retained			
	SAMPLE A	SAMPLE B	SAMPLE C	SAMPLE D
10	17	31	11	2
30	24	34	15	5
40	28	37	19	7
60	30	45	41	30
100	71	61	71	67.2
120	89	77	75.3	84.7
200	91	94.6	90.5	89
Pan	99.7	95	100	99.7
LL	31	N/A	54	29
PL	06	N/A	31	21

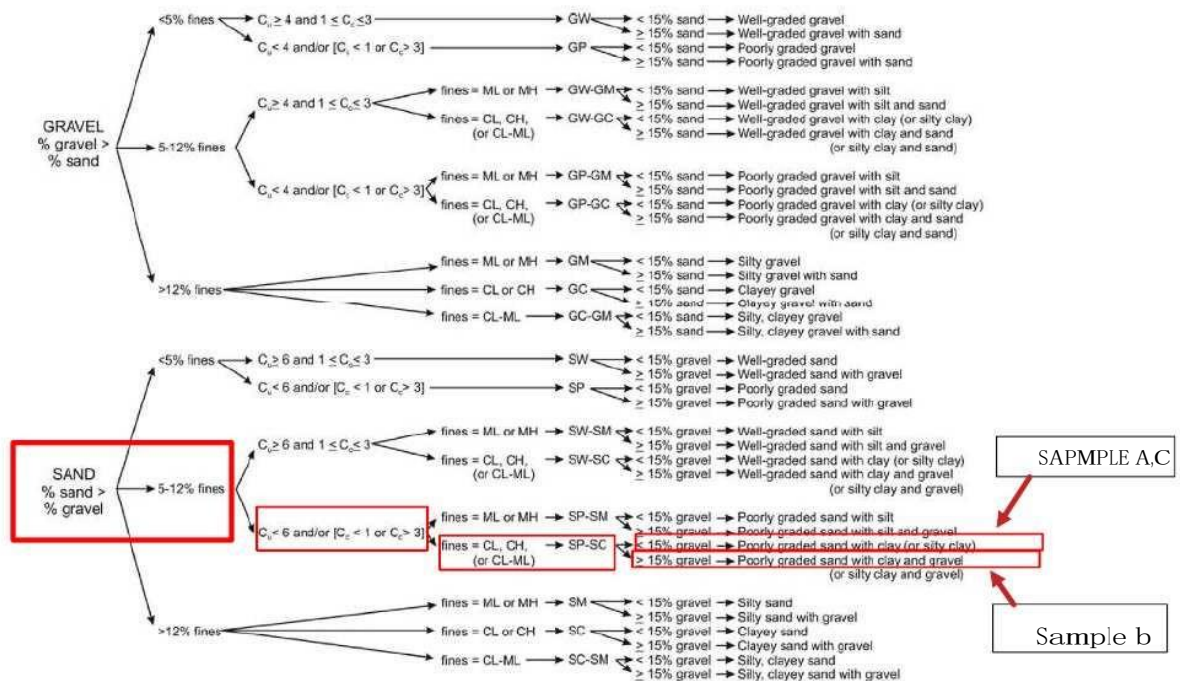
SIEVE NO	GRAIN SIZE (mm)	SAMPLE A		SAMPLE B		SAMPLE C		SAMPLE D	
		CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)
10	2	17	83	31	69	11	89	2	98
30	0.595	24	76	34	66	15	85	5	95
40	0.425	28	72	37	63	19	81	7	93
60	0.25	30	70	45	55	41	59	30	70
100	0.15	71	29	61	39	71	29	67.2	32.8
120	0.135	89	11	77	23	75.3	24.7	84.7	15.3
200	0.075	91	9	94.6	5.4	90.5	9.5	89	11
PAN	-	99.7	0.3	95	5	100	0	99.7	0.3
LL	-	31	-	N/A	-	54	-	29	-
PL	-	6	-	N/A	-	31	-	21	-



