

**II B.Tech I Semester Supplementary Examinations, November 2006**  
**PRIME MOVERS AND PUMPS**  
**(Electrical & Electronic Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) What is Cavitation? How can it be avoided in reaction turbine? [8+8]  
(b) What is specific speed? State its significance in the study of hydraulic turbines.
2. (a) Compare reciprocating pump and Centrifugal pump? [8]  
(b) What is the maximum suction lift for centrifugal pump and why?
3. (a) Classify the impellers of a centrifugal pump. [6]  
(b) Explain similarity laws of a centrifugal pump. [10]
4. (a) Derive an expression for the air standard efficiency of the Joule cycle in terms of pressure ratio. [8+8]  
(b) An open cycle gas turbine power plant takes air at 1 bar and 15°C and compresses it to 5 bar. The maximum temperature of the cycle is limited to 800°C. The hot gases expand to 1 bar in the turbine and then are exhausted to atmosphere. Determine the power developed by the turbine plant and the thermal efficiency if the airflow is 1kg/s.
5. (a) Explain the term 'Valve timing diagram'. What is its importance? [5]  
(b) Define compression ratio. What is its range for SI and CI engine? [5]  
(c) Define Indicated thermal efficiency, Mechanical efficiency and brake thermal efficiency. What is the relation between these three? [6]
6. Why the safety valves are needed in a boiler? Sketch and describe a spring loaded safety valve? [10+6]
7. (a) What is the principle of operation of simple impulse steam turbines? [6]  
(b) Show a diagrammatic view of a simple impulse steam turbine and explain its constructional features. [10]
8. (a) Discuss the relative advantages and disadvantages of reciprocating I.C engines and gas turbines. [8+8]  
(b) With the aid of a schematic diagram, explain the working of a simple closed cycle gas turbine.

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