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BME-058

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

00795 **December, 2014**

BME-058 : POWER PLANT ENGINEERING

Time : 2 hours *Maximum Marks : 70*

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

1. (a) What is the importance of thermal plants in the national power grid ? 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 in power plant ? 7

2. (a) What are the different methods used for reheating of steam ? Discuss the merits and demerits. 7

(b) What are the essential requirements of steam power station design ? 7

3. (a) What is an evaporator ? How are evaporators classified ? 7

(b) What do you mean by superheated flow ? Explain with the help of h-S diagram. 7

4. (a) Explain the working of nuclear reactor with neat sketch. 7

(b) Why is shielding of a nuclear reactor necessary ? What do you understand by thermal shielding ? 7

5. (a) What are the different methods of fuel injection used in diesel plants ? Which method is commonly used in diesel plants and why ? 7

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

Engine speed = 1500 rpm

Load on brake = 1200 N

Length of brake arm = 875 mm

Determine : 7

(i) Brake torque

(ii) Brake power

6. (a) What are the advantages of a gas turbine power plant over a same capacity steam power plant ? 7

(b) A gas turbine has a pressure ratio of 6 : 1 and a maximum cycle temperature of 600°C. The isentropic efficiencies of the compressor and turbine are 0·82 and 0·85 respectively. Calculate the power output, in kW, of an electric generator geared to the turbine when the air enters the compressor at 15°C at the rate of 15 kg/s. Take : C_p = 1·005 kJ/kg K and γ =1·4 for the compression process and take C_p = 1·11 kJ/kg K and γ = 1·333 for the expansion process. 7

7. (a) Explain the working of Pelton turbine with neat sketch. 7

(b) What safety measures need to be taken for the safe operation of a hydro-electric plant ? 7

8. Write short notes on any ***two*** of the following : 7+7

(a) Operational cost

(b) Wet pump lubrication system

(c) Supercharging