CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Semester Regular Examinations December-2024
Course Name	:	Microcontrollers
Course Code	:	A404309
Branch	:	Electronics & Communication Engineering
Date & Session	:	18-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Justify the significance of instruction byte queue in 8086μp architecture?	1 M
2.	Draw the Write cycle timing diagram for 8086μp in minimum mode and explain the timing sequence.	1 M
3.	Configure SCON register of 8051 μc to transmit the data serially at a baud rate of 9600.	1 M
4.	Justify the significance of Port0 structure of 8051 μc.	1 M
5.	List the features of RS232 interface.	1 M
6.	Compare I2C and SPI Protocols.	1 M
7.	Comment on ARM Nomenclature.	1 M
8.	Differentiate between ARM mode and Thumb mode of ARM.	1 M
9.	Write the salient features of Pipeline structure in ARM Advanced processors.	1 M
10.	Differentiate between RISC and CISC cores.	1 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A).	Explain the architecture of 8086μp with a neat diagram.	10M
	OR	
11. B).	i) Write a program to find the number of positive and Negative numbers given in any array? (Assume the array size as five and initialize the array at address 2000h).	5M
	ii) Explain the physical memory organization of 8086μp.	5M
12. A).	i) Explain the various addressing modes supported by 8051μc with suitable example of each.	5M
	ii) Write a program to transfer the string "Microcontrollers" over the serial port of 8051μc at a baud rate of 9600? (Assume xtal freq= 11.0592Mhz).	5M
	OR	
12. B).	i) Write a program to generate a square wave of 2khz frequency on pin P1.4 using Timer1 in mode1 using 8051μc? (Assume xtal freq= 11.0592Mhz).	5M
	ii) Explain the following instructions of 8051μc with suitable example? a) JNB b) DJNZ c) CJNE d) MOVX e) MOVC.	5M

(P.T.O..)

13. A). i) Explain the working of I2C protocol with a neat diagram and justify how the exchange of data is done using I2C. 6M

ii) Write a program to generate a triangular wave by interfacing DAC with 8051μc. 4M

OR

13. B). i) Write a program to interface 4X4 matrix keypad with 8051μc. 5M

ii) Interface an 16KX8 Data RAM IC with 8051μc and explain the process. 5M

14. A). Explain any five load store instructions supported by ARM with a suitable example of each. 10M

OR

14. B). i) Explain about Exceptions and Interrupt vector table of ARM. 5M

ii) Explain the 5-stage pipeline structure of ARM with a suitable example. 5M

15. A). Explain the ARM Cortex Processor features and its working architecture with a neat diagram. 10M

OR

15. B). Explain the OMAP Processor features and its working architecture with a neat diagram. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech V Sem Regular Examinations December-2024**
Course Name : **Antenna & Wave Propagation**
Course Code : **A404310**
Branch : **Electronics & Communication Engineering**
Date & Session : **20-12-2024 AN**   Duration: 3 hours   Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1. The radiation efficiency of antenna is 90%. The maximum radiation intensity is 0.7W/sr. Calculate the directivity of antenna if P_{in}=0.4W.   1 M

2. What is a retarded potential?   1 M

3. Discuss the characteristics of folded dipoles.   1 M

4. What is the advantage of using helical antenna over straight wire antenna?   1 M

5. What is aperture blocking and how to avoid it with Cassegrain feed mechanism?   1 M

6. Find the gain of a paraboloid of 2m diameter operating at 5GHz when half wave dipole feed is used.   1 M

7. Find the radiation pattern of 4 isotropic elements fed in phase, spaced $\lambda/2$ apart by using pattern multiplication   1 M

8. What are the sources of errors in Antenna Measurements?   1 M

9. Define Wave tilt of a ground wave and Multi-hop propagation.   1 M

10. Determine the maximum usable frequency for a critical frequency of 20MHz and an angle of incidence of 35^0.   1 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Explain the terms: (i) Magnetic vector potential (ii) Isotropic radiator (iii) Beam Width between First Nulls (iv) Radiation Intensity.   10M

OR

11. B). Derive expression for Electric field and Magnetic field components for Hertzian dipole antenna.   10M

12. A). What are parasitic elements? Design Yagi-Uda antenna of 3 elements with gain 12dB, if the operating frequency is 500MHz.   10M

OR

12. B). i) State the Fermat's Principle and explain its applicability to horn Antennas.   5M
ii) What is an Optimum Horn? Explain the design considerations of Optimum Horn.   5M

13. A). i) Explain working principle of Microstrip Patch Antenna.   5M
ii) Explain various feeding techniques in microstrip patch.   5M

OR

13. B). i) Describe the Cassegrain method of feeding a parabolic reflector.   5M
ii) Explain spill-over and aperture blocking effects in parabolic reflector antennas.   5M

(P.T.O..)

