THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY, PATIALA
ELECTRICAL & INSTRUMENTATION ENGINEERING DEPARTMENT
END SEMESTER EXAMINATION (December 8, 2006)
ANALYTICAL INSTRUMENTATION (EI-008)

TIME: 3Hours **Marks: 90**

Course Instructor: Gagandeep Kaur

Note: Attempt all questions in a given sequence strictly.

Q1.(a) What do you understand from spectroscopic analysis? Explain with diagrams the general schemes of the analysis applicable for gaseous, liquid and solid samples when IR spectroscopes are used? Differentiate dispersive and nondispersive techniques with neat labeled diagrams.

(b) How mass spectrometer works and how it is different from rest of the spectrometer? **(9, 9)**

Q2.(a) How air pollution is affecting visibility? Give components of ambient monitoring or source sampling device.

(b) What are ion selective electrodes? Differentiate glass electrode and gas sensing electrode with labeled diagram. How indicator electrode and reference electrode potential help in the measurement? **(9, 9)**

Q3.(a) How high pressure liquid chromatogram works? Explain with diagram.

(b) How Polarimetry and Refractometry help in the analytical analysis methods. Explain with neat diagram. Give industrial application of each. **(9, 9)**

Q4.(a) What are the measurement techniques used to measure pollutants in water? Explain them.

(b) Design waste water treatment plant assuming all the selection factors. **(9, 9)**

Q5.(a) The chopper is _____ disc which reflects the _____ and transmits the _____.

(b) Gravimeteric method states _____.

(c) What are the measurement principles of following gases?

Carbon monoxide	
Carbondioxide	
Ozone	
Oxygen	
Nitrogen Oxide	
Hydrocarbons	

(d) Output of electrochemical cell is 5V, reference voltage of 1.5V is used. Find the potential of indicating electrode when junction potential is negligible.

(e) Spectroscopic instruments are designed to provide bands of radiation of known _____ and _____. Give their classification.

(2,2,6,4,4)