SIEVE NO	GRAIN SIZE (mm)	SAMPLE A		SAMPLE B		SAMPLE C		SAMPLE D	
		CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)	CUMMULATIVE RETAINED (%)	COMMULATIVE PASSED (%)
10	2	17	83	31	69	11	89	2	98
30	0.595	24	76	34	66	15	85	5	95
40	0.425	28	72	37	63	19	81	7	93
60	0.25	30	70	45	55	41	59	30	70
100	0.15	71	29	61	39	71	29	67.2	32.8
120	0.135	89	11	77	23	75.3	24.7	84.7	15.3
200	0.075	91	9	94.6	5.4	90.5	9.5	89	11
PAN	-	99.7	0.3	95	5	100	0	99.7	0.3
LL	-	31	31	ASSUME	30	54	54	29	29
PL	-	6	6	ASSUME	6	31	31	21	21
D 60		FROM CHART	0.2		0.33		0.26		0.22
D30		FROM CHART	0.16		0.15		0.17		0.16
D10		FROM CHART	0.075		0.089		0.075		-
Cu		D60/D10	2.67		3.71		3.47		-
Cc		$D_{30}^2 / (D_{10} \times D_{60})$	1.71		0.77		1.48		-
PI		LL-PI	25		24		23		8

## USCS – COARSE GRAINED SOILS

(>50% RETAINED ON #200 SIEVE)



### RESULTS

- SAMPLE A IS POORLY GRADED SAND WITH CLAY OR SILTY CLAY.
- SAMPLE B IS POORLY GRADED SAND WITH CLAY and GRAVEL.
- SAMPLE C IS POORLY GRADED SAND WITH CLAY OR SILTY CLAY.
- SAMPLE D CANNOT BE FOUND BY USCS.

# BY AASHTO METHOD

	SAMPLE A	SAMPLE B	SAMPLE C	SAMPLE D
SIEVE	CUMMULATIVE	CUMMULATIVE	CUMMULATIVE	CUMMULATIVE
NUMBER (#)	PASSING (%)	PASSING (%)	PASSING (%)	PASSING (%)
10	83	69	89	98
40	72	63	81	93
200	9	5.4	9.5	11
SOLUTION				
LL	31	30	54	29
PL	6	6	31	21
PI	25	24	23	8
AASHTO	A-2-6	A-2-6	A-2-7	A-2-4

Table 5.1. AASHTO Classification System

General Classification	Granular materials (35% or less passing No. 200 Sieve (0.075 mm))							Silt-clay Materials More than 35% passing No. 200 Sieve (0.075 mm)			
	A-1		A-3	A-2				A-4	A-5	A-6	A-7
Group Classification	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				
(a) Sieve Analysis: Percent Passing											
(i) 2.00 mm (No. 10)	50 max										
(ii) 0.425 mm (No. 40)	30 max	50 max	51 min								
(iii) 0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
(b) Characteristics of fraction passing 0.425 mm (No. 40)											
(i) Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
(ii) Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min*
(c) Usual types of significant Constituent materials.	Stone Fragments Gravel and sand		Fine Sand	Silty or Clayey Gravel Sand				Silty Soils		Clayey Soils	
(d) General rating as subgrade.	Excellent to Good							Fair to Poor			

\* If plasticity index is equal to or less than (Liquid Limit-30), the soil is A-7-5 (i.e. PL > 30%)  
If plasticity index is greater than (Liquid Limit-30), the soil is A-7-6 (i.e. PL < 30%)

## RESULT

- SAMPLE A IS SILTY OR CLAYEY GRAVEL SAND A-2-6.
- SAMPLE B IS SILTY OR CLAYEY GRAVEL SAND A-2-6
- SAMPLE C IS SILTY OR CLAYEY GRAVEL SAND A-2-7
- SAMPLE D IS SILTY OR CLAYEY GRAVEL SAND A-2-4