AR16 SET–02

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMUS)
I M.Tech I Semester Regular Examinations, January – 2017
SOLAR ENERGY TECHNOLOGY
(Thermal Engineering)

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

Answer any five questions
All questions carry equal marks

1. What is the principle of working of a most common type pyranometer? Describe Eppley pyranometer with neat sketch.

2. Estimate the average solar radiation on a horizontal plane at various latitudes.

3. (a) Discuss the thermal losses and efficiency of a flat-plate collector.
   (b) With a neat sketch explain the heat transfer process in a flat plate collector.

4. (a) What are the main measuring instruments used for testing the solar collectors? Describe in brief with neat sketches.
   (b) Explain the performance of cylindrical parabolic collector with a neat sketch.

5. (a) Describe briefly the need of thermal energy storage with energy demand using figures.
   (b) Explain briefly hybrid sensible heat storage system with neat sketch.

6. Discuss briefly on Solar Refrigeration with neat sketches with benefits.

7. Describe with neat sketches of typical and commercial designs of solar water heaters.

8. Discuss in detail about semiconductor principles with neat sketches.

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AR16

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular Examinations, January, 2017

SEMICONDUCTOR DEVICES MODELLING
(Common to DECS & VLSI System Design)

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain about Fermi-Dirac distribution function.
   (b) Explain the terms i) Poisson's equation ii) Debye length.

2. (a) Describe the variation of quasi-fermi potential as a function of distance in a p-n diode for both forward and reverse biased junction.
   (b) Explain about Diffusion Capacitance.

3. (a) Write the difference between the energy band of three components of MOS capacitor: metal, SiO_2 and p-type silicon
   (b) Illustrate the effect of oxide trapped charge on surface potential.

4. (a) Show that the electric field is negligible in a region of uniform majority-carrier concentration for transistor.
   (b) Discuss the effect of heavy-doping in transistor.

5. (a) Derive the expression for long-channel current in the linear and saturation regions in MOSFET.
   (b) Discuss about Body effect in MOSFET

6. (a) Explain the transient current flow through MOSFET.
   (b) Explain two-section model for calculating short-channel capacitance in saturation for short-channel capacitance model.

7. (a) Derive the expression for collector current in a transistor.
   (b) Explain the effect of base-collector voltage on collector current.

8. (a) Discuss the term channel length modulation when a MOSFET is biased beyond saturation.
   (b) Explain the concept of MOSFET breakdown with the help of I_{ds}-V_{ds} curves.

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular Examinations, January-2017

MODERN CONTROL THEORY
(Power Electronics And Drives)

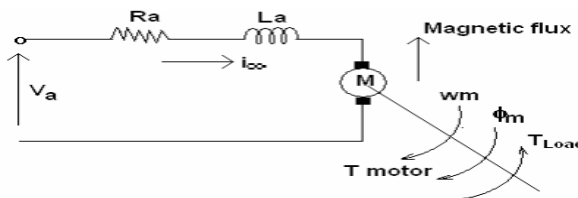Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain the concepts of state, state variables, state model and state diagram with suitable examples. [4M]

   (b) Consider the system shown for the d.c. motor. Obtain the state space model. Obtain its state diagram and also the block diagram. [8M]

2. (a) Explain the properties of state transition matrix. [6M]
   (b) Describe the significance of state transition matrix. [6M]

3. (a) Consider the system given by [6M]
   $$\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ 2 & 1 \end{bmatrix} x(t) + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u(t), \ y(t) = \begin{bmatrix} 1 & 2 \end{bmatrix} x(t)$$
   Check the controllability and observability

   (b) Write the observability and controllability canonical forms of state model. [6M]

4. (a) Discuss the describing function analysis of non-linear systems. [6M]

   (b) Explain the following non-linearity's i) Saturation and ii) Dead-zone [6M]

5. (a) Consider a non-linear system described by the [8M]
equations:

$$\dot{x}_1 = -x_1 + 2x_1^2 x_2$$
$$\dot{x}_2 = -x_2$$

Check the stability of the system by use of
variable gradient method.

(b) Define the following [4M]
   i) Stability in the sense of liapunov
   ii) Asymptotic stability
   iii) Asymptotic stability in the large.

6. (a) What is a singular point? Draw the phase trajectory [4M]
of the following singular points:
I)Stable node II) unstable node III) Saddle point iv)
Vortex point.

(b) What is a singular point? Explain different types of [8M]
singular points in a non-linear control system based
on the location of Eigen values of the system.

7. (a) Explain the krasooviski's method. [4M]
(b) Explain method of constructing Lyapunov [8M]
functions by Krasooviski's method for non-linear
systems.

8. (a) Define the following [6M]
I) Eigen values II) Eigen vectors III) State of a
system.

(b) What are the advantages and disadvantages of state [6M]
space analysis?

