

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

15EME14/24

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 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. Compare Renewable and Non-renewable energy resources. (05 Marks)
- b. Define "Calorific value" of fuel. Explain "Higher calorific value" and "Lower Calorific value". (06 Marks)
- c. Explain the principle of operation of "Solar Pond" with a neat sketch. (05 Marks)

OR

- 2 a. Draw the temperature enthalpy diagram for a constant pressure heating process to represent the following on it?
 - i) Sensible heat
 - ii) Latent heat of evaporation
 - iii) Amount of superheat
 - iv) Saturation temperature
 - v) Super – heated temperature
 - vi) Degree of superheat. (03 Marks)
- b. Name essential boiler mountings and state their respective functions. (07 Marks)
- c. Sketch and label all the parts of a "Babcock and Wilcox" boiler. Indicate the path of flue gases and water circulation in diagram. (06 Marks)

Module-2

- 3 a. Explain with a neat sketch the working principle of a gas turbine working on closed cycle. (04 Marks)
- b. Point out the differences between impulse and reaction steam turbines. (04 Marks)
- c. With a neat sketch explain the working principle of "Pelton" turbine. (08 Marks)

OR

- 4 a. Compare Two – stroke and Four – Stroke I.C Engines. (08 Marks)
- b. The following observations were recorded during a test on a 4-stroke engine :

Bore	=	250mm
Stroke	=	400mm
Crank speed	=	250rpm
Brake load	=	700N
Brake drum diameter	=	2m
Mean effective pressure	=	6 bar
Fuel consumption	=	0.1 litres/min
Specific gravity of fuel	=	0.78
Calorific value of fuel	=	43900 kJ/kg

Determine :

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

(08 Marks)

Module-3

- 5 a. Explain with neat sketches the following operations carried out on a drilling machine:
 i) Boring
 ii) Counter boring
 iii) Counter sinking. (08 Marks)
- b. Explain the following operations carried out on a Lathe machine, with neat sketches :
 i) Thread cutting
 ii) Taper turning
 iii) Knurling. (08 Marks)

OR

- 6 a. Define 'Robotics'. Classify robots based on robot configurations. (04 Marks)
 b. State the advantages and disadvantages of industrial robots. (04 Marks)
 c. Define "automation". Classify automation of production systems and explain in detail. (08 Marks)

Module-4

- 7 a. State the properties and applications of the following non-ferrous materials :
 i) Aluminium
 ii) Copper. (08 Marks)
- b. Define "composite". How are the composite materials classified? State the applications of composite materials in Aircraft and Automobile industry. (08 Marks)

OR

- 8 a. Bring out the difference between :
 i) Soldering and Brazing
 ii) Welding and Brazing. (08 Marks)
- b. Outline the general welding procedure for carrying out electric arc welding. (04 Marks)
 c. Write a short note on "Oxy – acetylene gas welding". (04 Marks)

Module-5

- 9 a. Name the refrigerants that are commonly used in practice. (02 Marks)
 b. State the properties of a good refrigerant. (06 Marks)
 c. Explain vapour compression refrigeration system with a neat diagram. (08 Marks)

OR

- 10 a. State the principle and applications of Air conditioners. (04 Marks)
 b. Compare vapour absorption and vapour compression refrigeration systems. (08 Marks)
 c. Define the following :
 i) Ton of refrigeration
 ii) Coefficient of performance. (04 Marks)
