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Total number of printed pages – 2

B. Tech  
PEME 6402

## Seventh Semester (Special) Examination – 2013

### POWER PLANT ENGINEERING

BRANCH : MECH

QUESTION CODE : D 479

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.  
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
- What is the use of regenerator ?
  - What is the function of economizer ?
  - What are the advantages of reheat cycle over simple ranking cycle ?
  - What are the advantages of high pressure boilers ?
  - What are the methods used in ash handling system ?
  - What is "half life" of nuclear fuels ?
  - State the advantage of pulverized fuel firing.
  - What do you understand by (i) nozzle (ii) diffuser ?
  - Enlist the various types of losses taking place in a steam turbine.
  - Mention the various types of tariff.
2. (a) Discuss the essential features of a steam power plant. 6
- (b) Discuss the factors considered in selecting a site for steam power plant. 4

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3. Dry saturated steam at 5 bar enters a convergent-divergent nozzle at a velocity of 100 m/s. The exit pressure is 1.5 bar. The throat and exit areas are 1280 mm<sup>2</sup> and 1600 mm<sup>2</sup>, respectively. Assuming isentropic flow up to the throat and taking the critical pressure ratio as 0.58, estimate the mass flow rate and nozzle efficiency. 10
4. Explain with neat sketch, the construction and working of any one type boiler. 10
5. The following particulars apply to a two-row velocity compounded impulse wheel :  
 Steam velocity at nozzle exit = 600 m/s  
 Nozzle angle = 16°  
 Mean blade velocity = 120 m/s  
 Exit angles: first row moving blades = 18°, fixed guide blades = 22°, second row moving blades = 36°  
 Steam flow = 5 kg/s  
 Blade friction coefficient = 0.85  
 Determine (a) the tangential thrust (b) the axial thrust (c) the power developed (d) the diagram efficiency. 10
6. With the help of a sketch show all the important part of nuclear reactor. Describe briefly the functions of each part. 10
7. (a) Why are the steam turbines compounded ? What are the different methods of compounding ? 5  
 (b) Define (i) approach (ii) range (iii) cooling efficiency of a cooling tower. 5
8. Write short notes on any **two** of the following : 5×2  
 (a) Jet condenser and surface condenser  
 (b) BWR and PWR  
 (c) Critical pressure ratio and choked flow in nozzle  
 (d) Peak load, Demand factor and Load factor.

