M 2080

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Third Semester

Textile Technology

TT 1202 — MECHANICAL ENGINEERING

(Common to Textile Technology/Fashion Technology)

(Regulations 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

Approves Thermodynamic Tables 2 charts are permitted.

PART A — (10 × 2 = 20 marks)

1. State first law of Thermodynamics.

2. What is Polytropic Process?

3. State any two types of Thermodynamic cycles.

4. How the internal combustion engines are classified?

5. Define the term 'Dryness fraction'.

6. What do you understand by hypothetical indicator diagram?

7. Define the term kinematic link.

8. What is the function of a flywheel?

9. What is the ratio of tensions for a flat beet drive?

10. Why is balancing of rotating parts necessary for high speed engines?

PART B — (5 × 16 = 80 marks)

11. (i) Define the term internal energy. (4)

(ii) Explain free expansion and throttling process. (6 + 6)

12. (a) (i) Derive an expression for the efficiency of a stirling air engine with the aid of P–V and T–S diagrams. (8)

(ii) In an otto cycle, the temperature at the beginning and end of the isentropic compression are 316 K and 596 K respectively. Determine the air standard efficiency and the compression ratio. Take $\gamma = 1.4$. (8)

Or

(b) (i) Differentiate between petrol and diesel engine. (6)

(ii) Explain with the help of suitable sketches the working of a four stroke cycle diesel engine. (10)

13. (a) (i) What is meant by superheated steam ad list out the advantages of super heated steam? (8)

(ii) Determine the volume of 1 kg of superheated steam at a pressure of 20 bar and a temperature of 300°C. (8)

Or

(b) (i) Describe, with a neat sketch, the working of a simple steam engine. (10)

(ii) Distinguish between impulse and reaction turbine. (6)

14. (a) Sketch and explain any two inversions of a single slider crank mechanism. (8 + 8)

Or

(b) The turning moment diagram for a petrol engine is drawn to the following scales; turning moment 1 mm = 5 N–m; crank angle 1 mm = 1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moments line taken in order are 295, 685, 40, 340, 960, 270 mm^2. The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 rpm. (16)

15. (a) (i) What are the types of flat belt drives? (4)

(ii) Find the power transmitted by a belt running over a pulley of 600 mm diameter at 200 rpm. The coefficient of friction between the belt and the pulley is 0.25, angle of lap 160° and maximum tension in the belt is 2500 N. (12)

Or

(b) (i) Differentiate between simple gear train and compound gear train. (4)

(ii) Explain the method of balancing of rotating masses in the same plane. (12)
