

# CBCS SCHEME

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17EC71

Seventh Semester B.E. Degree Examination, Jan./Feb.2021

## Microwave and Antennas

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. With neat diagram, explain construction and operation of reflex Klystron. (10 Marks)
- b. Define and derive an expression for reflection coefficient when the transmission line is terminated by load impedance ( $Z_L$ ). (06 Marks)
- c. A transmission line working at RF has following constants,  $L = 9 \mu\text{H/m}$ ,  $C = 16 \text{PF/m}$  the line is terminated in a resistive load of  $1000 \Omega$ . Find the reflection coefficient and standing wave ratio. (04 Marks)

OR

- 2 a. Explain the different mode current of reflex klystron. (06 Marks)
- b. Show the relationship between standing wave ratio and reflection coefficient. (06 Marks)
- c. A transmission line has the following primary constants per km of the line,  $R = 8 \Omega$ ,  $G = 0.1 \mu\text{S}$ ,  $L = 3.5 \text{mH}$  and  $C = 9 \text{nF}$ . Calculate  $Z_0$ ,  $\alpha$ ,  $\beta$ , VP and  $\lambda$  at  $\omega = 5000 \text{rad/sec}$ . (08 Marks)

### Module-2

- 3 a. Define the following losses in microwave interms of s-parameters, (i) Transmission loss (ii) Reflection loss (iii) Return loss (iv) Insertion loss (06 Marks)
- b. Explain S-matrix representation for multi port network. (06 Marks)
- c. State the properties of S-parameters, prove the symmetry property and unitary property of S-parameter. (08 Marks)

OR

- 4 a. With a neat diagram, explain rotary precision phase shifter. (06 Marks)
- b. What is magic tee? Explain magic tee and derive an S-matrix. Mention its application. (08 Marks)
- c. Explain different types of co-axial connectors in microwave circuits. (06 Marks)

### Module-3

- 5 a. What are the losses in microstrip lines? Explain the radiation losses. (08 Marks)
- b. Show that the maximum effective aperture of a short dipole is  $0.119\lambda^2$ . (06 Marks)
- c. Obtain the expression for inductance, capacitance and hence characteristic impedance of a parallel strip line. (06 Marks)

OR

- 6 a. Derive characteristic impedance of microstrip line with diagram. (06 Marks)
- b. Using power theorem find the directivity for the source with unidirectional cosine square power pattern.  $U(\theta, \phi) = U_m \cos^2 \theta$ . (06 Marks)
- c. Explain the following parameters with respect to antenna:  
(i) Directivity (ii) Beam area (iii) Radiation intensity (iv) Beam efficiency (08 Marks)

**Module-4**

- 7 a. State and explain the power theorem. (06 Marks)  
 b. Derive an expression for radiation resistance of short electric dipole. (08 Marks)  
 c. A source has a radiation intensity pattern given by  $U = U_m \sin \theta$  for  $0 \leq \theta \leq \frac{\pi}{2}$  and  $0 \leq \phi \leq 2\pi$ , find the power and directivity. (06 Marks)

**OR**

- 8 a. Derive an expression and draw the field pattern of two isotropic point sources of same amplitude and phase. (08 Marks)  
 b. Obtain the expression for field of dipole in general for the case of thin linear antenna. (06 Marks)  
 c. For a short dipole  $\frac{\lambda}{15}$  long find the efficiency, radiation resistance if loss resistance is  $1 \Omega$  and also find the (i) Maximum effective aperture (ii) Efficiency (iii) Radiation resistance. (06 Marks)

**Module-5**

- 9 a. Obtain the expression for radiation resistance of small loop antenna. (08 Marks)  
 b. Determine the directivity of loop antenna having radius 1.0 m when it is operated at 0.9 MHz. (04 Marks)  
 c. Discuss the following:  
 (i) Yagi Uda antenna.  
 (ii) Log periodic antenna. (08 Marks)

**OR**

- 10 a. Explain Helical geometry with diagram and practical consideration for the manofillar axial mode helical antenna. (08 Marks)  
 b. Derive the expression of far field equation of small loop antenna, with diagram. (08 Marks)  
 c. Find the radiation resistance of a loop antenna with diameter 0.5 m operating frequency at 1 MHz. (04 Marks)

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17EC72

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Digital Image Processing

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain with block diagram, the fundamental steps used in digital image processing. (10 Marks)  
b. Explain with relevant diagrams, different sensor arrangements. (10 Marks)

