(123)

MAJOR EXAM
Air Quality Modelling (CEL892)

Time: 10.30 AM-12.30 PM
Total Marks- 35
Date: 7.5.2007
Room IV323

Q.1 Briefly discuss the following (include necessary equations/formulae where applicable):

(i) Time series patterns (any 2) 2.0
(ii) Uncertainty in terms of prediction intervals for any one step forecast with an example. 2.0
(iii) Define order and half width of moving averages. Estimate 3 and 5 order MA for the entire period (as far as possible) of the following data: 3.0

Time (Month)	1	2	3	4	5	6	7	8	9	10	11	12
Conc. (ppm)	194	149	210	273	191	287	226	303	289	421	264	342

(iv) What is autocorrelation function? Define Auto-covariance and autocorrelation of lag k. 3.0

Q.2 Discuss in detail the Single Exponential Smoothing forecast method. Calculate the forecast for the following data for alpha= 0.1, 0.5 and 0.9 for the entire period of data in Q 1 (iii) and suggest what value of alpha is most appropriate and what order of MA (amongst 3 and 5) is better and why? 12.0

Q. 3 Briefly discuss the following:

(i) Rainout and washout of pollutants 2.0
(ii) Any one type of statistical distribution model 2.0
(iii) The highest and average concentration in a valley 3.0
(iv) Calculate average concentration in a valley for a source with emission height 100 m, valley width 500m, wind speed 1.5 m/s and source emission rate 1 g/s. 2.0

Q. 4 Discuss closed form analytical models giving examples and numerical first-order closure (K-theory) models. Highlight their differences with merits and demerits. 4.0