

# CBCS SCHEME



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17EME14/24

## First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 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 petroleum based gaseous fuels. (06 Marks)
- b. Explain the principle and working of a wind mill with neat sketch. (08 Marks)
- c. Bio-fuels are alternate for fossil fuels, explain. (06 Marks)

**OR**

- 2 a. Explain with neat sketch the construction and working of Babcock and Wilcox boiler. (10 Marks)
- b. List the differences between fire tube and water tube boilers. (06 Marks)
- c. Explain any 4 devices which are necessary for safe operation of boilers. (04 Marks)

### Module-2

- 3 a. Explain with neat sketch Parson turbine and its pressure velocity diagram. (08 Marks)
- b. List the differences between open cycle and closed cycle gas turbine. (06 Marks)
- c. Explain the constructions and working of a Kaplan turbine with neat sketch. (06 Marks)

**OR**

- 4 a. Bring out the comparisons between 2-stroke and 4-stroke IC engine. (06 Marks)
- b. Explain with neat sketch a 4 stroke engine where combustion of fuel takes place at constant pressure. (07 Marks)
- c. A gas engine working on a 4 stroke cycle has a cylinder diameter of 0.25m and length 0.45m and running at 180RPM. Its mechanical efficiency is 80% and when mean effective pressure is 6 bar. Find the indicated power, break power and frictional power. What is its fuel consumption rate (kg/hr) and break specific fuel consumption (kg/kwh) if the energy content of the fuel is 42,000 kJ/kg and brake thermal efficiency is 25%. (07 Marks)

### Module-3

- 5 a. Explain knurling operations with a neat sketch. (06 Marks)
- b. Explain with neat sketches counter sinking and counter boring operations. (08 Marks)
- c. List the various milling operations and explain a milling operation using side and face cutter. (06 Marks)



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OR

- 6 a. Classify robots based on physical configuration and explain a robot which has a work envelop of hemisphere with neat sketch. (08 Marks)  
b. Explain the necessity of automation and important features of flexible automation. (06 Marks)  
c. List any 2 advantages, limitations and applications of NC/CMC machines. (06 Marks)

**Module-4**

- 7 a. Explain composite materials and its need in today's word. (06 Marks)  
b. Classify Ferrous metals with suitable example. (06 Marks)  
c. Define non-ferrous metals and explain any two non-ferrous metals and two alloys. (08 Marks)

OR

- 8 a. List out the comparison between soldering and brazing. (06 Marks)  
b. Explain with neat sketch the electrodes used in arc welding and its functions. (06 Marks)  
c. Explain oxy-acetylene welding process with neat sketch. (08 Marks)

**Module-5**

- 9 a. Define refrigerant and explain commonly used refrigerant (any 3). (06 Marks)  
b. Explain with neat sketch the principles and working of a vapour compression refrigerator. (08 Marks)  
c. Define the following : i) ton of refrigeration ii) coefficient of performance iii) relative COP. (06 Marks)

OR

- 10 a. Explain with a neat sketch, working of room air conditioner. (08 Marks)  
b. Explain with neat sketch the working of vapor absorption refrigerator. (08 Marks)  
c. List out the properties of a good refrigerant. (04 Marks)

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