DEPARTMENT OF MECHANICAL ENGINEERING
Motilal Nehru National Institute of Technology, Allahabad - 211004
End Semester Examination 2014-15
Power Plant Engineering [EE1607]
B. Tech. IV Semester [Electrical Engineering]

Time: 3 Hours **M.M. 60**

Note: a) Attempt All the Questions.
b) Separate answer sheets to be issued for Part A and Part B.

PART A

1. What do you understand by nuclear fission? Explain the principle parts of nuclear power plant. Describe the type of nuclear reactors with suitable sketch. What are advantages of pressurized water reactor over the boiling water reactor? [10]

2. Describe the classification of IC engine. Describe the six system of diesel power plant with suitable sketch. Explain the diesel cycle with help of diagram. [9]

3. Explain ideal brayton cycle with the help of diagram. Describe the working principle of gas turbine power plant. Draw schematic of the open cycle gas turbine power plant and explain in details. [8]

4. Differentiate between [9]
   a) Closed cycle and open cycle gas power plant
   b) Four stroke and two stroke diesel engine
   c) Mechanical dust collector and electrostatic precipitator

PART B

5 (a) Draw a neat sketch showing important components of Francis turbine. [12]

(b) Define specific speed of hydro turbine. Also draw the efficiency vs load characteristics of Pelton, Francis, Kaplan turbines.

(c) Select the type of hydro turbine for a site in grid connected operation. Given parameters: Head= 300m, Discharge = 0.2 cu.m/sec.

(d) Explain with neat sketch the operation of governing system (hydraulic-mechanical governor) for Pelton turbine.

6 A thermal power plant spends Rs.25 lakhs in one year of coal combustion. The cola has heating value of 5000 kcal/kg and costs Rs 500/ton. If the thermal efficiency is 35% and electrical efficiency is 90%, find the average load on power plant. [3]

7 What are the major factor affecting the cost of generation in a power plant. Discuss in brief the following the factors commonly used in plant economics: [3]
Load factor, plant capacity factor, Plant use factor, diversity factor

8 What is the significance of load curve? Draw the load curve with neat sketch with brief the useful information being obtained. [3]

9 A generating station supplies the following loads to the various consumers. [3]
Industrial Consumer =750MW
Commercial establishment=350 MW
Domestic power =10 MW
Domestic light=50 MW
If the maximum demand on the station is 1000 MW and number of kWh generated per year is 50X105
Determine Diversity factor and average load factor.