

Code No: 13MTE1004

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech., I Semester Regular Examinations, January - 2014****ADVANCED FLUID MECHANICS
(Thermal Engineering)****Time: 3 hours****Max. Marks: 60****Answer any FIVE questions
All questions carry marks**

1. a. What are streamlines, pathlines, and streaklines. Under what conditions, all of these are the same? (6M)
b. A velocity field is given by $u = V \cos \theta$, $v = V \sin \theta$, and $w = 0$, where V and θ are constants. Find an expression for the streamlines of this flow. (6M)
2. Consider a flow field with pure tangential (circular) streamlines; $V_r = 0$ and $V_\theta = f(r)$. Evaluate the vorticity and circulation for (i) a rigid body rotation and (ii) a free vortex. Show that it is possible to choose $f(r)$ so that the flow is irrotational, i.e. to produce a free vortex. (12M)
3. A gas is flowing through a horizontal pipe at a temperature of 6°C . The diameter of the pipe is 0.1 m and at a section 1 in this pipe, the gauge pressure is $30 \times 10^4 \text{ N/m}^2$. The diameter of the pipe changes from 0.1 m to 0.05 m at the section 2, where the gauge pressure is $20 \times 10^4 \text{ N/m}^2$. Find the velocities of the gas at these sections, assuming an isothermal process, universal gas constant $R = 287.14 \text{ Nm/KgK}$ and atmospheric pressure = 100 kN/m^2 . (12M)
4. What do you understand by Boundary Layer Thickness? Define the terms Displacement Thickness, Momentum Thickness, and Kinetic Energy Thickness with reference to a Boundary Layer. Give the relevant expressions for estimating each of these. (12M)
5. a) What is drag of bodies? Explain the difference between pressure drag and skin friction drag and the factors affecting the amount of drag experienced by a body. Differentiate between streamlined bodies and bluff bodies. (6M)
b) A submarine has been approximated to a rectangular box of length 360 m, width 70 m, and height 25 m. If the submarine is travelling at a speed of 24 km/h in sea water with kinematic viscosity of $1.4 \times 10^{-6} \text{ m}^2/\text{s}$ and density 1020 kg/m^3 , determine the skin friction drag of the submarine and the power required to overcome the drag. (6M)

6. With neat sketches, compare and contrast between the propagation of shock waves through a stationary fluid with that in a moving fluid. Also explain the concept of a Mach cone and the various regions associated with it. Illustrate the phenomena with neat sketch showing all the significant zones. (12M)
7. Derive an expression for the condition of maximum mass flow through a nozzle and obtain the relation for the velocity of fluid at the nozzle outlet. (12M)
8. a. What are stagnation pressure and stagnation temperature? Explain. (6M)
b. An aeroplane is flying at 900 km/hr through still air having a pressure of $8 \times 10^4 \text{ N/m}^2$ and temperature -15°C . Calculate the pressure, temperature, and density of air at the stagnation point on the nose of the plane. Take specific heat ratio $k = 1.4$ and universal gas constant $R = 287 \text{ J/KgK}$. (6M)

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SET-02

Code No:13MDE1001

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT,TEKKALI
(AUTONOMOUS)**

I M.Tech. I Semester Regular Examinations, January -2014

**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. Find the transfer function and unit sample response of the system specified by the difference equation $y(n) - 5y(n-1) = x(n) + x(n-2)$
b. Prove that the frequency response of a discrete system is a periodic function of the frequency.
2. a. Explain the Neymen-Pearson criterion for detection of constant amplitude signals. Derive necessary relations.
b. A random variable X has density function defined by $f_X(x) = 5e^{-5x}$ for $0 \leq x$ find $E(X)$ and $P(1 \leq X \leq 5)$.
3. a. Derive the relation between autocorrelation function and Power spectral density?
b. Discuss the properties of PSD.
4. Discuss the optimum processing for the detection of an arbitrary known signal in the presence of noise
5. Explain Matched filter detection of signals in additive white Gaussian noise
6. Derive an expression for the mean squared error between the signal and its estimate with zero mean and variance σ^2 under noise conditions
7. Discuss with suitable derivation, the estimation of signal parameter using recursive linear mean squared estimation. Assume that the signal is random in nature.
8. Write short notes on
 - a) Maximum likelihood estimate of parameters of linear system.
 - b) Sampling of bandlimited random signals.

