Code No: 13MTE1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech., I Semester Regular/Supplementary Examinations, March,2015
ADVANCED FLUID MECHANICS
(Thermal Engineering)

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

Answer any FIVE questions
All questions carry marks

1.	**a)**	A two-dimensional flow field is specified by V = 3y**i** + 3x**j**. State whether the flow is steady, irrotational, and check whether the given field is feasible. Find the stream function and determine the volume flow rate passing between streamlines through the points (1, 3) and (3, 3).	**(12M)**
2.	**a)**	) Explain the concept of mixing length introduced by Prandtl and state the relationship that exists between the turbulent shearing stress and mixing length.	**(6M)**
	b)	For steady compressible flow of a gas through a nozzle, the quasi one-dimensional velocity distribution is given by $u = U_0(1 + x/L)$, where U_0 and L are constants. Using continuity, find an expression for density distribution $\rho(x)$, if $\rho = \rho_0$ at x = 0. At what position of x will the density drop to 25% below ρ_0?	**(6M)**
3.		Explain the concept of Boundary Layer and its importance in solving fluid flow problems. How is the boundary layer development for the case of flow around a body with a sharp leading edge different from the boundary layer development for the case of a body with a blunt nose?	**(12M)**
4.	**a)**	Water approaches the intake of a pump with the velocity varying inversely as the square of the radial distance from the intake. At a radial distance of 1.5 m, the velocity is found to be 0.68 m/s. What is the acceleration of flow at a radial distance of 1 m from the intake?	**(6M)**
	b)	Water flows at a speed of 1 m/s over a flat plate of length 1 m in the flow direction. The boundary layer is tripped to make it turbulent at the leading edge. Assuming 1/7 power turbulent velocity profile, find the boundary layer thickness, the displacement thickness, and the wall shear stress at the trailing edge of the plate. Solve the same problem if the flow over the plate is laminar. The kinematic viscosity of water is 10^{-6} m^3/s.	**(6M)**
5.		Show that for horizontal isentropic flow Bernoulli's equation takes the form $$\frac{\gamma}{\gamma-1}\frac{p}{\rho}+\frac{V^2}{2}=constant$$ Calculate, working from above equation, the stagnation pressure, temperature and density for an air stream at Mach number M = 0.7 and density ρ = 1.8 kg m^{-3} and temperature of 75°C. Take R = 287 J kg^{-1} K^{-1} and γ = 1.4.	**(12M)**
6.	**a)**	Define Mach number and give the expression for estimating the Mach number. Describe the different types of flow with reference to Mach number.	**(6M)**

	b)	Calculate the speed of sound in steel, in water, and in air at 20°C. Assume, for steel bulk modulus K =18x10^{10} N/m^2 and density ρ = 7.6x103 kg/m^3, for water K = 2.18x10^9 N/m2, for air specific heat ratio k = 1.4 and universal gas constant R = 287 J/KgK.	**(6M)**
7.	**a)**	What are shock waves, the types of shock waves, and their effects? For a normal shock wave derive the equation of a Rankine line and a Fanno line.	**(6M)**
	b)	Air is flowing through a duct and a normal shock wave is formed at a cross-section at which the Mach number is 2.0. If the upstream pressure and temperature are 105 bar and 15°C respectively, find the Mach number, pressure and temperature immediately downstream of the shock waves. Take γ = 1.4.	**(6M)**
8		Derive the Von-karmans momentum integral equation of boundary layer with zero pressure gradient.	**(12M)**

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AR13 SET01

Code No: 13MIT1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular/Supplementary Examinations, March – 2015

ADVANCED COMPUTER NETWORK
(Information Technology)

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

Answer any FIVE questions
All questions carry equal marks

01. a) Explain how segmentation and reassembling is done in ATM networks. (6 M)
b) List and explain various networking devices. (6 M)

02. a) Write about Inter domain multicast protocols. (7 M)
b) Draw and explain IPV6 packet header. (5 M)

03. a) Describe the TCP connection establishment and termination. (7 M)
b) What is congestion? Explain TCP congestion control mechanisms. (5 M)

04. a) What is DNS domain hierarchy? With an example explain DNS name resolution. (7 M)
b) Discuss about HTTP request and response messages. (5 M)

05. Write about IEEE 802.11 Wireless standard. (12M)

06. a) How packets are routed for mobile hosts? (8 M)
b) How route optimization is done in Mobile IP. (4 M)

07. a) Compare the wireless Ad-Hoc networks and wireless sensor networks. (6 M)
b) Mention the routing protocols for Ad-Hoc networks. Explain any one in detail. (6 M)

08. a) Write the overview of MPLS protocols. (6 M)
b) Discuss about traffic engineering with MPLS. (6 M)

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AR13 SET-02

13MPE1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular/Supplementary Examinations, March,2015
MICROCONTROLLERS AND APPLICATIONS
(Power Electronics & Electric Drives)

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

Answer any FIVE questions
All questions carry EQUAL Marks

1. Explain the pin structure of 8051 with emphasis on the ports.

2. a) Explain the MOV, MOVX AND MOVC instructions of 8051 with examples.
   b) Describe the register bank structure of 8051 microcontroller and also explain the bit-addressable memory of the same.

3. a) Draw the TMOD, TCON and SCON registers of 8051 microcontroller.
   b) Write an ALP to generate a delay of 5ms on 8051 microcontroller.

4. a) Draw the interrupt vector table for 8051 microcontroller.
   b) Write a program that continuously get 8-bit data from P0 and sends it to P1 while simultaneously creating a square wave of 200 μs period on pin P2.1. Use timer 0 to create the square wave. Assume that XTAL = 11.0592 MHz.

