



DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

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NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Academic Year	: 2017-2018
Name of the Faculty	: B. NEELIMA DEVI
Designation	: ASST.PROFESSOR
Department	: ECE
Year/Semester	: IV YEAR– II SEMESTER
Subject	: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT-1 PERFORMANCE CHARACTERISTICS OF INSTRUMENTS

- (a) Give a classification of voltmeters. Explain the working of any one voltmeter in detail. [8]
 - (b) Explain the following terms in detail (i) Accuracy (ii) Resolution (iii) Precision (iv) Expected value [2]
- (a) Explain the procedure how to find Errors in Measurement with example [4]
 - (b) A 200 Ω basic movement is to be used as an ohmmeter requiring full scale deflection of 1 mA and internal battery voltage of 5 V. A half scale deflection marking of 2 k is desired. Calculate
 - i. The values of R1 and R2
 - ii. Maximum value of R to compensate for a 3% drop in battery voltage [6]
- (a) Discuss in detail about the range extension of differential voltmeters [4]
 - (b) The following values are obtained from the measurements of the value of a resistor: 147.2 ohms, 147.4, 47.9, 147.1, 147.5, 147.6, 147.4, 147.6, 147.5. Calculate a) Arithmetic mean Average deviation Standard Deviation [6]
- (a) Explain the following terms in detail (i) speed of response (ii) Fidelity (iii) Lag and Dynamic error.[4]
 - (b) Two ammeters are joined in series in a circuit carrying 100 A. one ammeter has a resistance of 10000 ohm shunted by 0.10 ohm while the other ammeter has a resistance of 150 ohm shunted by 0.02ohm. if the shunts are interchanged what would be the readings of the instruments? [3]
 - (C) Draw the series type Ohmmeter and explain its operation [3]
- (a) Draw the Sketch and explain the principle and operation of Thermocouple type Ammeter. [6]
 - (b) A Voltmeter having a sensitivity of 30k/V reads 80V on a 100V scale, when connected across an unknown resistor. The current through the resistor is 2mA. Calculate the % of error due to loading effect. [4]

UNIT-2 SIGNAL GENERATORS

- (a) Draw the block diagram of a spectrum analyzer and explain its working. [6]
 - (b) Distinguish between spectrum analyzer and harmonic distortion analyzer [4]
- (a) Draw the block diagram of a signal generator and explain its operation. [6]

- (b) List out the differences between fixed frequency and variable AF oscillator in detail. [4]
- 3. (a) Explain the concept of Wien's Bridge method of Harmonic Distortion Analyzer along with circuit diagram. [5]
 - (b) What is Heterodyning and explain the use of Heterodyning in spectrum analyzer along with its circuit diagram.[5]
- 4. (a) Draw the circuit diagram of Sweep generator and explain its operation in detail [5]
 - (b) Define a wave analyzer and classify them. Explain the working of a Resonant Wave Analyzer.[5]
- 5. (a) What is AF oscillators and explain its operation along with circuit diagram. [5]
 - (b) Draw the circuit diagram of Digital Fourier Analyzers and explain its operation.[5]

UNIT-3 OSCILLOSCOPES

1. (a) List various types of probes used for CRO. What are active probes used with CRO? Draw the circuit of a FET probe and explain [7]
 - (b) Explain the concept of Triggered Sweep CRO along with circuit diagram [3]
2. (a) Draw the circuit diagram of a simple compensated attenuator and explain its working [6]
 - (b) An electrically deflected CRT has a final Anode voltage of 2000V and parallel deflecting plates of 1.5cm long and 5mm apart. If the screen is 50cm from the centre of the deflecting plates, Find a) Beam speed Deflection sensitivity of the tube and Deflection factor of the tube.[8]
3. (a) Define deflection sensitivity of a CRT? [2]
 - (b) List out the different Features of CRT and Explain the vertical section of CRT along with block diagram [6]
 - (c) Explain the basic principal of CRO [2]
4. (a) Explain the Measurement procedure of Lissajous patterns with one example [5]
 - (b) Explain the concept, principle & working of Storage oscilloscope along with circuit diagram [5]
5. (a) Draw the circuit diagram of Sampling oscilloscope and explain its operation in detail. [5]
 - (b) Draw the circuit diagram of Dual Trace oscilloscope and explain its operation in detail. [5]