OR

- 2 a. Explain the process of sampling and quantization, with relevant diagrams. (10 Marks)  
b. Define following: (i) Spatial and Intensity Resolution (ii) 4-, 8- and m-adjacency  
(iii) Euclidean distance, city-block distance and chessboard distance (10 Marks)

### Module-2

- 3 a. Explain with plots, some basic intensity transformation functions. (10 Marks)  
b. With relevant equations, discuss the discrete Laplacian of two variables and different implementation of Laplacian operator masks. (10 Marks)

OR

- 4 a. Discuss with relevant diagrams, the image smoothing using the frequency domain low pass filters (i) Ideal (ii) Butterworth (iii) Gaussian (10 Marks)  
b. Explain the following selective filter: (i) Bandreject and Bandpass Filters (ii) Notch Filters (10 Marks)

### Module-3

- 5 a. Discuss various noise models with respect to image restoration process. (10 Marks)  
b. Explain the following methods for estimating degradation function:  
(i) Estimation by image observation (ii) Estimation by experimentation (10 Marks)

OR

- 6 a. Explain the process of restoration of images using Inverse Filtering technique. (10 Marks)  
b. Explain with relevant equations, Minimum Mean Square Error (Wiener) Filtering. (10 Marks)

### Module-4

- 7 a. Explain the following color models: (i) RGB (ii) HSI (10 Marks)  
b. Explain Pseudocolor Image Processing. (10 Marks)

OR

- 8 a. Explain the following Morphological operations:  
(i) Erosion (ii) Dilation (iii) Opening (iv) closing (10 Marks)  
b. Explain multi-resolution expansions used in image processing. (10 Marks)

### Module-5

- 9 a. Explain Thresholding based segmentation. Discuss:  
(i) Global Thresholding (ii) Adaptive Thresholding (10 Marks)  
b. Explain segmentation of images using Morphological Watersheds. (10 Marks)

OR

- 10 a. Explain Chain Codes used to represent a boundary. (10 Marks)  
b. Discuss various approaches of boundary description (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

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17EC73

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Power Electronics

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Draw the symbols and the V-I characteristics of the following power semiconductor devices:  
(i) Diode (ii) Thyristor (SCR) (iii) SITH (iv) GTO (v) TRIAC (10 Marks)
- b. Explain peripheral effects of power electronic components and equipment, mention how to eliminate them. (06 Marks)
- c. List out different applications of power electronic system. (04 Marks)

OR

- 2 a. Explain the important characteristic features of power transistors and discuss different operating ranges of power BJT with the aid of output and transfer characteristic. (10 Marks)
- b. Illustrate the switching characteristics of power MOSFET with necessary waveforms. (10 Marks)

### Module-2

- 3 a. Describe modes of operation of SCR with a neat V-I characteristic. (10 Marks)
- b. Develop two transistor model and derive an expression for anode current in terms of transistor parameters for a thyristor. (10 Marks)

OR

- 4 a. Illustrate with neat diagrams and waveforms, the operation of UJT triggering circuit for SCR. (10 Marks)
- b. Estimate the required parameter for Snubber circuit to provide  $\frac{dv}{dt}$  protection to SCR used in single phase bridge converter; the SCR has a maximum  $\frac{dv}{dt}$  of 60 V/Msec. the input line to line voltage has peak value of 425 V and series inductance of 0.2 mH. (05 Marks)
- c. Compare natural commutation and forced commutation. (05 Marks)

### Module-3

- 5 a. Describe with neat diagram and waveforms, half wave controlled rectifier with freewheeling diode and obtain average value of output voltage. (12 Marks)
- b. A single phase full converter is operated from 120 V, 60 Hz supply. The load current with an average value of  $I_a$  is continuous with negligible ripple current. If turn ON ratio of transformer is unity with delay angle  $\alpha = \frac{\pi}{3}$ . Calculate:  
(i) Harmonic Factor (HF) of input current  
(ii) Displacement Factor (DF)  
(iii) Supply Power Factor (PF) (08 Marks)

OR

- 6 a. Illustrate with neat circuit diagram and waveforms, the working principle of single phase AC voltage controller using phase control. Obtain average value of output voltage for single phase half wave controller. (12 Marks)
- b. A single phase half wave AC voltage controller has resistance load of  $R = 5\Omega$  and input voltage  $V_S = 120\text{ V}$ , 60 Hz. The delay angle of thyristor is  $\alpha = \frac{\pi}{3}$ , determine:  
 (i) rms output voltage (ii) input power factor (iii) average input current (08 Marks)

