

**D 4086**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

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.

Approved Thermodynamic Tables and Charts are permitted.

PART A — (10 × 2 = 20 marks)

1. Give the Kelvin–Planck statement of the second law.
2. What is a heat pump?
3. Define 'enthalpy' of a system.
4. State four processes of diesel engine.
5. What are the applications of internal combustion engines?
6. What is the function of steam turbine in the steam power plant?
7. What is meant by Kinematic Pair?
8. Define the term 'fluctuation of energy'.
9. Enumerate the various types of belts used for the transmission of power.
10. What do you mean by static balancing?

PART B — (5 × 16 = 80 marks)

11. (a) (i) List the important limitations of the first law of thermodynamics. Illustrate with examples. (8)
- (ii) A closed system undergoes a reversible process at a constant pressure of 3.5 bar and its volume changes from 0.15 m<sup>3</sup> to 0.06 m<sup>3</sup>. During the process 25 kJ of heat is rejected by the system. Determine the change in internal energy of the system. (8)

Or

- (b) (i) Define 'internal energy and prove that it is a property of the system. (8)
- (ii) A reversible engine with 40% efficiency discharges 1520 kJ of heat per minute to a pond at 27°C. Find the temperature of the source which supplies the heat to the engine and power developed by the engine. (8)
12. (a) (i) Explain diesel cycle with P-V and T-S diagram. (8)
- (ii) A Carnot engine, working between 650 K and 310 K, Produces 150 kJ of work. Find thermal efficiency and heat added during the process. (8)

Or

- (b) (i) Explain the classifications of internal combustion engines, in detail. (8)
- (ii) Explain the main parts of internal combustion engine. (8)
13. (a) (i) Differentiate between wet, dry saturated and super heated steam. (8)
- (ii) A certain amount of steam is produced at a pressure of 8 bar and a dryness fraction of 0.8. Determine :
- (1) External work done during evaporation (4)
- (2) and Internal latent heat of steam. (4)

Or

- (b) (i) Explain the various classifications of steam turbines. (4)
- (ii) Explain impulsive principle. (4)
- (iii) Draw the velocity triangles for simple impulse turbine. (8)

14. (a) (i) Explain the following terms :
- (1) Kinematic link and (4)
  - (2) Kinematic chain. (4)
- (ii) With suitable sketch, explain any one inversion of a double slider crank mechanism. (8)

Or

- (b) (i) What is the main function of a flywheel in an engine. (2)
- (ii) Explain the procedure for determining the size and mass of a flywheel with the help of a turning moment diagram. (14)
15. (a) (i) What are the applications of wire ropes? (4)
- (ii) The pulley is driven by a flat belt running at a speed of 600 m/min. The coefficient of friction between the pulley and the belt is 0.3 and the angle of lap is  $160^\circ$ . If the maximum tension in the belt is 700 N; find the power transmitted by the belt. (12)

Or

- (b) (i) Two parallel shafts are connected by a simple gear train. The speed of the driving gear and the driven gear is 360 r.p.m. and 120 r.p.m. respectively. The number of teeth on the driving gear is 30. Determine
- (1) The speed ratio (2)
  - (2) The train value, and (3)
  - (3) Number of teeth on the driven or followers. (3)
- (ii) Explain the method of balancing of rotating masses in different planes. (8)
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