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BME–052

DIPLOMA IN MECHANICAL ENGINEERING (DME)/ADVANCED LEVEL CERTIFICATE COURSE IN MECHANICAL ENGINEERING

(DME/DMEVI/ACMEVI)

Term-End Examination

December, 2019

BME-052 : BASICS OF THERMAL ENGINEERING

Time : 2 Hours *Maximum Marks : 70*

Note : *Answer any five questions. All questions carry equal marks. Use of Scientific calculator, Steam tables and Mollier diagram is permitted. Assume missing data, if any.*

1. (a) " 'Internal energy' is a property of steam." Explain with justification. 7

(b) Define thermodynamic reversibility. Under what conditions a process is said to be reversible ? Explain. 7

2. (a) Explain the phenomenon of heat transfer of convection. State the Newton's law of cooling. 7

(b) Compare the renewable and non-renewable energy sources. List various engineering applications of solar energy. 7

3. (a) What is heat pump ? How does it differ from a refrigerator ? 7

(b) What are the four basic components of a steam power plant ? Explain with the help of a block diagram. 7

4. (a) State and explain the First Law of Thermodynamics for a closed system. 7

(b) Explain Joule's experiment with a neat sketch. 7

5. (a) What is the difference between boiler mountings and accessories ? Give examples of some mountings and accessories. Explain the working of a fusible plug. 7

(b) A cyclic heat engine operates between a source temperature of 1000°C and a sink temperature of 40°C. Find the least rate of heat rejection per kW net output of the engine. 7

6. (a) Enumerate the advantages of using steam condenser in a steam power plant. Explain the significance of vacuum efficiency and condenser efficiency. 7

(b) Give merits and demerits of a surface condenser over the jet condenser. 7

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

(i) Nozzles

(ii) Cooling Towers

(iii) Black Body

(iv) Impulse Turbine