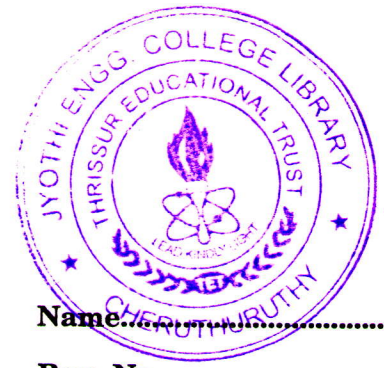


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Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2008**

EE 2K 303/PT 2K 303—MECHANICAL ENGINEERING—I

Time : Three Hours

Maximum : 100 Marks

- I. (a) State first law of Thermodynamics. Write the mathematical statements of first law for cycle and a process.
- (b) A tank containing a fluid is stirred by a paddle wheel. The work input to the paddle wheel is 6000 kJ. The heat transferred from the tank is 2000 kJ. Consider the tank and fluid inside as system find out the change in internal energy of this system.
- (c) An engine of 250 mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 14% of stroke volume. Find out its air standard efficiency.
- (d) Discuss about regeneration and intercooling in gas turbine.
- (e) Write short notes on boiler mountings.
- (f) What are the advantages of non-conventional energy sources ? List out some non-conventional sources of energy.
- (g) Classify air compressors. List out various applications of air compressor.
- (h) What are the differences between impulse and reaction turbines ?

(8 × 5 = 40 marks)

- II. (a) (i) A cylinder fitted with a piston has an initial volume of 0.1 m^3 and contains nitrogen at 150 kPa, 25°C . The piston is moved, compressing the nitrogen until the pressure is 1 Mpa and the temperature is 150°C . During this compression heat is transferred from the nitrogen, and the work done on the gas is 20 kJ. Determine the amount this heat transfer. Take $C_u = 0.7448 \text{ kJ/kg K}$.

(9 marks)

- (ii) Derive the steady flow energy equation for compressor and nozzle.

(6 marks)

Or

- (b) (i) Mention both the statements of II law of thermodynamics.

(5 marks)

- (ii) Prove Carnot theorem.

(10 marks)

Turn over

- (c) Explain with necessary sketches. Principle of operation of different types of clamper circuits. (12 marks)
- (d) What are its practical applications? (3 marks)
- IV. (a) Derive the biasing condition equations for fixed bias and self bias circuit of CE-BJT and compare the relative stability. (15 marks)

Or

- (b) Draw and explain the circuit of a class B push-pull amplifier. (10 marks)
- (c) What is cross over distortion and how it can be minimized? (5 marks)
- V. (a) Draw the hybrid-Pi model for transistor in CE configuration and explain the meaning of each component. (15 marks)

Or

- (b) Explain the operation of a differential amplifier and define the term (a) Common mode gain (b) Differential mode gain (c) CMMR. (15 marks)
- (4 × 15 = 60 marks)