**Module-4**

- 7 a. Demonstrate the working principle of step-down Chopper with RL load. Derive an expression for average and rms value of load voltage. (12 Marks)
- b. A step up dc chopper has an input of 200 v and an output of 250 V. The blocking period ( $T_{\text{off}}$ ) in each cycle of operation is  $0.6 \times 10^{-3}$  seconds. Find the period of conduction ( $T_{\text{ON}}$ ) in each cycle. (08 Marks)

OR

- 8 a. Outline the different performance parameters of dc choppers. (06 Marks)
- b. Describe class D chopper with neat diagram. (08 Marks)
- c. Design the filter components for buck convert which has an input voltage of 12V and output voltage of 5V. The peak to peak ripple voltage is 20 mV and peak to peak ripple current of inductor is limited to 0.8A. The switching frequency is 25 kHz. (06 Marks)

**Module-5**

- 9 a. With the help of circuit diagram and waveforms, explain the working of single phase bridge inverters. (12 Marks)
- b. The single phase full bridge inverter with resistive load of  $R = 2.4\ \Omega$  and dc input voltage  $V_S = 48\text{V}$ . Determine:  
 i) RMS output voltage at the fundamental frequency  
 ii) Output power  
 iii) Peak current and average current of each transistor (08 Marks)

OR

- 10 a. Outline various performance parameters used for inverters. Compare Current Source Inverter (CSI) and Variable DC link inverter. (10 Marks)
- b. Explain AC Switches (single phase) and Microelectronic Relays (MER) with neat diagram. (10 Marks)

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17EC741

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Multimedia Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain five types of communication network that are used to provide multimedia services. (10 Marks)
- b. Explain web page, home page, hyperlink, URL, HTML. (10 Marks)

OR

- 2 a. Explain the working principle of circuit mode and packet mode of operation of multimedia network. (10 Marks)
- b. Determine the propagation delay associated with the following communication channels
  - i) A connection through a private telephone network of 1 km
  - ii) A connection through a PSTN of 200 km
  - iii) A connection over a satellites channel of 50,000kmAssume that the velocity of propagation of a signal in the case of : i) and ii) is  $2 \times 10^8 \text{ms}^{-1}$  and in the case of iii)  $3 \times 10^8 \text{ms}^{-1}$ . (10 Marks)

### Module-2

- 3 a. State and explain the basic form of representation of : Text, Image, Audio, Video, Fax Machine. (10 Marks)
- b. Assuming the bandwidth of a speech signal is from 50Hz through to 10KHz and that of a music signal is from 15Hz to 20KHz, derive the bit rate that is generated by the digitization procedure in each assuming the Nyquist sampling rate is used with 12 bits per sample for the speech signal and 16 bits per sample for the music signal. Derive the memory required to store a 10 minute passage of stereophonic music. (10 Marks)

OR

- 4 a. With the aid of block diagram explain PCM signal encoding and decoding principle. (10 Marks)
- b. Derive the time to transmit the following digitized images at both 64 Kbps and 1.5 Mbps.
  - i) A  $640 \times 480 \times 8$  VGA compatible image
  - ii) A  $1024 \times 768 \times 24$  SVGA – compatible image. (10 Marks)

### Module-3

- 5 a. Explain compression principles. (08 Marks)
- b. Explain static Huffman coding. (06 Marks)
- c. Explain JPEG coding principles. (06 Marks)

OR

- 6 a. Discuss multimedia operating system with respect CPU management, memory management, I/O management and file system management. (08 Marks)
- b. What is multimedia operating system? (06 Marks)
- c. Explain main features of a DMS. (06 Marks)

**Module-4**

- 7 a. With a neat diagram, explain video compression principles. (08 Marks)  
b. Explain MPEG – 4 coding principles. (06 Marks)  
c. Explain linear predictive coding. (06 Marks)

OR

- 8 a. Explain H.261 encoding formats. (08 Marks)  
b. Explain how better sound quality can be obtained by using subband DPCM with the help of block diagram of encoder and decoder. (06 Marks)  
c. Write a note on audio compression. (06 Marks)

