

**B.TECH. DEGREE EXAMINATIONS: NOVEMBER 2009**

Third Semester

**TEXTILE TECHNOLOGY (FASHION TECHNOLOGY)**

U07ME307: Basics of Mechanical Engineering

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. The SI unit of rate of heat transfer is -----  
A. Watt      B. Joule      C. Newton      D. Kilogram Force
2. A wall which permits flow of heat is-----  
A. Adiabatic wall      B. Thick wall      C. Thin wall      D. Diathermic wall
3. Waste gases leaving the chimney of a boiler is controlled by means of -----  
A. Feed control valve      B. Damper      C. Pressure gauge      D. Safety valve
4. Cochran boiler is -----  
A. Horizontal fire tube boiler      B. Vertical water tube boiler  
C. Vertical fire tube boiler      D. Horizontal water tube boiler
5. Fuels used in SI engines are rated by -----  
A. Octane number      B. Methane number      C. Cetane number      D. Not rated
6. The process of removing burnt gases from combustion chamber of the engine cylinder by means of fresh charge is called -----  
A. Knocking      B. Supercharging      C. Scavenging      D. Detonation
7. Electricity is not required for-----  
A. Arc welding      B. Soldering      C. Gas welding      D. All the above
8. Tubes can be manufactured by-----  
A. Milling      B. Welding      C. Casting      D. Extrusion
9. Transmission losses are minimum in-----  
A. Gear drives      B. Belt drives      C. Rope drives      D. None
10. The intermediate wheels in a simple gear train are called-----  
A. Pulleys      B. Idle wheels      C. Sprockets      D. Rollers

**PART B (10 x 2 = 20 Marks)**

11. State Kelvin – plank statement of thermodynamics II law.

12. What is a thermal energy reservoir?
13. List the advantages of superheated steam
14. List out the various steam turbines.
15. What are the causes for Knock in CI engines?
16. Differentiate between open and closed air refrigeration system?
17. List out some tools used for milling.
18. How the metal forming process is classified?
19. What are the materials that are generally used for making belts?
20. What is gear train?

**PART C (5 x 14 = 70 Marks)**

- 21 (a) i) Prove that ENERGY is a property of a system with suitable evidences. (8)
- ii) A stationary mass of gas is compressed without friction from an initial state of 0.3 m<sup>3</sup> and 0.105 MPa to a final state of 0.15 m<sup>3</sup> and 0.105 MPa, the pressure remaining constant during the process. There is a transfer of 37.6 KJ of heat during the process. How much does the internal energy of the gas change? (6)

(OR)

- (b) State and prove Carnot's theorem.

- 22 (a) Explain the construction and working principle of pressurised water reactor with a neat sketch.

(OR)

- (b) What is co-generation? Explain any co-generation power plant that uses boiler with a neat sketch.

- 23 (a) (i) What are the various types of lubrication system? (2)

- (ii) Differentiate 4-stroke and 2-stroke engines. (12)

(OR)

- (b) Explain the various stages in vapour compression refrigeration cycle in detail with a neat sketch.

- 24 (a) (i) Classify rolling mills and explain them briefly. (7)

- (ii) What is extrusion? Explain forward and reverse extrusion with neat sketches. (7)

(OR)

- (b) With a neat sketch, explain the components of column and knee type milling machine.

(a) Explain the various types of gear trains with a neat sketch for each.

(OR)

(b) A belt drive consists of two V-belts in parallel, on grooved pulleys of the same size. The angle of the groove is 30 deg. The cross sectional area of each belt is  $750 \text{ mm}^2$  and  $\mu = 0.12$ . The density of the belt material is  $1.2 \text{ Mg/m}^3$  and the maximum safe stress in the material is  $7 \text{ MN/m}^2$ . Calculate the power that can be transmitted between the pulleys of 300 mm diameter rotating at 1500 rpm. Find also the shaft speed in rpm at which the power transmitted would be maximum.

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