14. A). Derive the expression for the far field pattern of an array of 2 – isotropic point sources of equal amplitude & phase and draw the radiation pattern of 8-point sources with separation of $\lambda/2$.   10M

OR

14. B). In order to measure the gain of a radiating antenna, gives an experimental arrangement and explain different measurement technique used.   10M

15. A). i) Describe briefly the salient features of ground wave propagation.   5M
ii) What should be the polarization of EM wave for the ground wave propagation? Justify.   5M

OR

15. B). Write a short notes on: 10M
(i) Critical Frequency and MUF
(ii) LUF and Optimum Frequency
(iii) Virtual height and skip distance.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	CMOS VLSI Design
Course Code	:	A404311
Branch	:	Electronics & Communication Engineering
Date & Session	:	23-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1. Define threshold voltage (V_{th}) in a MOS transistor.   1 M
2. Analyze Why CMOS technology is more energy-efficient than NMOS technology.   1 M
3. List the main steps in the VLSI design flow.   1 M
4. Draw a simple stick diagram for an NMOS transistor.   1 M
5. What is switch logic?   1 M
6. What are the sources of wiring capacitances?   1 M
7. Define a shifter in the context of data path subsystems.   1 M
8. Compare the operational speed of SRAM and DRAM.   1 M
9. What is the need for testing?   1 M
10. List any two applications of FPGA.   1 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). With neat diagrams explain the steps involved in the NMOS fabrication process.   10M

OR

11. B). Derive the relationship between drain to source current I_{ds} versus drain to source voltage V_{ds} in a non-saturated and a saturated region.   10M

12. A). List the key design rules that are based on the lambda (λ) scaling method.   10M

OR

12. B). Why scaling is required? Write the scaling factors for different types of device parameters.   10M

13. A). With a detailed step by step process, design and draw the AND-OR-INVERT form complex gates in CMOS logic for the output equation   10M

$Y = \overline{(AB + CD)}$

OR

13. B). Describe three sources of wiring capacitances. Explain the effect of wiring capacitance on the performance of a VLSI circuit.   10M

(P.T.O..)

14. A). Explain the working principle of 6-transistor static RAM and 1-transistor dynamic RAM with necessary diagrams.   10M

<div align="center">OR</div>

14. B). Analyze the structured design approach for building a parity generator and understand the role of each component.   10M

15. A). Describe the difference between FPGAs and CPLDs in terms of architecture and flexibility   10M

<div align="center">OR</div>

15. B). List out the different fault types that occurred in VLSI circuits and explain each fault in detail.   10M

<div align="center">*****</div>

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	IoT Architectures and Protocols
Course Code	:	A404312
Branch	:	Electronics & Communication Engineering
Date & Session	:	26-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1. Mention different components of IoT.   1 M
2. Mention the Applications of IOT.   1 M
3. List out the key elements of NFV architecture.   1 M
4. What is M2M? Give one example.   1 M
5. Expand the terms ICMP, RPL in view of IoT.   1 M
6. Expand the terms CORPL, CARP in view of IoT.   1 M
7. Name the layer used by IoT uses HTTP protocol.   1 M
8. Define XMPP in IoT protocol.   1 M
9. What are the key threats in IoT networks?   1 M
10. How does CoAP ensure secure communication in IoT?   1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).   i) What is the technology that performs analysis on data given by the IoT devices? Explain in detail.   5M
     ii) Describe various functional blocks of IoT.   5M

OR

11. B).   i) How the sensors and Actuators impact on smart city development?   5M
     ii) What is Actuators? Describe various types of Actuators.   5M

12. A).   i) With the help of neat diagrams, explain the M2M system architecture.   5M
     ii) Explain various service types used in service specifications step of IoT system design methodology.   5M

OR

12. B).   i) Describe how NFV can be used for virtualizing IoT devices.   5M
     ii) Analyze how SDN can be used for various levels of IoT?   5M

13. A).   Analyze in detail Lora WAN technology, illustrating the layers, MAC format and Architecture.   10M

OR

13. B).   Explain the following: 10M
     (i) 6LoWPAN
     (ii) DASH7

(P.T.O..)

