AR13 | SET-01

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January-2014
ADVANCED THERMODYNAMICS
(Thermal Engineering)

Time: 3 hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. a) Show that the adiabatic mixing of two fluids at different temperatures is irreversible.
    b) Derive Mayer's relation

2. Boiler steam at 8 bar, 250°C, reaches the engine control valve through apipeline at 7 bar, 200°C. It is throttled to 5 bar before expanding in theengine to 0.1 bar, 0.9 dry. Determine per kg of steam, (i) The heat loss in the pipeline, (ii) The temperature drop in passing through the throttle valve (iii) The work output of the engine(iv) The entropy change due to throttling, (v) The entropy change in passing through the engine.

3. a) Write short notes on adiabatic flame temperature.
    b) Determine the heat transfer per kg mol of fuel for the following reaction.
    $CH_4 + 2O_2 = CO_2 + 2H_2O$ (l)
    The reactants and products are each at 1 atm. and 298K.

4. a) Explain the working principle of magneto hydrodynamic generator , with a neat sketch.
    b) State the advantages and dis advantages of fuel cells.

5. Water at 30 °C flows in to a cooling tower at the rate of 1.15 kg per kg of air. Airenters the tower at a DBT of 20 °C and a relative humidity of 60% and leaves it at a DBT of 28 °C and 90% relative humidity. Make up water is supplied at 20 °C. Determine: (i) The temperature of water leaving the tower (ii) The fraction of water evaporated and (iii) Approach and range of the coolingtower.

6. A simple vapour compression plant produces 5 tonnes of refrigeration. The enthalpy values at inlet to compression, at exit from the compressor and at exit from the condenser are 183.19,209.41, and 74.59 kJ/kg, respectively.Estimate (i) The refrigerant flow rate (ii) The COP (iii) The power Required to drive the compressor.(iv) The rate of heat rejection from the condenser

7. Air expands through a turbine from 500kPa, 520 °C to 100kPa, 300°C. Neglecting the K.E and P.E changes, determine per kg of air (i) The decrease in availability (ii) The irreversibility.

8. a)What is joule – Thomson coefficient? Why it is zero for an ideal gas?
    b) Explain the working principle of thermoelectric generator with a neat sketch.

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Answer any Five Questions
All Questions carry equal marks

1. a) Explain the algorithms for block read ahead and writing a disk block?   6M
   b) Explain the Algorithm for releasing a buffer?   4M
   c) Discuss the data structures used in kernel?   2M

2. a) Briefly explain about File & Directory maintenance?   7M
   b) Discuss about the standard input and standard ouput?   5M

3. a) What is a Process? Explain the different types of Process identifiers.   6M
   b) Explain the following.   6M
        i) Sleep functions
       ii) Kill and raise functions
      iii) Pause functions
       iv) Zombie process

4. a) Explain about file and record locking techniques   6M
   b) Elaborately discuss the system V IPC mechanisms.   6M

5. a) Give brief description about Message queue structure in Kernel.   6M
   b) Write a client server application to identify the machines connected to network.   6M

6. a) Explain the concept of kernel support for semaphores?   6M
   b) Discuss about the semaphores and shared memory-example   6M

7. write short notes on the following   12M
   a) API's for shared memory
   b) Streams and file descriptions
   c) Namespaces

8. a) What are FIFOs? How they are different from pipes?   6M
   b) Briefly discuss about process control and identifiers.   6M

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AR13   Set 02

Code No:13MPE1002

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January -2014
ANALYSIS OF POWER ELECTRONIC CONVERTERS
(Power Electronics and Electric Drives)

Time: 3 hours   Max.Marks:60

Answer any FIVE questions
All questions carry equal marks

1.a. Explain the operation of single phase AC voltage controller with R-L load and derive the expression for RMS load voltage.   6M

  b. Explain the operation of single phase AC voltage controller with PWM control   6M

2. A 3- phase star connected balanced resistances are supplied from a 3-phase AC voltage controllers. Derive the expression for RMS value of load current in the complete range of firing angle. Draw the wave forms of load voltage.   12M

3.a. Explain the operation of 1-phase fully-controlled converter for continuous load currents.   6M

  b. For a 1-phase half-controlled converter derive the expression for input P.F& harmonic factor.   6M

4a. Explain the operation of semi-converter in continuous conduction mode and derive the expression for output voltage.   6M

  b. For the above circuit derive the expression for input PF & harmonic factor.   6M

5.a. How can the input current of the rectifier fed-boost converter be made sinusoidal and in phase with the input voltage.   6M

  b. Explain the operation of 3-phase boost PFC converter.   6M

6. a. Explain principle of operation of Voltage control for single phase inverter using
      Trapezoidal, Staircase, stepped and Harmonic Injection modulation methods.   8M
   b. Discuss modified PWM techniques.   4M

7. Explain the space vector PWM technique as applicable to 3-phase inverter control with neat
   schematic diagrams.   12M

8. a. What is a multilevel inverter? Discuss the basic concept and features of multilevel inverter.
                                                                                           6M
   b. List out the advantages and disadvantages of flying capacitor multilevel inverter   6M

AR13 | Set-02

Time: 3 hours   MaxMarks:60

Answer any FIVE questions
All questions carry indicated marks

1. a)Derive the drain -to-source current I_{ds} versus Voltage V_{ds} relationships in non-saturated region?   7marks
   b) Explain the body effect and threshold Voltage V_t?   5marks

2. a) Derive the $Z_{pu}/Z_{pd}=4/1$?   7marks
   b)Explain nMOS transistor model with neat diagram?   5marks

3. a)Discuss the stick diagram of multiplexer using NAND cell?   7marks
   b)Analyse the automatic layout with neat diagrams?   5marks

4. a)Explain any two alternative gate circuits with examples?   7marks
   b)Explain Crosstalk between RC wires?   5marks

5. a)Explain the Power optimization using flip-flop to stop a glitch?   6marks
   b)Design and test a sequential machine ?   6marks

6. a)Draw and explain the architecture of pad frame ?   6marks
   b)Design and analyse the electrostatic discharge protection in the pad interms for both input and output pad respectively?   6marks

7 a)Explain Architecture testing by using register graph?   6marks
   b)Design a built -in selftest(BIST) to generate Pseudorandom sequence?   6marks

8 a)Explain the placement and Routing algorithms with examples?   6marks
   b)Discuss the flow of a generic integrated design flow?   6marks

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Time: 3 hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1.a) Explain about multi Processors and multi computers   6M
  b) Explain about sign magnitude 2's complement approaches for representing fixed point numbers. Explain why 2's complement approach is preferable.   6M

2.a) List and explain arithmetic, logic and shift micro operations.   6M
  b) what is an addressing mode and explain different addressing modes   6M

3. write an algorithm to subtract two binary numbers represented in normalized floating point mode with base 2 for exponent.   12M

4. a) Discuss different mapping procedures in the organization of cache memory.   6M
  b) Explain about Associative Memory with its Hardware Organization.   6M

5.a) What is DMA? What is the need for DMA? Explain the working of DMA. Also mention its advantages.   12M

6.a) What is meant by instruction pipeline? Explain.   6M
  b) Explain the following related to the instruction pipeline   6M
    i) Pre-fetch target instruction
    ii) Branch target buffer

7. a) List and explain different interconnection structures used in multi processors.   6M
  b) What is Cache coherence ? Expalin its importance.   6M

8. Write Short Notes   6M
  a) Instruction formats
  b) Inter Process Communication   6M

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