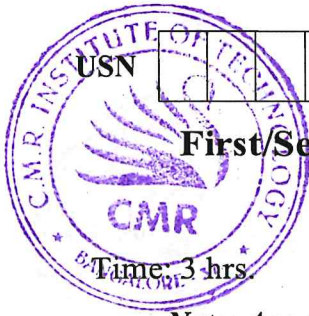


# CBCS SCHEME

15EME14/24



## First/Second Semester B.E. Degree Examination, Jan./Feb. 2021 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What are the advantages of Renewable Energy Resources? (04 Marks)
- b. With neat sketch, explain the working of Wind Mill. (06 Marks)
- c. Draw and label all the parts of Babcock and Wilcox boiler. Indicate the path of circulation of water flue gases. (06 Marks)

OR

- 2 a. Briefly explain the products released due to combustion of fuel. (04 Marks)
- b. Differentiate between:
  - (i) Boiler mountings and accessories
  - (ii) Water tube boiler and fire tube boiler (06 Marks)
- c. With the help of temperature enthalpy diagram, explain the heating process of water from 0°C into steam. (06 Marks)

### Module-2

- 3 a. Briefly explain the working principle of impulse steam turbine with suitable sketch. (06 Marks)
- b. Draw all the 4 stages and explain the working of 4-stroke diesel engine and label all the major parts. Indicate P-V diagram also. (10 Marks)

OR

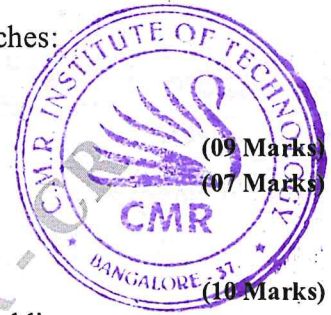
- 4 a. With neat sketch, explain the working of Francis turbine. (06 Marks)
- b. The following observations were obtained during a trial on a 4-stroke diesel engine:  
Cylinder diameter = 25 cm  
Stroke of piston = 40 cm  
Crankshaft speed = 250 rpm  
Brake load = 70 kg  
Brake drum diameter = 2 m  
Mean effective pressure = 6 bar  
Fuel consumption = 0.0013 kg/sec  
Calorific value of fuel = 43900 kJ/kg  
Calculate the following parameters of the engine:
  - (i) Brake power
  - (ii) Indicated power
  - (iii) Mechanical efficiency
  - (iv) Brake thermal efficiency
  - (v) Indicated thermal efficiency (10 Marks)

### Module-3

- 5 a. With suitable sketches, explain the following lathe operations:
  - (i) Taper turning by swiveling the compound rest (10 Marks)
  - (ii) Thread cutting (06 Marks)
- b. With sketch, explain Cartesian coordinate robot (06 Marks)

OR

- 6 a. Briefly explain the following drilling operations with suitable sketches:  
(i) Counter sinking  
(ii) Boring  
(iii) Counter boring  
b. Discuss the elements of a CNC system with a neat block diagram.

(09 Marks)  
(07 Marks)**Module-4**

- 7 a. Briefly explain different types of steel. (10 Marks)  
b. Explain different types of oxy-acetylene flames produced in gas welding. (06 Marks)

OR

- 8 a. Briefly explain how composites are classified. (05 Marks)  
b. Differentiate between soldering and welding. (05 Marks)  
c. With suitable sketch, explain the working principle of Arc Welding. (06 Marks)

**Module-5**

- 9 a. List out the desirable properties of good refrigerant. (06 Marks)  
b. Draw a neat sketch of a room air conditioner and explain its working. (10 Marks)

OR

- 10 a. Explain the refrigerants commonly used. (06 Marks)  
b. With the help of line diagram, explain the working of vapour compression refrigerator. (10 Marks)

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