**Module-5**

- 9 a. Explain packet audio and video in the network environment. (08 Marks)  
b. Explain video transport across generic network. (06 Marks)  
c. Write a short note on multimedia transport across ATM networks. (06 Marks)

OR

- 10 a. Explain multiplexing in ATM networks. (08 Marks)  
b. Explain video delay in ATM networks. (06 Marks)  
c. Write a short note on errors and losses in ATM. (06 Marks)

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## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Cryptography

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What is Divisibility? Explain the division algorithm with suitable example. (06 Marks)  
b. Explain with examples the properties of modular Arithmetic. (06 Marks)  
c. Write a note on Finite field of the Form  $GF(P)$ . (08 Marks)

OR

- 2 a. Write the Arithmetic addition modulo and multiplication module for  $GF(2^4)$ . (06 Marks)  
b. With suitable example, explain the polynomial Arithmetic with co-efficient in  $Z_p$ . (08 Marks)  
c. What are Groups? Explain in detail with respect to its properties. (06 Marks)

### Module-2

- 3 a. With a neat sketch, explain the model of symmetric cryptosystems. (06 Marks)  
b. For the keyword "ELECTRONICS", Give the cipher text for the plain text "COMMUNICATION ENGINEERING", using play fair cipher. Explain the rules for play fair cipher. (10 Marks)  
c. Explain with an example, how the transposition technique is used to convert PT to CT. (04 Marks)

OR

- 4 a. What is Steganography? Explain different methods adopted in steganography. (06 Marks)  
b. Explain simplified DES algorithm with a neat block diagram. (08 Marks)  
c. Explain with suitable sketch, the concept of Feistel encryption and decryption. (06 Marks)

### Module-3

- 5 a. List and explain the algorithm and characteristics implementation and AES. (08 Marks)  
b. Explain the Key-Block-Round combination analysis in AES. (06 Marks)  
c. Explain the concept of AES encryption single Round stages. (06 Marks)

OR

- 6 a. Explain in detail the nonlinear shift Register. (06 Marks)  
b. Write an explanatory note on Linear Feed Back Shift Registers. (10 Marks)  
c. Compare different LFSR boxed stream ciphers for its cryptographic weaknesses. (04 Marks)

### Module-4

- 7 a. Find the GCD of (1970, 1066) using Euclid's method. (04 Marks)  
b. With suitable explanation prove Euler's theorem. (07 Marks)  
c. Explain Chaises Remainder Theorem and its features. (09 Marks)



OR

- 8 a. Explain the complete steps involved for encryption key Generation and Decryption for RSA algorithm. (08 Marks)
- b. What is Key Management? Explain DH key exchange mechanism. (08 Marks)
- c. Users A and B use the DH key exchange technique. A common prime  $Q = 353$  and a primitive root  $\alpha = 3$ , If A select private key  $X_A = 97$  and B selects private key  $X_B = 233$ , then, what is public key  $Y_A$  of A and public key  $Y_B$ . Calculate shared secret key 'K'. (04 Marks)

Module-5

- 9 a. What are one way Hash Functions? Explain in detail one way hash function using symmetric block algorithms. (08 Marks)
- b. Write an explanatory note on MAC. (06 Marks)
- c. Briefly explain the security threats on Hash function and MAC. (06 Marks)

OR

- 10 a. Explain in detail Direct Digital Signature and Arbitrated Digital Signature. (08 Marks)
- b. Explain with suitable sketch, Discrete Logarithm signature scheme. (06 Marks)
- c. Briefly, explain the signing and verifying the Digital Signature Algorithm (DSA). (06 Marks)

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17EC752

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 IOT and Wireless Sensor Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Describe IoT reference model suggested by CISCO. (08 Marks)  
b. With neat diagram, explain M2M architecture. (08 Marks)  
c. Explain the enabling technologies for IoT. (04 Marks)

OR

- 2 a. Explain MQTT protocol for IoT. (08 Marks)  
b. Write and explain modified OSI model for the IoT/M2M system. (08 Marks)  
c. Write and explain 4 layer architectural frameworks developed at CISCO for a city. (04 Marks)

### Module-2

- 3 a. Explain Internet Protocol Version 4. (08 Marks)  
b. Explain DHCP protocol for dynamically configuring the IP address and other networks. (08 Marks)  
c. List any 4 important features of HTTP port. (04 Marks)