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AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular Examinations, January-2017

OBJECT ORIENTED PROGRAMMING
Computer Science Engineering

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Briefly explain how does java achieves platform independence.	6 M
	(b)	Explain role and importance of AGC (Automatic Garbage Collection) in java.	6 M
2.	(a)	Write a program to input three numbers from keyboard (use scanner) and print largest among them.	6 M
	(b)	Differentiate interfaces, abstract classes and Adapter classes.	6 M
3.	(a)	What is Multi processing and Multi threading. Explain how to create threads in java.	6 M
	(b)	Explain briefly about thread synchronization with suitable example.	6 M
4.	(a)	What is OOED and explain about Event Listeners.	4 M
	(b)	Write a java program that resembles a simple calculator with any two arithmetic operations and values must be positive only (use Action Listener and Focus Listener).	8 M
5.	(a)	Explain in brief about life cycle of Applet.	4 M
	(b)	Develop an applet application that displays the messages as "Object", "Oriented", "Programming" at its status bar by changing them for every 10 Seconds.	8 M
6.	(a)	Explain how to handle Strings in java with examples.	6 M
	(b)	Write a program that creates an input dialog box (javax. swing) and reads three numbers from it (separated with comma), and print sum of them in message dialog box.	6 M
7.	(a)	What is JIT compiler and defend yourself why it was needed in java.	6 M
	(b)	Explain the problem with multiple inheritances and how java overcomes it.	6 M
8.	(a)	Design a simple login screen to enter user name and password using swing package.	6 M
	(b)	Explain about life cycle of a thread.	6 M

AR13

Code No: 13MSE1006   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Supplementary Examinations, January-2017

FOUNDATION ENGINEERING
(Structural Engineering)

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

Answer any FIVE questions
All questions carry equal marks

1. (a) Explain different types of soil investigation methods for preparing site investigation reports. [7M]
   (b) What are the primary objectives of soil exploration? [5M]

2. (a) Draw a neat sketch of Split Spoon. Sampler showing all the salient parts. [6M]
   (b) Write briefly about the standard penetration test conducted in the field. What are the corrections to be made in the standard penetration value? [6M]

3. (a) Explain general bearing capacity equation along with Meyerhof's, Hansen's and Vesic's bearing capacity factors. [6M]
   (b) Briefly explain the different types of shallow foundation failures? [6M]

4. (a) A 500 mm diameter and 22 m long RCC pile is to be installed at a site, which is characterized by two clay layers. The top layer is 12 m thick, has a γ_t = 20 kN/m^3 and a Cu = 70 kN/m^2. The bottom layer is 20 m thick, has a γ_t = 22 kN/m^3 and a Cu = 90 kN/m^2. The ground water table is at the ground surface. Determine the ultimate axial load capacity of the pile. Assume α = 0.9 for both the clay layers (c = Cu = Su = Undrained shear strength). [7M]
   (b) Describe the differences between shallow and deep foundations? List different types of deep   foundations based on shape and size? [5M]

5. (a) Determine the ultimate bearing capacity of a strip foundation , 1.5m wide with its base at a depth of 1m, resting on a dry sand stratum, take γd = 17 kN/m^3, Φ' = 38^0, and c' = 0, using Terzaghi's theory. [7M]
   (b) Explain various factors influencing bearing capacity of soils. [5M]

6. (a) Determine the ultimate bearing capacity of a strip footing 1.5 m wide and at 0.9 m depth using Terzaghi's theory and assuming general shear failure. Take $\phi' = 32°$, γ = 17.5 kN/m^3 and c' =15 kN/m^2 . Ground water level is at a depth of 1.2 m. [5M]
   (b) A reinforced concrete pile 9 m long and 0.38 m in diameter is embedded in saturated clay of very stiff consistency. Laboratory tests on samples of undisturbed soil gave an average un drained cohesive strength cu = 120 kN/m^2. Determine the allowable axial capacity with Fs=3. α= 0.9. [7M]

7. (a) A 12m long, 300mm diameter pile is driven in a uniform deposit of sand $\Phi' = 40^0$.   [7M]
         The water table is at a great depth and is not likely to rise. The average dry unit
         weight of sand is 18 kN/m^3, using Nq = 137, calculate the safe load capacity of the
         pile with a factor of safety of 2.5.
    (b) What is negative skin friction? How the pile capacity calculations are affected with   [5M]
         negative skin friction?

8.   Proportion a square footing to carry a load of 150 t from a column. The depth of   [12M]
         foundation is to be kept at 2 m below ground surface. Maximum permissible
         settlement of the footing is 40 mm and a factor of safety of 3 is required against
         shear failure. The subsoil is sand with an average connected N value of 18 as
         established from borings. Water table is at large depth. Use Teng's correlations.

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AR13

Code No: 13MCS1005   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Supplementary Examinations, January- 2017

OPERATING SYSTEMS
(Computer Science and Engineering)

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

Answer any FIVE questions
All questions carry equal marks

1.		Explain in detail about evolution of operating systems.	12M
2.	a)	Briefly explain in detail about file handling utilities and backup utilities.	6M
	b)	Describe mkdir , rmdir mount and unmount commands with suitable examples.	6M
3.	a)	What is a shell? Explain its responsibilities.	6M
	b)	Describe in detail about shell variables.	6M
4.	a)	Explain any two scheduling algorithms with suitable examples.	6M
	b)	Discuss in detail about process schedulers.	6M
5.	a)	Differentiate between physical and logical addresses. Discuss in detail about the steps in handling a page fault	6M
	b)	Explain the concept of Segmentation.	6M
6.	a)	What is a critical section problem? Explain its concept.	6M
	b)	Describe about different types of Semaphore mechanisms used in Synchronization.	6M
7.	a)	Explain about various file allocation methods.	6M
	b)	Discuss in detail about file attributes, operations and types in detail.	6M
8.	a)	Discuss in detail about Inter-process communication mechanism.	6M
	b)	Explain the following.	6M
		i) Message queues ii) Shared memory	

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