| **BIME-017**

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

Term-End Examination

ОО713

June, 2018

BIME-017 : POWER PLANT ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

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

1. (a)   Discuss the different criteria for selection of a site and also discuss the points of consideration in the layout of a thermal power plant.   7

    (b)   What are the requirements of a good coal handling plant ? Explain.   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) In an air standard gas turbine, 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. Air enters the turbine at a temperature of 815°C and exfpands 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 an ideal Brayton cycle. 7

3. (a) What is the difference between blade efficiency and stage efficiency of a turbine ? How are these efficiencies associated with the performance of the turbine ? 7

(b) Explain the various methods of turbine governing with help of neat diagrams. 7

4. (a) Describe the construction and working of a Pressuridsed Water Reactor (PWR) with a neat sketch. List out its advantages. 7

(b) Draw the general layout and describe the various components of hydroelectric power plants. 7

5. (a) Explain the operation of a fuel pump in a diesel power plant. How is the fuel supply regulated in a diesel engine power plant ? 7

(b) A four-cylinder, four-stroke diesel engine runs at 1000 rpm. The bore and stroke of each cylinder are 100 mm andd 160 mm respectively. The dcut-off is 6·62% of the stroke. Assume that the initial conditions of air inside the cylinders are 1 bar and 20°C and mechanical defficiency is 75%. Calculate the air standard efficiency and brake power developed by the engine. Also calculate the bradke specific fuel consumption, if the air/fuel ratio is 20 : 1. Take k for air as 0·287 kJ/kg-K and clearance volume as 0·000084 m^3. 7

6. (a) What do you understand by the term 'tariff' ? What are the objectives and requirements of a tariff ? 7

(b) What are the cost elements of a thermal power plant ? Explain briefly. 7

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

   (a) Knocking

   (b) Plant Factor

   (c) Ignition Timing

   (d) Cavitation

   (e) Co-generation

   (f) Installed Capacity