

**DIPLOMA IN MECHANICAL  
ENGINEERING (DME)/ADVANCED  
LEVEL CERTIFICATE COURSE IN  
MECH. ENGG. (DMEVI/ACMEVI)**

**Term-End Examination**

**June, 2019**

**BME-052 : BASICS OF THERMAL ENGINEERING**

*Time : 2 Hours*

*Maximum Marks : 70*

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*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.*

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1. (a) With the help of examples, define thermodynamic property and process. 7
- (b) Define thermal equilibrium. State and explain the zeroth law of thermodynamics. Explain. 7

2. (a) What are the types of energy sources ? State various renewable and non-renewable energy sources. 7
- (b) What is function of a cooling tower ? How cooling towers are classified ? Explain any one of them with a neat sketch. 7
3. (a) Define a thermodynamic system. Explain the different types of thermodynamic systems with suitable example. 7
- (b) A heat engine receives heat at the rate of 1500 kJ/min and gives an output of 8.2 kW. Determine : 7
- (i) The thermal efficiency
- (ii) The rate of heat rejection
4. (a) What is Steam Condenser ? State its functions. 7
- (b) Describe the working of the Babcock and Wilcox boiler with the help of a neat sketch. 7
5. (a) State and explain Kelvin-Planck statement of the second law of thermodynamics. 7

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- (b) What do you understand by triple point ?  
What is quality of steam ? 7
6. (a) Define Entropy. What are the causes of  
entropy increase ? 7
- (b) Derive the equation for work done during  
an isothermal process. 7
7. Write short notes on the following :
- (i) Stefan-Boltzmann's law  $3\frac{1}{2}$
- (ii) Nuclear energy  $3\frac{1}{2}$
- (iii) Economiser  $3\frac{1}{2}$
- (iv) Flow through Nozzle  $3\frac{1}{2}$