UNIT-4 AC BRIDGES

1. (a) Illustrate the method of measurement of unknown inductance by Maxwell's bridge [4]
 - (b) List out the different Precautions to be taken when using a Bridge with one example[3]
 - (c) A sheet of 4.5 mm thick Bakelite is tested at 50 Hz between 12 cm in diameter. The Schering bridge uses a standard air capacitor C2 of 105 pF capacitor, a nonreactive, R4 of 1000/π in parallel with a variable capacitor and is obtained with C4 = 0.5 μF and R3 = 260 Ω. Calculate the capacitance, PF and relative permittivity of the sheet [3]
2. (a) Define Quality factor and give the expressions for the inductive and capacitive Quality factors. Explain about a bridge which is used for the measurement of the High Quality factor values.[5]
 - (b) Draw the Anderson Bridge and derive the expression for the unknown inductance. What are the salient features of this bridge circuit? [5]
3. (a) Draw the circuit of Wien Bridge and derive the balance condition for bridge. List out the different Limitations of Wheatstone's Bridge in detail [5]
 - (b) Draw the circuit diagram of Schering's Bridge and explain the operation of it. [5]
4. (a) In the case of a Schering Bridge, arm AC has R=4.7kΩ. Arm CD has unknown elements. Arm BD has C=0.1μF Arm AB=4.7KΩ is shunt with 1MF. Determine Values of components in the arm CD. [5]
 - (b) Explain the "parallel-connection" method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor.[5]

5. (a) Explain the operation of Maxwell's Bridge and derive the condition for balance of a Bridge.[5]
 (b) In the case of Hay's Bridge one arm has resistance of $10K\Omega$.Another arm has a resistance of $6.7K\Omega$. The third arm $8K\Omega$ in series with a capacitor of $0.5\mu F$. Determine the R_x and L_x in the fourth arm.[5]

UNIT-5 TRANSDUCERS

1. (a) Explain Primary and secondary Transducers [3]
 (b) Draw the circuit diagram of Photo Transistor and explain its output characteristics [4]
 (c) Explain the different Advantages of Electrical Transducers in detail [3]
2. (a) List out difference between active and passive transducer in detail [5]
 (b) Derive the expression for Gauge factor of a strain Gauge. [5]
3. (a) A Thermistor has a resistance of 3980 at the ice point(0^0 and 749 at 50^0C . The resistance Temperature relationship is $R_T = aR_0e^{b/T}$. Find the values of a and b. Calculate the resistance to be measured in case the temperature varies from 40^0C to 100^0C . [5]
 (b) Define the terms Thermistor & Sensistor and explain the importance of thermistor along with advantages of it [5]
4. (a) Draw the Linear variable differential Transducer and explain its operation in detail. [5]
 (b) Explain the Resistive position Transducer along with circuit diagram. [5]
5. (a) List out different types of Strain Gauges used Transducer and explain any one in detail.[5]
 (b) What is the difference between photo-emissive, photo-conductive and photovoltaic transducers? [5]

UNIT-6 MEASUREMENTS OF PHYSICAL PARAMETERS

1. (a) With the help of a neat sketch explain the principle and working of Electromagnetic Flow meter. What are the advantages and Limitations of this Method? [5]
 (b) Briefly explain the working principles and measurement of force by any two nonelectric techniques? [5]
2. (a) Define moisture and explain a method to measure it. [5]
 (b) Explain the working principle of an accelerometer. [5]
3. (a) Define Humidity and give a classification. Explain the procedure for the measurement of humidity. Explain any one of the method for the measurement of humidity? [5]
 (b) Explain in detail about the stroboscope for the measurement of speed. [5]
4. (a) A Barium Titanate pickup has the dimensions of $5mm \times 5mm \times 1.25mm$. The acting force is 5N. The charge sensitivity of the material is $150pc/N$ and permittivity is $12.5 \times 10^{-9} F/m$. If the modulus of elasticity of material is $12 \times 10^6 N/m^2$, calculate the strain, charge and capacitance. [5]
 (b) What are the two types of anemometer available for liquid flow measurement? Explain the principle and operation of Hotwire Anemometer. [5]
5. (a) Explain piezo electric effect. [3]
 (b) How does pirani gauge differ from thermocouple gauge in operating principle [3]
 (c) Explain the concept of Data acquisition systems in detail [4]
6. Write short notes on the following [10]
 - a) Measurement of force
 - b) Multi channel DAS