OR

- 4 a. Explain four cloud deployment models. (06 Marks)  
b. Explain in detail different cloud service models used in IoT. (08 Marks)  
c. List the essential features of cloud storage and computing. (06 Marks)

### Module-3

- 5 a. Write and explain traffic light control program using Arduino UNO. (10 Marks)  
b. Explain security requirements and threat analysis. (10 Marks)

OR

- 6 a. Describe how data is read from sensors and devices. (10 Marks)  
b. Explain IOT security tomography and layered attacker model. (10 Marks)

### Module-4

- 7 a. Explain single node architecture of WSN with neat diagram. (10 Marks)  
b. Explain optimization goals and figures of merit in WSN. (10 Marks)

OR

- 8 a. Explain gateway concepts. (10 Marks)  
b. Explain challenges and characteristics requirements of WSN. (10 Marks)

### Module-5

- 9 a. Explain in brief the LEACH protocol in WSN. (10 Marks)  
b. Explain energy efficient unicast routing. (10 Marks)

OR

- 10 a. Explain SMAC protocol. (10 Marks)  
b. Explain CSMA protocol. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

# CBCS SCHEME

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17EC755

## Seventh Semester B.E. Degree Examination, Jan./Feb.2021 Satellite Communication

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define and explain three laws of Kepler to describe the motion of an artificial satellite around earth. (10 Marks)
- b. Briefly explain any five orbital parameters to determine a satellite orbit with suitable sketches. (10 Marks)

OR

- 2 a. With neat sketches, explain satellite stabilization. (10 Marks)
- b. Define Eclipses. With a neat diagram, explain solar and lunar eclipse. (10 Marks)

### Module-2

- 3 a. Explain solar energy driven power supply system of a satellite. (10 Marks)
- b. Describe the Telemetry, Tele command and tracking control monitoring system of a communication satellite. (10 Marks)

OR

- 4 a. List and explain the types of earth stations on basis of service provided by them and their usage. (10 Marks)
- b. Discuss in detail about earth station testing (any one method in mandatory tests). (10 Marks)

### Module-3

- 5 a. Describe the important parameters that influence the design of a satellite communication link. (08 Marks)
- b. Briefly explain the basic concepts of TDMA and FDMA. (12 Marks)

OR

- 6 a. Explain general TDMA frame structure. (10 Marks)  
b. With usual notation, derive satellite transmission equation. (06 Marks)  
c. Discuss about CDMA. (04 Marks)

**Module-4**

- 7 a. With neat sketches, explain VSAT. (10 Marks)  
b. Explain communication application of satellite. (10 Marks)

OR

- 8 a. Define transponder. Explain the types of transponder used in satellite. (10 Marks)  
b. Discuss the advantages and disadvantages of satellite over terrestrial network. (06 Marks)  
c. List the frequency bands used in satellite communication. (04 Marks)

**Module-5**

- 9 a. Classify the sensors used in remote sensing satellites and explain remote sensing system. (10 Marks)  
b. With suitable sketches, explain working of GPS. (10 Marks)

OR

- 10 a. Mention the applications of weather forecasting satellites and also remote sensing satellites. (10 Marks)  
b. Explain microwave remote sensing and thermal remote sensing system. (10 Marks)

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# CBCS SCHEME

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17TE71

## Seventh Semester B.E. Degree Examination, Jan./Feb.2021 Cryptography and Network Security

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain the procedure to calculate GCD using Euclid's algorithm. Determine the GCD of (24140, 16,762) using Euclid's algorithm. (06 Marks)
- b. Encrypt the message "Work is workshop" using, play fair cipher with the keyboard "COMPUTER" and decrypt the cipher text to recover the original message. Give the rules for encryption and decryption. (08 Marks)
- c. Develop a set of additive and multiplications tables for modulo 9. (06 Marks)

OR

- 2 a. Construct the finite field GF ( $2^4$ ) multiplication table using the polynomial arithmetic modulo  $(x^4 + x + 1)$ , show the calculation steps. (06 Marks)
- b. Using extended Euclidean, find the multiplicative inverse of 550 mod 1769. (06 Marks)
- c. Define the following:
  - (i) Groups, rings and fields.
  - (ii) Fermat's and Euler's theorem.
  - (iii) Cryptology, Cryptoanalysis, Cryptography. (08 Marks)

