



**VSM SRK INSTITUTE OF TECHNOLOGY, NIPANI**  
**First Semester B.E. Degree (CBCS) Preparatory Examination-June 2019**  
**Elements of Mechanical Engineering**

Time: 3 hrs

Max. Marks: 100

Note: 1. Answer any five full questions, choosing one full question from each module.  
 2. use of steam table is permitted

**MODULE-I**

1. a. Explain briefly the principle of working of a nuclear reactor.. (10 Marks)
- b. Illustrate the formation of steam with relevant sketches. (10 Marks)

**OR**

2. a. Explain the Zeroth law, first law and second law of thermodynamics. (10 Marks)
- b. Find the enthalpy of 1 kg of steam at 12 bar pressure when i) Steam is dry saturated, ii) Steam is 22% wet, iii) Superheated to 250°C. Given  $C_{ps} = 2.25 \text{ kJ/kg K}$ ,  $h_f = 798.4 \text{ kJ/kg}$ ,  $h_{fg} = 1984.3 \text{ kJ/kg}$   $t_{cs} = 188^\circ\text{C}$ . (10 Marks)

**MODULE-II**

3. a. With neat sketch explain the working of Babcock & Wilcox Boiler. (10 Marks)
- b. Explain the boiler mountings and accessories. (10 Marks)

**OR**

4. a. Classify hydraulic turbines & with a neat sketch explain the working of Francis turbine (10 Marks)
- b. Classify hydraulic pumps & explain the working principle of centrifugal pump. (10 Marks)

**MODULE-III**

5. a. With the help of P-V diagram explain the operation of 4-stroke petrol engine. (10 Marks)
- b. A four stroke single cylinder diesel engine piston diameter is 250 mm & stroke is 400mm. The MEP is 4bar & speed is 500 rpm. Diameter of the brake drum is 1000mm. The effective brake load is 400N. Find IP, BP & FP. (10 Marks)

**OR**

6. a. Define the following refrigeration terms. (i) Refrigerant (ii) Ton of refrigeration (iii) COP (iv) Relative COP (v) refrigerating effect. (05 Marks)
- b. Define refrigeration. State the applications of refrigeration. (05 Marks)
- c. Explain with flow diagram the vapor absorption refrigeration cycle. (10 Marks)

**MODULE-IV**

7. a. Explain various types of Cast Iron (09 Marks)
- b. Define composit material & classify it. (09 Marks)
- c. With a neat sketch explain the Oxy-Acetylene gas welding. (10 Marks)

Note: 1. on completing your answers, compulsory draw diagonal cross on the remaining blank pages.  
 2. any revealing of identification, appeal to evaluator and/ equations written. E.g. 38+2=40, will be treated as malpractice.

**OR**

8. a. Derive an expression for length of a open belt drive (10 Marks)  
b. What are the advantages & disadvantages of gear drives over belt drives. (10 Marks)

**MODULE-V**

9. a. Explain the following operations on lathe with suitable sketches; (10Marks)  
i) Turning, ii) Knurling, iii) Facing, iv) Thread cutting  
b. Explain the following operations on lathe with suitable sketches; (10 Marks)  
i) Form milling, ii) Angular milling, iii) Gang milling

**OR**

10. a. Explain the components of a CNC with a block diagram. (10 Marks)  
b. Elaborate the various robot configurations with simple sketches. (10 Marks)