Assignment – Module 7

1. Consider the observations of mean annual flood (Q in cumec) obtained in 15 different watershed, as given in the table below. The mean annual flood is assumed to be dependent on area of watershed (A in hectares), rainfall (P in cm) and basin length (L in km). Obtain regression equation for Q in terms of remaining variables and obtain R^2 value.

Q	P	A	L
89	107	92	35
140	108	369	55
408	104	349	56
371	106	527	93
301	107	357	54
242	105	167	47
682	107	1190	112
133	103	104	39
97	104	57	25
640	75	1012	91
335	76	410	46
85	79	165	41
436	76	1992	143
446	79	3401	265
83	91	79	24

2. Obtain the principal components for the data given in problem no.1

3. The annual yield of a basin (Y in mm) is to be obtained from annual rainfall (in mm) of 4 stations (A, B, C and D) in and around the basin is given below. Obtain the multiple regression equation using PCA.

Y	A	B	C	D
929	556	1193	1569	834
1052	646	1048	2226	950
1120	568	1243	2111	810
1116	571	944	2016	982
1076	596	1208	1874	853
887	490	775	1690	969
876	395	673	1443	845
840	420	858	1128	768
861	385	698	1222	684
1129	457	1196	1687	1033
906	405	1037	1469	937
1082	475	1337	1823	1821
955	558	1300	1621	1753
1042	564	1095	1719	1612
1107	598	1194	1922	1919
1315	899	1750	2327	2583
999	420	843	1185	1420
925	483	1060	1199	1417
1146	678	1381	1914	1874

4. Obtain the lag one cross correlation of annual rainfall data at two sites C and B in problem no. 3

5. The annual flows (m³/sec) at two sites X and Y for 25 years are given below Generate ten values of data from the two sites, using the Matalas model.

Year	Q at X	Q at Y
1	803	834
2	1139	1012
3	1079	916
4	1031	970
5	959	975
6	864	819
7	738	751
8	577	747
9	625	690
10	863	1003
11	751	763
12	932	1068
13	829	886
14	879	858
15	983	883
16	1190	1224
17	606	752
18	613	783
19	979	905
20	652	701
21	869	829
22	1039	1011
23	813	814
24	973	843
25	1009	998