### Module-2

- 3 a. Compare AES to DES for each of the following elements of DES :
  - (i) XOR of subkey material with the input of the f function.
  - (ii) XOR of the f function output with the left half of the block.
  - (iii) f function
  - (iv) Permutation P
  - (v) Swapping of half of the block. (06 Marks)
- b. Consider the elliptic curve defined over  $E_{23}(1, 1)$ . Let  $P = (3, 10)$  and  $Q = (9, 7)$ . Find  $(P+Q)$  and  $2P$ . (08 Marks)
- c. Given  $p = 19$ ,  $q = 23$ ,  $m = 5$  and  $e = 3$ . Use RSA algorithm to find  $n$ ,  $\phi(n)$ ,  $d$  and  $C(m)$ . Also find  $M$  from decryption. (06 Marks)

OR

- 4 a. What are the 4 tasks performed in each round of AES cipher? Explain. (06 Marks)
- b. Users A and B use the Diffie Hellman key exchange technique, a common prime  $q = 11$  and a primitive root  $\alpha = 7$ 
  - (i) If user A has private key  $X_A = 3$ . What is A's public key  $Y_A$ ?
  - (ii) If user B has private key  $X_B = 6$ . What is B's public key  $Y_B$ ? What is the shared secret key? Write the algorithm as well? (06 Marks)
- c. Given the plaintext [000102030405060708090A0B0C0D0E0F] and the key [01010101010101010101010101010101]. Show the (a) State matrix (b) Initial round key (c) Sub Bytes (d) Shift rows (e) Mix columns output states. (08 Marks)

**Module-3**

- 5 a. Explain MD5 algorithm steps. Compare it with SHA-1. (08 Marks)  
 b. Discuss the key components of digital signature algorithm. (06 Marks)  
 c. Explain the HMAC algorithm with a neat diagram. (06 Marks)

**OR**

- 6 a. Explain the Discrete Logarithm signature scheme. (06 Marks)  
 b. Describe SHA 512 algorithm in detail. (06 Marks)  
 c. Explain the following:  
 (i) Hash function and its requirements.  
 (ii) Role of compression function in Hash functions.  
 (iii) Difference between weak and strong collision resistance.  
 (iv) Advantages of HMAC over other hash based schemes. (08 Marks)

**Module-4**

- 7 a. Describe the four protocols defined by secure socket layer. (06 Marks)  
 b. Explain the Secure Shell (SSH) architecture. (06 Marks)  
 c. Explain the various phases of 802.11i. (08 Marks)

**OR**

- 8 a. Explain the parameters defined in SSL connection. (06 Marks)  
 b. Bring out the differences between SSL and TLS. (06 Marks)  
 c. Explain HTTPS elements encrypted connection initiation and connection closure. (08 Marks)

**Module-5**

- 9 a. Explain the services provided by PGP and the reasons for using PGP. (06 Marks)  
 b. Explain Encapsulating security pay load header. (06 Marks)  
 c. Explain the preparation of enveloped Data S/MIME entity. Write the functions of S/MIME and Enhanced Security Services of S/MIME. (08 Marks)

**OR**

- 10 a. Explain the IPsec architecture. (06 Marks)  
 b. Describe the following :  
 (i) Differences between Tunnel mode and Transport mode of IPsec.  
 (ii) Scope of ESP encryption and authentication. (08 Marks)  
 c. Explain IKE key determination protocol. (06 Marks)

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17TE72

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 Satellite Communication and Remote Sensing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define remote sensing. Illustrate with a neat diagram the main components of a remote sensing system. (10 Marks)
- b. What is outer space treaty? What additional principles does it include? (10 Marks)

OR

- 2 a. Briefly explain the benefits of environmental monitoring from satellite sensors. (10 Marks)
- b. Illustrate the milestones in remote sensing observations. (10 Marks)

### Module-2

- 3 a. Explain the following terms with relevant expression as applied to the remote sensing application.  
i) Radiant energy ii) Radiant irradiance iii) Emissivity iv) Radiant exitance v) Albedo. (10 Marks)
- b. What is meant by special reference signature? Enlist the main factors affecting special signature. (10 Marks)

OR

- 4 a. Explain the laws governing the behavior and characteristics of electromagnetic radiation with relevant expressions. (10 Marks)
- b. What is atmospheric scattering? Write a short note on the three types of atmospheric scattering. (10 Marks)