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WSN QUESTION BANK

UNIT I

- 1) a) How does adhoc network differ from wireless networks? [8]
b) Mention the major applications of Wireless Sensor Networks.[7]
- 2) a) What are the deployment challenges in Wireless Sensor Networks? [8]
b) List the application areas of sensor networks.[7]
- 3) a) Differentiate ad hoc networks & sensor networks. Outline the features of Wireless Sensor Networks.[8]
b) Compare the features of cellular networks and ad hoc networks.[7]
- 4) a) What are the major issues and challenges that need to be considered for designing adhoc wireless system?[9]
b) Describe the Enabling Technologies for Wireless Sensor Networks.[6]
- 5) Define Wireless Sensor Networks? Explain in brief about the Applications of Wireless Sensor Networks?[15]

UNIT II

- 1) a) Describe the single node architecture with appropriate diagram. [8]
b) Explain energy aware protocols in WSN.[7]
- 2) a) Discuss about quality of sensor network. [8]
b) Draw and explain sensor network architecture.[7]
- 3) a) Draw and explain the architecture of Sensor Networks. [8]
b) Describe in detail about the energy consumption of sensor nodes.[7]
- 4) a) Explain the optimization goals of Sensor Networks. [7]
b) Explain the merits and demerits of Sensor Networks.[8]

5) Explain in brief about the Topology of Personal Area Networks?[15]

UNIT III

- 1) a) Discuss the Security issues in MANETs. [8]
b) Explain in detail about the different types of MANET routing Algorithms.[7]
- 2) a) Define the problem of Hidden and Exposed terminals. [8]
b) What are the different kinds of multiplexing techniques? Explain them.[7]
- 3) a) Explain in detail about Transceiver Design Considerations. [8]
b) Explain the properties of MANETs.[7]
- 4) a) What are the applications needed in a MANET? [8]
b) What is mobile ad-hoc network? What are the applications of MANET?[7]
- 5) a) Discuss about the Contention Based MAC Protocols with Scheduling Mechanisms.[7]
b) Explain the any two MAC Protocols that use Directional Antennas.[8]

UNIT IV

- 1) a) Explain the difference between Proactive routing protocols and Reactive routing protocols.[8]
b) Explain the OLSR protocol in detail. Compare it with AODV protocol.[7]
- 2) a) List the classification of routing protocols in ad hoc networks. Explain any two in detail. [8]
b) What are the issues in designing a Routing Protocol for Ad Hoc Wireless Networks?
- 3) a) Describe about various types of hybrid routing protocols. [8]
b) Explain in detail about the source initiated routing protocols for adhoc networks.[7]
- 4) a) Explain in brief about DSDV Routing Protocol? [8]
b) List out the advantages and disadvantages of CHGSR protocol?[7]
- 5) a) Differentiate between Table –Driven Routing Protocols and On–Demand Routing Protocols?[7]
b) Explain in brief about the Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks?[8]

UNIT V

- 1) a) What are the issues designing in transport layer for adhoc networks? [8]
b) Describe the classification of transport layer and its solutions.[7]
- 2) a) What are the design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks?[8]
b) Justify what are the solutions for classification of transport layer. [7]
- 3) a) Describe the issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks.[8]
b) What are the challenges in transport layer for Adhoc networks?[7]
- 4) a) What is a transport layer? How to Classify Transport Layer Solutions? [8]
b) Explain the transport layer protocols in detail.[7]
- 5) a) Explain in brief about the Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks?[8]
b) Explain in brief about Secure aware AODV Routing protocol?[7]

UNIT VI

- 1) a) What are the issues and Challenges in Security Provisioning? [8]
b) Describe the attacks in Network Security.[7]
- 2) a) Explain the Node- level software in detail. [8]
b) Describe in detail about the state centric programming. [7]
- 3) a) Explain about Sensor Tasking and Control. [8]
b) Explain in detail about Security in Ad Hoc Wireless Networks.[7]
- 4) a) Explain the programming challenges in Wireless Sensor Networks. [8]
b) Using sensors how to automate a home? Explain it. [7]
- 5) a) Explain the Node level simulators in detail. [8]
b) Describe the Wireless Fidelity systems in detail. [7]



