

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

December, 2016

00412

BIME-017 : POWER PLANT ENGINEERING

Time : 3 hours

Maximum Marks : 70

Note : Answer any five questions. Assume missing data suitably, if any. Use of scientific calculator is permitted.

1. (a) Discuss the different criteria for selection for a site and also discuss the points of consideration of layout of a thermal power plant. 7
- (b) What do you understand by proximate and ultimate analysis of coal ? What are the uses of these analyses when coal is to be used as fuel in thermal power plants ? 7
2. (a) What are the different types of nuclear reactions that take place ? Explain the significance of each in nuclear power generation. 7

- (b) What are the different types of nuclear wastes ? Which are more dangerous and why ? How do you dispose the nuclear wastes ? 7
3. (a) Explain the working principle of a closed cycle gas turbine plant with help of a block diagram. 7
- (b) In an air standard gas turbine cycle, air at a temperature of 15°C and a pressure of 1.01 bar enters the compressor where it is compressed through a pressure ratio of 5. Combustion products enter the turbine at a temperature of 815°C and expand to the original pressure of 1.01 bar. Determine the ratio of turbine work to compressor work and the thermal efficiency when the engine operates on ideal Brayton cycle. 7
4. (a) How are the hydro turbines classified ? What points should be considered while selecting a right type of hydro turbine ? 7
- (b) A hydro turbine is to operate under a head 25 metres at 200 rpm. The discharge is $9\text{ m}^3/\text{sec}$, and the efficiency is 90%.
Determine : 7
- (i) Specific speed of the turbine
- (ii) Power generated
5. (a) List the essential components of a diesel power plant and explain them briefly. 7

- (b) During the trial of a four-stroke diesel engine, the following observations were recorded :

Area of indicator diagram = 475 mm^2

Spring index = 1.1 bar/mm

Length of indicator diagram = 62 mm

Dia of piston = 100 mm

Length of stroke = 150 mm

Engine speed = 375 rpm

Determine the

- (i) indicated mean effective pressure, and
(ii) indicated power. 7

6. (a) Enumerate and explain briefly the various methods to calculate the depreciation cost of a power plant. 7

- (b) What do you understand by the term 'tariff' ? What are the objectives and requirement of tariff? 7

7. Write short notes on the following : $4 \times 3 \frac{1}{2} = 14$

- (a) Co-generation
(b) Supercharging
(c) Plant Load Factor
(d) Superheater
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