### Module-3

- 5 a. Define resolution of a sensor system. Briefly explain spatial resolution and temporal resolution of a sensor system. (08 Marks)
- b. Explain the principle of working of an along-track scanner and cross track scanner with the help of a neat diagram. (12 Marks)

OR

- 6 a. Explain the terms range resolution and azimuth resolution of a radar system with appropriate expansions. (10 Marks)
- b. Explain lay over and radar shadows with the help of a neat diagram. (04 Marks)
- c. Explain the principles of radar altimetry with the help of a neat diagram. (06 Marks)

### Module-4

- 7 a. With the help of a neat block diagram explain the different approaches to interpret digital values required by the sensor. (10 Marks)
- b. Explain briefly how remote sensing can be incorporate into each observation project. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. With the help of a neat block diagram explain the generalized procedure for remote sensing imagery. (10 Marks)  
b. Explain in brief about the costs of data acquisition end user requirements of satellite imagery. (10 Marks)

Module-5

- 9 a. With a neat diagram explain hierarchal organization of visual interpretation criteria. (10 Marks)  
b. Briefly explain the elements of visual analysis. (10 Marks)

OR

- 10 a. With the aid of suitcase figure explain the process in color formation. (12 Marks)  
b. Explain with a suitable diagram how shadows help in object recognition. (08 Marks)

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# CBCS SCHEME

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## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 CMOS VLSI Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Derive the expression for current in Cutoff, Linear and Saturation region for nMOS Transistor with neat diagram. (10 Marks)
- b. Describe with a neat sketch the CMOS P well process steps to fabricate a CMOS inverter. (10 Marks)

OR

- 2 a. Compare Cmos and bipolar Technologies. (06 Marks)
- b. Discuss : i) Velocity saturation. (08 Marks)
- ii) Mobility degradation effect due to increase in saturation current. (06 Marks)
- c. Demonstrate the operation of Noise margin with neat diagram. (06 Marks)

### Module-2

- 3 a. Discuss the  $\lambda$  - based design rules for i) nMOS encoding ii) Butting contact. (10 Marks)
- b. Draw the Stick Diagram and Layout for the CMOS implementation of the two input NAND gate. (10 Marks)

OR

- 4 a. Estimate the rise time and fall time for a CMOS Inverter. (08 Marks)
- b. Derive the expression for delay in terms of  $\tau$  for CMOS Inverter pair. (06 Marks)
- c. Define Sheet Resistance 'Rs' and the standard unit or Capacitance  $\square$  Cg. (06 Marks)

### Module-3

- 5 a. Determine the scaling factors for the following :  
i) Gate Area ( $A_g$ ) ii) Parasitic Capacitance ( $C_x$ )  
iii) Maximum Operating frequency ( $f_o$ ) iv) Power dissipation per gate ( $P_g$ ).  
v) Power Speed product ( $P_T$ ). (10 Marks)
- b. Explain Carry Look Ahead Adder (CLA) and represent the 4 bit block CLA unit. (10 Marks)

OR

- 6 a. What are the observations that has to be kept in mind during the design process of VLSI? Define Regularity. Find the regularity for 4-bit and 8-bit barrel shifter. (10 Marks)
- b. Explain with neat diagram and equations : i) The Manchester Carry Chain (10 Marks)
- ii) Carry select adders. (10 Marks)

### Module-4

- 7 a. Explain Parity Generator with necessary equations and also draw the stick diagram for nMOS and CMOS blocks. (10 Marks)
- b. With a neat diagram, explain the Architecture of FPGA. (10 Marks)

OR

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 8 a. Explain with neat diagram : i) Dynamic CMOS logic ii) CMOS Domino logic. (10 Marks)  
b. Explain Switch logic of a 4 – way multiplexer for nMOS switches. (04 Marks)  
c. Explain in detail the goals and techniques of FPGA. (06 Marks)

**Module-5**

- 9 a. Explain Pseudo – Static RAM/register cell with neat diagram. Also comment on the Area, Dissipation and its Volatility. (10 Marks)  
b. Discuss the following : (10 Marks)  
i) BIST ii) Adhoc Testing.

OR

- 10 a. Write a note on : (06 Marks)  
i) Stuck – at faults and ii) Open and short circuit Faults. (06 Marks)  
b. What are the Timing consideration requirements in system design? (06 Marks)  
c. Explain the working of a three transistor dynamic RAM cell and draw the layout with respect to nMOS structure. (08 Marks)

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