

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

00933

Term-End Examination

December, 2016

BME-031 : ENERGY CONVERSION

Time : 3 hours

Maximum Marks : 70

Note : Answer any seven questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data, if any.

1. (a) Discuss energy and its conversion. 5
- (b) A device has a conversion efficiency of 91% and a power input of 120 MW.
 - (i) Calculate both the useful power output of waste power values in MW.
 - (ii) Draw a block diagram of the process. 5
2. (a) Explain multistage energy conversion. 5
- (b) Define and explain the scavenging process of 2-stroke engines. Also explain the working process of a 2-stroke SI engine. 5

3. (a) Explain photoelectric energy conversion. 5
- (b) What is calorific value ? Explain GCV and NCV. Why is the calorific value of a fuel important ? 5
4. (a) Give the chemical reactions of combustion process, when C_7H_{18} is combusted. 4
- (b) Explain the following : 6
- (i) Fuel-air ratio
- (ii) Overleaning and Overriching
- (iii) Stoichiometric ratio
5. (a) Explain solar power plant with a schematic diagram to generate electrical energy. 5
- (b) Explain wind power plant with a neat sketch. 5
6. (a) With a neat sketch, explain Biomass gasification system. 5
- (b) Explain the relative advantages and limitations of an open cycle gas turbine over a closed cycle gas turbine. 5
7. (a) What is a steam nozzle ? How are steam nozzles classified ? 5
- (b) What are the advantages of using steam condenser ? 5

8. (a) Explain parallel flow jet condenser. 5
- (b) Explain evaporative condenser with a neat sketch. 5
9. (a) Explain regeneration and reheat processes for a power plant using steam turbine. 5
- (b) Explain fluidised bed boilers. 5
10. (a) Air enters the compressor of a gas turbine plant operating on Brayton cycle at 1 bar, 27°C. The pressure ratio in the cycle is 6. If $W_t = 2.5 W_c$, where W_t and W_c are the turbine and compressor work respectively, calculate the maximum temperature and the cycle efficiency. 7
- (b) Describe the working of a simple constant pressure open cycle gas turbine. 3
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