

# CBCS SCHEME



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17EME14/24

## First/Second Semester B.E. Degree Examination, Dec.2019/Jan.2020 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain with a neat sketch the working of a nuclear power plant. (10 Marks)  
b. Distinguish between renewable and non-renewable source of energy with suitable examples. (06 Marks)  
c. Explain higher calorific value and lower calorific value. (04 Marks)

OR

- 2 a. Explain the formation of steam at constant pressure, with suitable sketches. (10 Marks)  
b. With a neat sketch, explain the working of a Babcock and Wilcox boiler, show the path of flue gases. (10 Marks)

### Module-2

- 3 a. Explain the principle of working of impulse and reaction turbine. (10 Marks)  
b. Differentiate between open and closed cycle gas turbine. (05 Marks)  
c. With a neat sketch, explain the working of Pelton wheel. (05 Marks)

OR

- 4 a. With the help of a PV diagram, explain the working of a four stroke diesel engine. (10 Marks)

- b. The following observations were obtained during a trial on a four stroke diesel engine:

Cylinder diameter	= 25cm
Stroke of the piston	= 40cm
Crank shaft speed	= 250rpm
Brake load	= 70kg
Brake drum diameter	= 2m
Mean effective pressure	= 6bar
Diesel oil consumption	= 0.1m <sup>3</sup> /min
Specific gravity of diesel	= 0.78
Calorific value of diesel	= 43900kJ/kg

Find:

- i) Brake power  
ii) Indicated power  
iii) Frictional power  
iv) Mechanical efficiency  
v) Brake thermal efficiency  
vi) Indicated thermal efficiency.

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-3**

- 5 a. Explain the taper turning by swiveling of the compound rest, with a neat sketch. (10 Marks)  
b. Explain Boring operation on a drilling machine with simple sketch. (06 Marks)  
c. List out the various operations that can be performed on a milling machine. (04 Marks)

OR

- 6 a. With the help of simple diagrams, explain various types of Robot joints. (10 Marks)  
b. Define automation. Explain different types of automation. (10 Marks)

**Module-4**

- 7 a. How do you classify engineering materials? (05 Marks)  
b. Define composite material. Explain metal matrix composite and polymer matrix composite. (10 Marks)  
c. State the various applications of composite materials. (05 Marks)

OR

- 8 a. Explain the principle of arc welding, with a neat sketch. (10 Marks)  
b. What are the applications of welding? (04 Marks)  
c. Differentiate between soldering and brazing. (06 Marks)

**Module-5**

- 9 a. Describe with a neat sketch the working of a vapour absorption refrigerator. (10 Marks)  
b. Explain the basic concepts of refrigeration. (06 Marks)  
c. Name the refrigerants that are commonly used. (04 Marks)

OR

- 10 a. Draw a neat sketch of a room air conditioner and explain its working principle. (10 Marks)  
b. What are the properties of a good refrigerant? Explain. (10 Marks)

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