



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgavi)

**Second Semester, B.E. - Semester End Examination; May/June - 2018**

**Elements of Mechanical Engineering**

(Common to All branches)

Time: 3 hrs

Max. Marks: 100

*Note: i) Answer FIVE full questions, selecting ONE full question from each unit*

*ii) Assume suitably missing data if any.*

### UNIT - I

- |      |  |    |
|------|--|----|
| 1 a. | With neat sketches, explain water tube and fire tube boilers.                                    | 10 |
|      | b. What is enthalpy? Explain the formation of steam using temperature-enthalpy diagram.          | 10 |
| 2 a. | With neat sketches, explain the principle of operation of impulse and reaction turbines.         | 8  |
|      | b. With neat sketches, explain working of open and closed cycle gas turbines. Also compare them. | 12 |

### UNIT - II

- |      |   |    |
|------|---|----|
| 3 a. | With neat sketches, explain the working of two stroke petrol engine.  | 12 |
|      | b. A four stroke cycle oil engine has the following data :<br>mean effective pressure = 540 kPa, swept volume = 15 liters, speed of the engine = 6 rps,<br>effective break load = 80 kg, effective brake radius = 8 kg/h, calorific value of fuel = 40 MJ/kg.<br>Determine; | 8  |
|      | i) IP            ii) BP            iii) Mechanical efficiency            iv) Brake thermal efficiency.  |    |
| 4 a. | With neat sketches, explain the working of four stroke diesel engine.   | 12 |
|      | b. Define the following :   |    |
|      | i) Indicated power                            ii) Brake power   | 8  |
|      | iii) Mechanical efficiency            iv) Brake thermal efficiency.   |    |

### UNIT - III

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|------|--|----|
| 5 a. | Give a detailed classification of pumps.   | 8  |
|      | b. With neat sketches, explain;  |    |
|      | i) Single acting reciprocating pump system            ii) Centrifugal pump system. | 12 |
| 6 a. | With a neat sketch, explain vapour absorption refrigeration system.                | 10 |
|      | b. With a neat sketch, explain room air conditioner.                               | 10 |

### UNIT - IV

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|------|---|----|
| 7 a. | With neat sketches, describe the following lathe operations :                 | 14 |
|      | i) Cylindrical turning            ii) Thread cutting            iii) Tapping. |    |
|      | b. With neat sketches, differentiate between drilling, reaming and boring.    | 6  |
| 8 a. | With a neat sketch, explain vertical milling machine.                         | 10 |
|      | b. With a neat sketch, explain centreless grinding. What are its advantages?  | 10 |

## UNIT - V

- 9 a. With a neat sketch, explain oxyacetylene gas welding setup. Mention its two merits and demerits. 10
- b. Make a comparison between welding, brazing, and soldering. 10
- 10 a. Explain types of belt drives with sketches. 6
- b. Explain velocity ratio of belt drives. 4
- c. A 10 kW motor running at 1750 rpm has a pulley of 160 mm diameter fitted to it. It drives a line shaft at a speed of 800 rpm. Three machines are driven by the line shaft, their speeds being 300, 500, and 200 rpm. The pulleys attached to the machines are 240, 320 and 400 mm in diameter respectively. Find the size of pulleys to be fitted on to the line shaft. 10

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