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QUESTION BANK

Academic Year	:	2017 - 2018
Name of the Faculty	:	Ms. Sheik Shabeena
Designation	:	Assistant Professor
Department	:	ECE
Year/Semester	:	IV-II Sem
Regulation	:	R13
Subject & Code	:	Cellular Mobile Communication

UNIT-1

- 1 a) Describe the analog and digital cellular systems and limitations of AMPS standard.[6M]
b) Explain the phenomena of severe fading.[4M]
2. a) What are the main advantages and disadvantages of various cellular structures?[5M]
b) Discuss the performance criteria of the basic cellular system?[5M]
3. a) Describe the principle of operation of cellular mobile system and explain the Cellular concept with a neat diagram.[5M]
b) Why 800 MHz is for cellular mobile system?[5M]
4. a) What are the limitations of conventional mobile telephone system and Describe the various generations of wireless mobile systems.[5M]
b) Explain about NMT and NTT System[5M]
- 5.a) Briefly explain cell shape and handoff.[5M]
b) What do you mean by Mean Option Score and explain in detail.[5M]

UNIT-2

- 1.a) Explain the frequency reuse distance in cellular radio system. [5M]
b) List the various techniques used to expand the capacity of a cellular system, Explain in detail.[5M]
2. a) What is the purpose of cell sectoring? Explain how co-channel interference in a cellular system may be reduced?[5M]
b) Describe the frequency reuse concept in cellular communication system and derive the equation for the frequency reuse ratio.[5M]

- 3.a) Explain the concept of frequency reuse channels. [5M]
- b) Derive the C/I for normal case in an Omni directional antenna system[5M]
4. a) Draw the frequency reuse pattern for a cluster size of $N=3$ and $N=7$. [5M]
- b) What are the various components in a cellular system? Explain briefly[5M]
- 5.a) Describe the effects of antenna parameter on the cell interferences.[5M]
- b) With the help of neat diagram explain the N cell reuse pattern for four ,seven cell reuse.[[5M]

UNIT-3

1. a) Explain the concept of lowering the antenna height to decrease the co-channel interference.[5M]
- b) Prove that for hexagonal geometry the co-channel reuse ratio is given by $Q=\sqrt{3}N$ [5M]
2. a) Explain how co-channel interference is measured in real time mobile radio transceiver.[5M]
- b) Explain the importance of de-multiplexer at the receiver to reduce the non-cochannel interference.[5M]
3. a) Discuss the diversity schemes for interference reductions at both mobile unit and cell site.[5M]
- b) What is near-end-far-end interference ratio and explain its effects?[5M]
4. a) Define co-channel interference. How is it measured at the mobile unit and cell site?[5M]
- b) Explain different methods to reduce the co-channel interferences.[5M]
- 5a) Write short notes on diversity receiver.[5M]
- b) Describe the effects of antenna parameter on the cell interference.[5M]

UNIT-4

1. a) Explain about the Underlay-Overlay Arrangement. [5M]
- b) What do you understand by non-fixed channel assignment? Describe the corresponding algorithms.
2. a) Explain in detail access channels and operational techniques. [5M]
- b) Write the concept of the self location scheme at the mobile unit and the Autonomous registration[5M]
3. a) Write about fixed channel assignment schemes in detail. [5M]
- b) Compare the average blocking in spatially uniform and non uniform Traffic distribution for FCA, BCA and FBCA[5M]
4. a) Discuss the concept of frequency management concern to the numbering the channels and grouping into the subset.[5M]
- b) Explain in detail the non-fixed channel assignment[5M]

5. a) Why there is a constant standard deviation along a path-loss curve. [5M]
- b) Describe the various steps involved in finding antenna height gain in a mobile Environment.[5M]

UNIT-5

1. a) Why do the micro cellular structures have more number of handoffs per Second as compared to macro cellular structures? Explain.[5M]
- b) What is meant by a dropped call? Explain the factors that influence the dropped call rate.[5M]
2. a) What is Intersystem handoff? [5M]
- b) What are the various handoff strategies based on algorithms of handoff? Explain in detail.[5M]
3. a) What type of handoff is used when a call initiated in one cellular system Enters another system before terminating? Explain how it works.[5M]
- b) What are the different vehicle locating methods? Explain in detail.[5M]
4. a) Write about forced handoff and delayed handoff mechanisms in detail. [5M]
- b) What is the general formula of dropped call rate? Explain[5M]
- 5.a)Discuss various vehicle locating methods.[5M]
- b)What is meant by MAHO, Explain[5M]