14. A).	Show by a diagram the object exchanges between devices, CoAP-MQ Broker and Web Applications.	10M

OR

14. B).	Describe about application layer protocols (i) CoAP (ii) MQTT	10M

15. A).	i) Mention advantages and Disadvantages of M2M communication system. ii) Explain the major security threats in IoT networks.	5M 5M

OR

15. B).	Summarize the security challenges in IoT networks and explain about the security mechanisms used in IoT protocols.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Computer Organization & Operating Systems
Course Code	:	A404401
Branch	:	Electronics & Communication Engineering
Date & Session	:	28-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	What is the function of Program Counter?	1 M
2.	Define memory transfer.	1 M
3.	Define virtual memory concept.	1 M
4.	Mention different types of semiconductor memories	1 M
5.	What is serial communication?	1 M
6.	What is the primary function of USB?	1 M
7.	What is an operating system?	1 M
8.	What are the different file types in Unix/Linux systems?	1 M
9.	What does "mounting" a file system mean?	1 M
10.	What is the difference between a file and a directory?	1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Explain logic micro-operations in computer organization. Provide examples of logic microoperations and their applications.	10M

OR

11. B).	How does a CPU determine the type of instruction during the fetch and decode phase? Outline the examples of different instruction types.	10M
12. A).	Differentiate between hardwired control and microprogrammed control.	10M

OR

12. B).	What are the different types of Mapping Techniques used in the usage of Cache Memory? Explain.	10M
13. A).	Analyze the function of a DMA controller. How does it facilitate DMA transfers between memory and peripheral devices with diagram?	10M

OR

13. B).	Demonstrate the priority interrupt handling mechanism in computer systems.	10M
14. A).	Explain the concept of the Thrashing in detail.	10M

OR

14. B).	Relate implementation of paging and segmentation with neat diagrams.	10M
15. A).	Summarize the concept of a file in computing. Explain the process of file system mounting and its importance in an operating system	10M

OR

15. B).	Describe various file access methods.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Data Communications and Computer Networks
Course Code	:	A404402
Branch	:	Electronics & Communication Engineering
Date & Session	:	28-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	List out the topologies used in networks.	1 M
2.	List various components in a network.	1 M
3.	Explain flow control.	1 M
4.	What is ALOHA in networking?	1 M
5.	Define Forwarding and Routing.	1 M
6.	What is the purpose of the Internet Control Message Protocol (ICMP)?	1 M
7.	Differentiate between TCP and UDP.	1 M
8.	Define Congestion Control.	1 M
9.	What is the use of FTP?	1 M
10.	What information is used to examine DNS?	1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). With a neat diagram explain the OSI reference model in detail? Explain the functions performed in each layer.   **10M**

OR

11. B). Explain the evolution of the Internet in connection with the development of various types of computer networks.   **10M**

12. A). What is high level data link control (HDLC)? Explain HDLC frame format in detail.   **10M**

OR

12. B). Describe different techniques used for error detection and correction. Given a generator polynomial of x^3+x+1, a sender wants to transmit the data sequence 1001.
i) Generate the CRC code for the data using the given polynomial.
ii) Explain the process of error checking if the 3rd bit from the left in the transmitted data is inverted.   **10M**

13. A). What is classful addressing? Discuss class A, class B, class C, class D, class E address with its range in decimal dotted notation and example.   **10M**

OR

13. B). Explain the differences between Virtual Circuit Networks and Datagram Networks.   **10M**

(P.T.O..)

14. A). Describe with examples the three mechanisms by which congestion control is formulated   10M
in TCP.

OR

14. B). Describe how the transport layer services ensure reliable data transfer and efficient   10M
communication.

15. A). Analyze the message format and the message transfer and the underlying protocol   10M
involved in the working of the electronic mail.

OR

15. B). What is the use of DNS? Explain how it works.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Electronic Measurements and Instrumentation
Course Code	:	A404403
Branch	:	Electronics & Communication Engineering
Date & Session	:	28-12-2024 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1. Define Measurement and Instrumentation.   1 M
2. List various types of errors.   1 M
3. Define Harmonic Distortion.   1 M
4. Give few specifications of video signal generator.   1 M
5. What is need for delay line in CRO?   1 M
6. List the high frequency CRO considerations.   1 M
7. What is meant by strainguage?   1 M
8. Define piezoelectric transducer.   1 M
9. How do you measure humidity and moisture?   1 M
10. Draw the block diagram for data acquisition system.   1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Six determinations of a quantity as entered on the data sheet and presented to you for   10M
analysisare12.35, 12.71,12.48,10.24,12.63,12.58. Examine the data on the basis of your
conclusions calculate (i) Arithmetic mean (ii) Standard deviation (iii) Probable error in
present of the average of the reading (iv) Deviation of the mean.

OR

11. B). A basic D'Arsonval movement with a full-scale deflection of 50 μA and an internal   10M
resistance of 1800 Ω is available. It is to be converted into a 0-1V,0-5V,0-25V,0-225V
multi range voltmeter using an individual multiplier for each range. Calculate the values
of the individual resistors.

12. A). Identify & analyze the circuit which produces different waveforms of adjustable   10M
frequency.

OR

12. B). With a neat figure demonstrate the concept of Spectrum analyzer?   10M

13. A). Draw the block Schematic of CRO and explain the principle and operation.   10M

OR

13. B). Draw the block Schematic of DSO and explain the principle and operation.   10M

(P.T.O..)

