AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

ADVANCED THERMODYNAMICS
(Thermal Engineering)

Time: 3 hours   Max Marks: 60

Answer any FIVE questions
All questions carry equal marks

1. (a) Air flows through an adiabatic compressor at 2 Kg/s. The inlet conditions are 1 bar and 310K and the exit conditions are 7 bar and 560K. Compute the net rate of availability transfer and the irreversibility. Take $T_o = 298K$.   **6**
    (b) Derive Maxwell's equations.   **6**

2. A large insulated vessel is divided into two chambers, one containing 5 kg of dry saturated steam at 0.2MPa and the other 10 kg of steam, 0.8 quality at 0.5 MPa. If the partition between the chambers is removed and the steam is mixed thoroughly and allowed to settle, find the final pressure, Steam quality, and entropy change in the process.   **12**

3. (a) What is enthalpy of combustion? What is internal energy of combustion?   **6**
    (b) Diesel fuel ($C_{12}H_{26}$) at 25°C is burned in a steady-flow combustion chamber with 20 percent excess air that also enters at 25°C. The products leave the combustion chamber at 400K. Assuming combustion is complete. Determine the required mass flow rate of the diesel fuel to supply heat at a rate of 1800KW.   **6**

4. A Refrigerant-12 Vapour compression cycle has a refrigeration load of 3 Tonnes. The evaporator and condenser Temperatures are -20°C and 40°C Respectively. Find (a) the refrigerant flow rate in Kg/s, (b) the volume flow rate handled by the compressor in m³/s, (c) the work input to the compressor in KW, (d) the heat rejected in the condenser in KW, and (e) the isentropic discharge Temperature. If there is 5° C Sub-cooling of liquid before it flows through the expansion valve, determine the above quantities.   **12**

5. (a) Define coefficient of expansion and compressibility factor.   **4**
    (b) Prove that $C_p - C_v = \dfrac{\beta^2 T v}{K}$ **8**

6. (a) Explain the principle involved in Fuel cells.   **6**
    (b) Explain Thermo-Ionic power generation.   **6**

7. (a) Explain the difference between open and closed cycle MHD Systems.   **6**
    (b) Explain the working of Photo-voltaic cells.   **6**

8. (a) Explain the working of Cogeneration plant.   **4**
    (b) In an air standard Otto cycle the compression ratio is 7, and compression begins at 35°C, 0.1 MPa. The maximum Temperature of the cycle is 1100°C. Find (i) the Temperature and Pressure at the cardinal points of the cycle, (ii) the heat supplied per Kg of air, (iii) the workdone per Kg of air, (iv) the cycle efficiency, and (v) the m.e.p of the cycle.   **8**

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

ANALYSIS OF POWER ELECTRONICS CONVERTERS
(Power Electronics and Drives)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain the operation of a single phase AC voltage Controller feeding an RL load with neat circuit diagram and waveforms. [6M]
   (b) Explain the effects of source inductance and load inductance on the output voltage in an AC voltage controller with neat waveforms. [6M]

2. Explain the principle of operation of three phase AC voltage controllers feeding an inductive load with the help of neat circuit diagram and waveforms. [12M]

3. (a) Explain any three power factor improvement methods for a single phase converter circuit. [6M]
   (b) Explain the operation of a single phase series converter feeding a resistive load with neat circuit diagram and waveforms. [6M]

4. (a) Derive the expressions for the performance parameters of a three phase fully controlled converter circuit. [6M]
   (b) A three phase fully controlled converter is operated from a three phase Y-connected 208V, 60Hz supply and the load resistance is R = 10Ω. If it is required to obtain an average output voltage of 50% of the maximum possible output voltage, calculate (a) delay angle (b) the rms and average output currents (c) average and rms thyristor currents (d) rectifier efficiency and (e) input PF. [6M]

5. (a) Explain the operation of a single phase single stage boost power factor correction circuit with neat waveforms [6M]
   (b) What is the need of a power factor correction circuit? Explain the operation of a three phase boost PFC converter. [6M]

6. (a) What is meant by Pulse Width Modulation? Explain the different PWM techniques for a single phase inverter circuit with neat waveforms. [6M]
   (b) Explain the principle of operation of a single phase inverter circuit with the help of a neat diagram. [6M]

7. Explain the operation of a three phase inverter for 180^0 condition and derive the output voltage and current feeding a resistive load. [12M]

8. (a) Explain the concept of multilevel inverters. What are their advantages over the conventional multi pulse inverters? Name some applications of multilevel inverters. [6M]
   (b) What is the importance of voltage balancing in a multilevel inverter? Explain in detail with the help of a five level half bridge multilevel inverter. [6M]

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CODE: 16MCS1002   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018
DATABASE MANAGEMENT SYSTEMS
Computer Science & Engineering

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	What are the advantages of DBMS over the file system for data processing?	6M
	(b)	Explain the three Schema architecture.	6M
2.	(a)	What are Integrity Constraints? When Integrity Constraints are enforced by a DBMS? Discuss.	4M
	(b)	Illustrate and Explain ER schema diagram for a University database	8M
3.		Write the SQL expressions for the following relational database?	12M

       Sailor(sailor id, Boat id, sailor name, rating, age)

       Reserves (Sailor id, Boat id, Day)

       Boat (boat id, Boatname, color)

       i. Find the age of the youngest sailor for each rating level?

       ii. Find the age of the youngest sailor who is eligible to vote for each rating
          level with at lead two such sailors?

       iii. Find the No.of reservations for each red boat?

       iv. Find the average age of sailor for each rating level that at least 2 sailors.