5. Describe the Register File Map of PIC16C7X

6. Describe the STATUS, OPTION, INTCON, PCON and PIR1 registersof PIC16C7X.

7. a) Write an ALP for 8051 microcontroller to display “MICROCONTROLLERS” at the center of the LCD display.
   b) Write an ALP to switch ON the LEDs connected to a port of 8051 microcontroller with a delay of 1 sec and turn OFF in the reverse order with the same delay.

8. Write an ALP for 8051 microcontroller to accept input from switches and display the same on a 7 – segment display.

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AR13 SET-01

Code No: 13MCS1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular/Supplementary Examination, March,2015
Software Engineering
(Computer Science and Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

1. Explain about Waterfall Model and Incremental Model. 12M

2. What are the five generic process framework activities? What is a process Pattern? Explain it with an example. 12M

3. Explain about the Behavioural Models a). Dataflow Diagram. b).State machine Model. 12M

4. Explain about the following a). Design process b). Design Concepts 12M

5. What is meant by User Interface? What are the golden rules and Explain about user interface Analysis and Design. 12M

6. What is Software Testing? Explain about Test strategies for conventional software. 12M

7. What is Software Risk? Explain the following 12M
   a). Risk Identification b). Risk Projection c). RMMM

8. Write about 12M
   a. Validation Testing
   b. System Testing
   c. Art of Debugging

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AR13 SET 1

Code No: 13MDE1001

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech I Semester Regular / Supplementary Examinations, March – 2015

DETECTION & ESTIMATION OF SIGNALS
(Digital Electronics & Communication Systems)

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

Answer any FIVE questions
All questions carry equal marks

1. a) Explain the Fourier Transform of a discrete time signal for phase spectrum. [6M]
   b) Compare DFT and FFT with suitable examples [6M]

2. a) Explain Sampling Band-limited signals. [4M]
   b) Consider a signal x(n) = s(n) + w(n) where s(n) is an AR (1) Process that satisfies the difference equation. S(n) = 0.8 s(n-1) + v(n) where {v(n)} is a white noise sequence with variance σ_v^2 = 0.49 and {w(n)} is a white noise sequence with variance σ_w^2 = 1. The process {v(n)} and {w(n)} are uncorrelated (i) Determine the autocorrelation sequence $\{r_{ss}(m)\}$ and $\{r_{xx}(m)\}$. (ii) Design a wiener filter of length M = 2 to estimate {s(n)} (iii) Determine the MMSE for r = 2. [8M]

3. a) Obtain a relation between ACF and PSD of a signal. [5M]
   b) A student wishes to sample the z-transform of a sequence x(n) = u(n)- u(n-5) at Six points on the unit circle uniformly to obtain its DFT as follows: [7M]

$$X(k) = X(z)\,|_{z = \exp(j2\pi k/6)} \quad \text{for } k = 0, 1, \ldots, 5$$

   Determine the inverse DFT $x'(n)$ of X (k). Compare it with x(n) and explain why the two sequences x'(n) and x(n) are not same.

4. a) Derive the likelihood ratio test (LRT), under the Neyman Pearson (NP) criterion for a binary hypothesis. [6M]
   b) How to Detect signals in the noise using matched filter concept in detail? [6M]

5. a) Define the likelihood function and explain the method of Maximum Likelihood (ML) estimation. [6M]
   b) How to estimate signals in noise using least mean square estimation in detail [6M]

6. a) Explain the concept of pseudo noise generation to test data processing system in detail. [6M]

   b) Based on N statistically independent samples of a Gaussian process of variance σ^2 and unknown mean μ, we wish to find a MAP estimator of the mean.If μ can be assumed to be greater than 0, find the probability density function, and the estimator [6M]

7. a) Explain Kalman filtering concept using one step signal production [6M]

   b) Find the H matrix of $x(k) = H\, s(k) + n(k)$, with usual notation, given that [6M]

   $x_1(k) = 3\, s_1(k) + 4\, s_2(k) + n_1(k)$;

   $x_2(k) = 3s_2(k) + n_2(k)$; …….; and $x_M(k) = s_M(k) + n_M(k)$.

8. Write short notes on: [12M]

   i) Bayes estimator

   ii) Autocorrelation and power spectral density

   iii) Air Traffic Control radar tracking.

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Code.No: 13MVL1004 **AR13**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. I Semester Regular Examinations,
March2015

VHDL MODELLING OF DIGITAL SYSTEMS
(VLSI System Design)

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

Answer any FIVE questions
All questions carry equal marks.
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1. a) Explain about an overview of digital system design process using CAD tools?
   b) Write a brief note on VHDL sub programs with example. (6M+6M)

2. a) Explain about the syntax representation of various data objects and types in VHDL.
   b) List out various delay model representations in VHDL. (6M+6M)

3. a) Explain about the utilities of package parts and design libraries in HDL.
   b) Give block level representation of nibble comparator using design configuration declaration.
   (6M+6M)

4. a) List out various data operators in HDL with examples.
   b) Explain about various sequential statements in VHDL. (6M+6M)

5. a) Write a structural VHDL code for BCD-Seven segment display decoder converter using common cathode display. (6M+6M)
   b) Design and write a behavioral VHDL code for 2x1 multiplexer with NAND gates.

6. a) What is the importance of guard signal assignment statement in HDL and give one example.
   b) Write short notes on open collector gates in VHDL. (6M+6M)

7. a) Explain in more detail about Parwan CPU.
   b) Design and write a behavioral VHDL code for synchronous 3-9 converter with D flip-flop's? (6M+6M)

8. a) Explain in detail about MSI based design (6M+6M)
   b) Write the VHDL function for full adder along with truth table

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