14. A). Discuss in detail about transducers and its classifications. 10M

OR

14. B). Demonstrate the operation of LVDT. 10M

15. A). The basic AC bridge consists of the following constants. Arm AB: R_1=400 Ω, Arm BC: R_2=150 Ω in series with C_2=0.2μf, Arm CD: Unknown impedance, Arm DA: R_3=100 Ω in series with inductance L_3=100mH.The source of the oscillator frequency is 1KHz. Determine the components of Arm CD. 10M

OR

15. B). Draw and derive the balance condition for Kelvin's Bridge and explain its operation. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Radar Systems
Course Code	:	A404407
Branch	:	Electronics & Communication Engineering
Date & Session	:	30-12-2024 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	What is the purpose of the radar equation?	1 M
2.	Define maximum unambiguous range in radar.	1 M
3.	What is the Doppler effect in the context of radar?	1 M
4.	How does Doppler measurement help in radar applications?	1 M
5.	What does PRF stand for, and how is it relevant to MTI radar?	1 M
6.	Explain the difference between MTI radar and pulse Doppler radar.	1 M
7.	What is a monopulse tracking radar?	1 M
8.	Identify one key difference between tracking radar and search radar.	1 M
9.	Define cross-correlation function in radar.	1 M
10.	What is the purpose of a duplexer in radar systems?	1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Describe the block diagram of a basic radar system and explain the function of each component.	10M

OR

11. B).	What are system losses in radar? Describe the different types of system losses and how they impact radar performance.	10M

12. A).	What is FM-CW radar? Explain its working principle and applications in range and altitude measurement.	10M

OR

12. B).	Explain the importance of receiver bandwidth in CW radar and how it impacts signal processing.	10M

13. A).	Explain the working of delay line cancellers in MTI radar. How do they help in removing clutter?	10M

OR

13. B).	Explain staggered Pulse Repetition Frequencies (PRFs) and their role in reducing blind speeds in MTI radar.	10M

14. A).	Discuss the various scanning patterns used in tracking radar systems. Compare their advantages and disadvantages.	10M

(P.T.O..)

OR

14. B). Explain amplitude comparison monopulse tracking and describe how it is used to track a target's position.   10M

15. A). Discuss the techniques used for efficiency enhancement of non-matched filters in radar systems.   10M

OR

15. B). i) Explain the design and operation of noise figure and noise temperature in radar receivers.   5M

ii) Estimate the system noise figure if the antenna is at 300deg Kelvin and the transmission line loss is 1.5 dB and the receiver noise figure is 2.6 dB.   5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025**
Course Name : **Satellite Communications**
Course Code : **A404411**
Branch : **Electronics & Communication Engineering**
Date & Session : **08-01-2025 FN**   Duration: 3 hours   Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1. If a satellite has an elevation angle below 0°, can the ground station establish a connection? Why or why not?   1 M
2. What is the primary cause of a satellite's east-west drift in a geostationary orbit?   1 M
3. Name one method used to correct a satellite's drift in its orbit.   1 M
4. Which component in AOCS is used to stabilize satellite orientation?   1 M
5. Why is uplink frequency higher than downlink frequency?   1 M
6. What is the major source of noise in a satellite downlink?   1 M
7. Name one key component of an Earth Station.   1 M
8. What is the function of a low-noise amplifier (LNA) in an Earth Station?   1 M
9. What is the typical altitude range of LEO satellites?   1 M
10. What is the orbital period of a GEO satellite?   1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Discuss the origins of satellite communications, highlighting its historical background, key milestones, and the evolution of technology that led to its modern applications.   10M

OR

11. B). Explain the different types of launch vehicles used in satellite communication, and discuss the major characteristics, advantages, and challenges associated with each type.   10M

12. A). Explain the working principle of the Attitude and Orbit Control System (AOCS) in satellite communication.   10M

OR

12. B). Explain how Space Qualification of every part of the satellite ensures that it has a long-life expectancy in orbit?   10M

13. A). i) A satellite transmits a signal with an EIRP of 40 dBW. The signal is received on Earth at 36,000 km. Calculate the power flux density at the Earth's surface.   5M
ii) A ground station receives a satellite signal with a power flux density of -120 dBW/m². If the receiving antenna has a gain of 35 dB and an aperture area of 10 m², calculate the satellite's EIRP.   5M

OR

13. B). Write the design steps for Ku -Band Downlink Design, Downlink Noise Power Budget and Downlink Power Budget.   10M

(P.T.O..)

14. A). With the help of block diagram, explain the General Configuration of an Earth Station.   10M

OR

14. B). Explain the working of antenna subsystems used in satellite communication.   10M

15. A). Illustrate the functioning of Medium Earth Orbit (MEO) satellites, list its advantages and disadvantages?   10M

OR

15. B). Explain the function of General arrangement of position locations with GPS?   10M

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