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SET- 02

CODE : 13MIT1004

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech I Semester Regular Examinations, January - 2014

**ADVANCED COMPUTER NETWORK
(INFORMATION TECHNOLOGY)**

Time: 3 Hours

Max. Marks: 60

**Answer any Five Questions
All Questions carry equal marks**

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| 1. a) Write in brief about the Network edge. | 4M |
| b) Explain Router structure and Routing devices. | 8M |
| 2. a) Describe the non-least cost path routing algorithm with an example. | 8M |
| b) Discuss Congestion Control at Network Layer. | 4M |
| 3. a) Explain the Interdomain Multicast protocols. | 6M |
| b) Explain Node-Level Multicast algorithms. | 6M |
| 4. a) Explain the UDP protocol. | 6M |
| b) Explain about Domain Name System. | 6M |
| 5. a) Describe the various Wireless LAN technologies. | 6M |
| b) Write about the functioning of Optical routers. | 6M |
| 6. a) Discuss Wireless Mesh Networks. | 6M |
| b) Write short notes on Real-Time Media Transport Protocols. | 6M |
| 7. a) Write brief notes on Communication Energy Model. | 6M |
| b) Discuss about Stream Control Transmission Protocol. | 6M |
| 8. a) Describe the MPLS Architecture and related protocols. | 6M |
| b) Discuss QoS and Network Recovery with MPLS technology. | 6M |

13MPE1004**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. I Semester Regular Examinations, January – 2014****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 basic components of 8051 based microcontroller with neat diagrams.
2. a) Find the machine cycle for 8051 microcontroller if the crystal frequency is i) XTAL = 11.0592 MHz ii) XTAL = 16 MHz
b) Draw and explain the on chip Internal RAM structure of 8051 microcontroller.
3. a) Explain the Timers modes of 8051 microcontroller with neat sketches.
b) Describe the process for finding the count value into the timer for a desired delay.
4. Draw and explain the SCON register of 8051 microcontroller. Explain the procedure for finding the count value into the timer for a desired baud rate. Write a program for the 8051 to receive bytes of data serially, and put them in P1, set the baud rate at 4800, 8-bit data, and 1 stop bit. Assume that XTAL = 11.0592 MHz.
5. Explain the Program Memory Map and Stack organization of PIC16C7X with a neat diagram.
6. Explain the Special Function Register Summary of PIC16C7X with a neat diagram.
7. a) Write an ALP to blink the LEDs connected to a port of 8051 microcontroller with a delay of 1 sec.
b) Write an ALP for 8051 microcontroller to display "MICROCONTROLLERS" at the center of the LCD display.
8. Write an ALP for 8051 microcontroller to act as a counter from 0 – 99 and display the same on a 7 – segment display.

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Set 01

Code.No: 13MVL1004

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech. I Semester Regular Examinations, January - 2014

**VHDL MODELLING OF DIGITAL
SYSTEMS (VLSI System Design)**

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions
All questions carry equal marks.**

1. a) Explain about design flow steps of digital system using CAD tools? 6M
b) With neat diagram explain about design methodologies in HDL? 6M
2. a) List out various delay models representations in VHDL? 6M
b) Write five different syntax formats of concurrent statements in HDL? 6M
3. a) Explain about the importance of sub programs, libraries and packages in HDL and give example for each. 6M
b) Design and write structural VHDL for four input prime number detector. 6M
4. a) Write behavioral VHDL code for dual priority encoder using generic statement. 6M
b) Design the four bit comparator circuit and write a VHDL code using “ite” operator. 6M
5. a) Design and write behavioral VHDL code for four-bit synchronous Johnson counter. 6M
b) Explain about MSI based design with example in HDL. 6M
6. a) Design 16x1 multiplexer using 8x1 multiplexer and write a structural VHDL code for the same. 6M
b) Design the circuit for bidirectional shift register and write the VHDL code. 6M
7. a) Design and write VHDL code for synchronous up/down decade counter. 6M
b) Explain about behavioral description of Parwan CPU? 6M
8. a) With neat diagram representations explain about interface design and modeling in HDL? 6M
b) Design the circuit for “01-string recognizer” and write a VHDL code for the same. 6M

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SET-02

Code No: 13MCS1004

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I M.Tech. I Semester Regular Examinations, January - 2014

**Software Engineering
(Computer Science and Engineering)**

Time: 3 hours

Max Marks: 60

**Answer any FIVE questions
All questions carry equal marks**

1. Distinguish between software process and software project. Explain about personal and team process models. 12M
2. a) Differentiate between waterfall models and Evolutionary process models. 6M
b) Explain with suitable examples the user requirements, system requirements and non-functional requirements. 6M
3. a) What is meant by feasibility study? State and explain various feasibility studies that may be performed on a software project. 8M
b) Differences between context model and behavioral models 4M
4. Discuss the importance of design phase in software development. And also explain various software design concepts with suitable examples. 12M
5. a) Discuss the advantages of component level design over other design methods. 6M
b) What are the three golden rules ? Explain clearly about user interface analysis and design. 6M
6. a) What are the testing strategies for conventional software? 6M
b) What is block box testing and white box testing? Explain them in detail. 6M
7. a) Explain the software process and product Metrics. 6M
b) What is the need for risk management? Explain the process of risk identification, risk projection and risk refinement. 6M
8. Explain the following briefly: 4M
 - a) Software Configuration Management
 - b) CMMI 4M
 - c) Object Oriented design process 4M