4.	(a)	What is Normalization? Explain 1NF, 2NF, 3NF and BCNF with suitable example?	6M
	(b)	What is a functional dependency? Who specifies the functional dependencies that hold among the attributes of a relation schema?	6M
5.		Describe using suitable examples problems of concurrent transactions .Can these problems occurred in transactions which do not Read the same data values?	12M
6.	(a)	Compare Linear Hashing with extendable Hashing.	4M
	(b)	What is primary index? In what way primary index is different from secondary and unique indexes? Briefly describe hash based indexing.	8M
7.	(a)	"Concurrent execution of transactions may leave the database in a inconsistent State". Explain with an example.	6M
	(b)	How to implement lock and unlock requests? Describe the specialized Locking Techniques.	6M
8.		If you were about to create an index on a relation, what considerations would guide your choice? Discuss:	12M

       i. The choice of primary index.

       ii. Clustered versus uncluttered indexes.

       iii. Hash versus tree indexes.

       iv. The use of a sorted file rather than a tree-based index.

       v. Choice of search key for the index. What is a composite search key, and what
         considerations are made in choosing composite search keys? What are index-
         only plans, and what is the influence of potential index-only evaluation plans
         on the choice of search key for an index?

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018
THEORY OF ELASTICITY AND PLASTICITY
(Structural Engineering)

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Derive deferential equation of equilibrium in terms of the displacement component for plain stress problem in Cartesian coordinate system by neglecting the body forces.   6M
   (b) Show that for a simply supported beam of length 2l and depth 2a and unit length loaded by concentrated load W at the center the stress for satisfying the load condition is given by   6M

   $$\emptyset = \frac{bxy'^3}{6} + cxy$$

2. (a) Obtain the governing definition equation in body forces in polar coordination system in plane stress condition   6M

   (b) Show that $\emptyset = \frac{-pr^2\theta}{2\pi} - Sin\theta.Cos\theta$ is a stress function in a polar coordinate system.   6M

3. (a) What is the significance of Theorem of virtual work   6M
   (b) Discuss and explain the total strain energy   6M

4. (a) Determine the principle stresses and obtain Stress Invariants for 3-D systems   6M
   (b) Explain Strain at a point for 3-D Cartesian system of coordinates   6M

5. (a) Derive an expression for the stress components in a solid bar of elliptical cross section subjected to twisting moment?   6M
   (b) Explain the Saint Venant's theory for obtaining torsion of straight bars   6M

6. (a) Write short notes on membrane analogy.   6M
   (b) Into how many components does the shearing stress should be resolved for torsion of straight bars   6M

7. Explain the plasticity, assumptions and different concepts of plasticity and briefly explain the yield criterions.   12M

8. (a) The Castigilano's theorem is extremely useful in determining the displacement of structures and solving statically indeterminate linearly elastic solids Structure – Evaluate.   6M
   (b) Apply and obtain the principle of least work for rectangular plates.   6M

Code No: 13MVL1002

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Supplementary Examinations, December-2018
VLSI TECHNOLOGY AND DESIGN
(Digital Electronics & Communication Systems)

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

Answer any FIVE questions
All questions carry equal marks

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1.   a) Explain main steps in a typical n-well process with a neat flow chart
     b) Compare between CMOS and BIPOLAR technologies

2.   a) What is domino logic and explain domino OR gate and its operation with neat
        sketch
     b) How Cascaded inverters driving a large capacitive load?

3.   a) Discuss various techniques to reduce the delays in combinational circuits
     b) Explain cross talk minimization with suitable example

4.   a) what is clocked inverter? Explain how to construct a D-latch using clocked
        inverters
     b) Explain clocking rules for single and two phase systems?

5.   a) Explain various clock distribution schemes with suitable examples
     b) Explain floor plan of the IBM Power 2 super chip?

6.   a) what is logic synthesis
     b) Explain Technology – dependent Logic Optimizations
     c) Briefly explain Hardware/Software Co-Design

7.   a) Explain the method power down mode for reducing power
        Consumption in the architecture
     b) Discuss several important issues in system-on-chip design

8.   a) Explain a simple BiCMOS inverter with neat skecth
     b) write short notes on Off-Chip Connections

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