

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

**Term-End Examination**

**December, 2018**

00733

**BME-031 : ENERGY CONVERSION**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Attempt any seven questions. Use of scientific calculator is permitted.*

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1. (a) A jet strikes a fixed curved vane at angle of  $\beta$  and leaves it at angle of  $\alpha$ . The angles are measured between direction of jet and central line (normal to curve). What force will be acting on the vane ? The shape of the vane is semicircular. 5

(b) Define power. Explain electromechanical energy conversion with the help of block diagrams. 5

2. (a) What do you mean by calorific value of fuel ? Explain Gross calorific value and Net calorific value. 5
- (b) What is wind energy ? With neat sketch, explain wind energy power plant. 5
3. (a) How are steam condensers classified ? 4
- (b) With a neat sketch, explain counter flow jet condenser. 6
4. (a) What is catalytic cracking ? Explain in brief, moving bed type catalytic cracking. 4
- (b) Explain the following : 6
- (i) Amagat's law
- (ii) Law of conservation of energy
- (iii) Dalton's law
5. (a) What is the function of a spark plug in a petrol engine ? How does combustion occur in diesel engine ? 5
- (b) Differentiate between boiler mountings and boiler accessories. Give two examples of each. 5

6. (a) What are the different types of coal ? Which type of coal contains maximum moisture and which type of coal contains maximum carbon ? 5
- (b) Discuss proximate and ultimate analysis of coal. Explain how water content of coal is determined. 5
7. (a) What are the different forms of energy ? Describe them in detail. 5
- (b) Discuss the difference between direct and multi-stage conversion. 5
8. (a) Define the terms 'octane number' and 'cetane number'. How can octane number of fuels be determined ? 5
- (b) Coal having gross calorific value of 33.5 MJ/kg consists of 5% hydrogen and 10% moisture. Determine the net calorific value of the coal, if the sensible heat of water vapour is 2.45 MJ/kg. 5
9. (a) Differentiate between Reheat and Regenerative cycles for power plants. 5
- (b) Derive the expression for the efficiency of Otto cycle. 5
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