



# Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2018-19

EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of FY B.Tech

Course Code: FYT104

Course Title: Elements of Mechanical Engineering

Semester – II

Day and Date Wednesday

29/05/2019

End Semester Examination (ESE)

Time: Max Marks: 100

10.30 to 1.30 PM

## Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.

| Q.1 | Solve any Two  | Marks | Bloom's Level  | CO  |
|-----|--|-------|----------------|-----|
| a)  | A nozzle is a device for increasing the velocity of a steadily flowing steam. At the inlet to a certain nozzle, the enthalpy of the fluid passing is 3000 kJ/kg and the velocity is 60 m/s. At the discharge end, the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it. (a) Find the velocity at exists from the nozzle. (b) If the inlet area is 0.1 m <sup>2</sup> and the specific volume at inlet is 0.187 m <sup>3</sup> /kg, find the mass flow rate.                    | 07    | L <sub>3</sub> | CO1 |
|     | OR   |       |                |     |
| a)  | Air flows steadily at the rate of 0.4 kg/s through an air compressor, entering at 6 m/s with a pressure of 1 bar and a specific volume of 0.85 m <sup>3</sup> /kg, and leaving at 4.5 m/s with a pressure of 6.9 bar and a specific volume of 0.16 m <sup>3</sup> /kg. The internal energy of the air leaving is 88 kJ/kg greater than that of the air entering. Cooling water in a jacket surrounding the cylinder absorbs heat from the air at the rate of 59 W. Calculate the power required to drive the compressor. | 07    | L <sub>3</sub> | CO1 |
| b)  | Explain with neat sketch working of 4 stroke CI engine.  | 08    |                | CO2 |
|     | OR   |       |                |     |
| b)  | Compare CI and SI engine.  | 08    | L <sub>2</sub> | CO2 |
| Q.2 | Solve any Two  |       |                |     |
| a)  | Explain construction and working of winter air conditioning system.  | 07    | L <sub>2</sub> | CO3 |
|     | OR   |       |                |     |
| a)  | What are the advantages of vapour absorption refrigeration system over vapour compression refrigeration system.  | 07    | L <sub>2</sub> | CO3 |

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|     |    |   |    |                |     |
|-----|----|---|----|----------------|-----|
|     | b) | Explain with neat sketch construction and working of Hydroelectric power plant.                             | 08 | L <sub>2</sub> | CO4 |
|     |    | OR  |    |                |     |
|     | b) | Distinguish between renewable and non-renewable sources of energy with example.                             | 08 | L <sub>2</sub> | CO4 |
| Q.3 |    | <b>Solve any Two</b>  |    |                |     |
|     | a) | Explain the following:<br>1) Point function and Path function<br>2) Extensive and Intensive Property        | 08 | L <sub>2</sub> | CO1 |
|     | b) | Define the following terms in IC engine:<br>1) TDC 2) BDC 3) Compression Ratio 4) Clearance Volume          | 08 | L <sub>1</sub> | CO2 |
|     | c) | Define the following terms in Refrigeration system:<br>1) ITR 2) WBT 3) DBT 4) COP                          | 08 | L <sub>1</sub> | CO3 |
|     | d) | Explain with neat sketch construction and working of Geo Thermal power plant.                               | 08 | L <sub>2</sub> | CO4 |
| Q.4 |    | <b>Solve any Two</b>  |    |                |     |
|     | a) | Derive an expression to find the length of belt for cross belt drive system.                                | 09 | L <sub>2</sub> | CO5 |
|     | b) | What is priming in centrifugal pump? Explain construction and working of centrifugal pump with neat sketch. | 09 | L <sub>2</sub> | CO5 |
|     | c) | Describe with neat sketch construction and working of lobe pump with its advantages and disadvantages.      | 09 | L <sub>2</sub> | CO5 |
| Q.5 |    | <b>Solve any Two</b>  |    |                |     |
|     | a) | Describe in brief steps involved in sand casting process.   | 09 | L <sub>2</sub> | CO6 |
|     | b) | Explain with neat sketch the operations performed on lathe machine and drilling machine.                    | 09 | L <sub>2</sub> | CO6 |
|     | c) | Explain types of rolling processes  | 09 | L <sub>2</sub> | CO6 |
| Q.6 |    | <b>Solve any Three</b>  |    |                |     |
|     | a) | Explain with neat sketch double acting reciprocating pump.  | 06 | L <sub>2</sub> | CO5 |
|     | b) | Classify with neat sketch types of gears.   | 06 | L <sub>2</sub> | CO5 |
|     | c) | Explain in brief arc welding processes  | 06 | L <sub>2</sub> | CO6 |
|     | d) | List out different cutting and non-cutting operation with neat sketch performed in sheet metal processes.   | 06 | L <sub>2</sub> | CO6 |

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