UNIT-6

1. a) Explain in detail about GSM architecture.[5M]
- b) Explain about TDMA channels[5M]
2. a) Explain in detail about multiple access schemes. [5M]
- b) Explain the architecture of NA-TDMA[5M]
3. a) What are the services offered by GSM channels? [4M]
- b) Write short notes on,
- i) TDMA structure [2M]
- ii) Frame length [2M]
- iii) Frame offset [2M]
4. a) Write short notes on modes in GSM channels. [5M]
- b) Write about the signaling format and message structure in TDMA[5M]
- 5.a)Explain in brief about CDMA.[5M]
- b) Explain about GSM CHANNELS.[5M]



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Department of Electronics & Communication Engineering

IV B.Tech II Semester EMBEDDED SYSTEMS

Question Bank

Name : D.L.Mythri

Branch : ECE

UNIT-1

- 1 a) Explain in detail about Embedded system design process with examples?
 - b) Explain the difference between Embedded System and general computing systems?
- 2 a) Describe the classification of Embedded systems
 - b) Write a short note on characteristics of Embedded Computing Applications
- 3 a) Explain the following terms:
 - i. Sensors
 - ii. Actuators
 - iii. Communication Interface
 - b) Explain the History of Embedded System
- 4 a) Write a short notes non-quality attributes of Embedded systems
 - b) Write briefly about domain specific embedded systems?
- 5 a). Explain the Quality attributes of the Embedded systems
 - b) Describe with an Example about the application specific embedded system

UNIT-2

1. Explain the following
 - a) Watch dog timer
 - b) Real time clock
2. Explain basic design using RTOS hard real time scheduling
3. Explain i) Serial communication devices
 - ii) Parallel device ports
4. Discuss about the analog and digital components used in designing an embedded systems

- 5 a) Brief out the various wireless devices
- b) Explain the I/O types in the world of embedded systems

UNIT-3

- 1 a) Explain DMA transfer mechanism and how you interface to the processor ?
 - b) Explain about Embedded firmware design approaches.
- 2 a) Explain the concepts of C versus embedded C?
 - b) Discuss about the firmware development in an embedded system
- 3.a)Explain about the conversion process of assembly language into machine level language
 - b) Sort out the differences between compiler into crosscompiler
- 4. Explain the concepts of Interrupts and ISR
- 5 a) Mention the different firmware development languages
 - b) Explain the concept of DMA

UNIT-4

- 1. a) Explain the functions of a scheduler in an RTOS and how does the scheduler carryout those functions?
 - b)Explain message queues,mail boxes and pipes and events. Give examples?
- 2. a) Explain the implementation of creating and terminating process?
 - b)Explain task, task state ,semaphore and shared data?
- 3. Explain the action plan for designing an RTOS based embedded system in its development Process
- 4 a) What is meant by hardware and software co-design. Explain hardware software Trade-offs.
 - b).Explain about the computational models in embedded system design?
- 5 a) Explain about the fundamental issues in hardware software Co design
 - b) With a help of examples explain how scheduling processes are implemented?

UNIT-5

- 1 a) Describe a ROM Emulator
 - b) List the Difference between ROM Emulator and In-Circuit-Emulator
- 2 .Define the following terms related to embedded system design
 - i)Emulators ii) instruction set simulator
- 3. a)How the target hardware debugging done in design of embedded system

b) Explain about the embedded software development process and tools ?

4 a) Explain about boundary scan

b) Define hardware /Software Co-simulator ?

5 a) What is a key method for speeding up simulator ?

b) Explain about the different types of files generated on cross compilation.

UNIT-6

1a) List and describe the translation tools used in an Embedded system

b) Explain about Laboratory instruments for testing the embedded system

2. Write short notes on quality assurance and testing of the embedded system design?

3. With respect to embedded RTOS compare among the following :

- a) Mailbox
- b) Message queue
- c) Event Register
- d) Pipes.

4. Explain the important features of the following that are relevant to embedded system

- a) Compilers & Linkers
- b) laboratory tools

5. Brief out the following:

- i) Interpreters
- ii) compilers
- iii) CAD tools