

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

## SEVENTH SEMESTER B.TECH (INSTRUMENTATION AND CONTROL ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2015

## SUBJECT: POWER PLANT INSTRUMENTATION AND CONTROL (ICE-437)

Time: 3 Hours

MAX. MARKS: 50

5

## Instructions to Candidates:

- ✤ Answer ANY FIVE FULL questions.
- ✤ Missing data may be suitably assumed.
- <sup>1A</sup> With the help of a neat block diagram interpret the Figure 1A. What modification needs to be made to increase the efficiency? Draw and explain the same?



<sup>1B</sup> Figure 1B illustrates boiler water circulation methods. How are they different from that of a <sup>5</sup> condenser?





From Figure 2A Isolate, Draw and Describe

- 1. The cascade level control loop
- 2. any one flow control loop and
- 3. any one pressure control loop
- **3A** Identify the Figure 3A alongside.
- **3B.** What do you mean by a foaming? How does excessive foaming effect water level?
- Redraw the schematic of Figure 3A and label all the parts. What kind of valve is usually used with it?
- 3D. What is a ramsbottom valve? Draw, Label and explain its working.
- **3E**. State and explain a pressure *safety* interlock used here.



4A.	State and prove the Betz relation.	3
4B.	With a neat vector diagram state and explain the thrust and moment producing forces acting on a horizontal axis, airfoil type wind turbine.	3
4C.	Does a horizontal wind turbine adjust to changes in the incoming wind velocity? If yes, Justify with a control scheme.	2
4D.	With a neat diagram, explain the <i>control scheme</i> of a fast breeder type of nuclear reactor.	2
5A.	What is a flow duration curve? What is its significance?	3
5B.	Classify hydel-power plants on the basis of available head; State the type of turbine each uses	2
5C.	Define load factor. What is the nominal range of load factor for thermal power units?	2
5D.	State and Explain a scheme of precise flow measurement for large perennial rivers.	3
6A	What is meant by proximate and Ultimate analysis of coal? How is it done and why is it so important?	3
6B.	State and explain the factors that determine the design and height of chimney of a thermal power plant.	2
6C.	Why is measurement of valve position on steam inlet important? State any method by which it is done.	3
6D.	With the help of a neat flowchart explain the steps involved in monocrystalline solar cell fabrication	2