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BME-031

B. TECH. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) (BTME)

Term-End Examination

December, 2019

BME-031 : ENERGY CONVERSION

Time : 3 Hours *Maximum Marks : 70*

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

1. (a) Distinguish between a fire tube and a water tube boiler. In which case will the thickness of drum of water be less, if two types of same capacity are compared ? Which boiler will have less reserved energy and why ? 5

(b) Show the shapes of fixed and moving blades in impulse and reaction turbine working on steam. 5

2. (a) Explain the working of a 4-stroke S. I. engine with neat sketches. 5

(b) Explain the difference between 2-stroke and 4-stoke engines. 5

3. (a) Define indicated power (IP) and brake power (BP) of an engine. Also define mean effective pressure. Show, how you would calculate IP. 5

(b) Describe, how (BP) of an engine is measured in a laboratory. Why do you need to cool brake pulley ? 5

4. What are the methods of removing particulate matter from fire gases ? Describe any *one* of them. What harmful effects are associated with particulate matter exhausting in atmosphere ? 10

5. (a) Classify the steam condensers. Draw the schematic of a condensing plant and show the essential components. 5

(b) Draw the schematic of an evaporative condenser. What are its special characteristics ? 5

6. (a) Distinguish between throttling and adiabatic processes. 5

(b) What do you understand by life cycle costing ? Explain the total life cycle cost of photovoltaic system. 5

7. (a) Describe the characteristics of coke and briquette fuels. 5

(b) What is the role of fundamental laws for Stoichiometric calculation ? Explain each in brief. 5

8. Sketch the Babcock and Wilcox boilers and show the position of superheater. Why are the tubes in this boiler inclined ? Show the path of hot gases. 10

9. (a) Describe the integrated power generating systems for rural areas. 5

   (b) Define combustion efficiency. Explain the terms 'Gross calorific value' and 'Net calorific value'. 5

10. Write short notes on the following : $2\frac{1}{2}$ each

    (a) Wind energy

    (b) La-Mont boiler

    (c) Solar thermal system

    (d) Bio-gas generating system