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APR-MAY 2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(Et & T Engg. Branch)

ADVANCED COMMUNICATION SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions are compulsory including part (a) of each question. Attempt any two parts from part (b), (c) and (d). Any missing or misprint may be assumed.*

Unit-I

1. (a) Write down the advantages of satellite communication. 2

   (b) How to determine the earth coverage and find out the height of satellite? 7

(c) Describe in detail the three laws of Kepler used for satellite communication. 7

(d) What is orbital perturbation? Give brief explanation about launching of satellite. 7

Unit-II

2. (a) In satellite system why upward frequency is greater than downward frequency? 2

(b) Derive the expression for Signal to Noise Ratio for FM detection in case satellite communication. 7

(c) Find out the expression for received power in case of satellite communication. 7

(d) Determine the power received by a satellite located at 40,000 KMs from the surface of Earth. Satellite is operating a frequency of 11 GHz and EIRP of 21 Decible Watts. The gain of a receiving antenna is 50·5 Decibel Watts. 7

Unit-III

3. (a) Give the full form of DAMA and FHSS. 2

(b) Draw TDMA, FDMA and CDMA. Discuss their receiver merits and demerits communication. 7

(c) Draw the block diagram for Transmitter and Receiver of CDMA system and explain its working. 7

(d) Give all the necessary technical details of TDMA system used in satellite communication. 7

Unit-IV

4. (a) What is the significance of total internal reflection for fiber optic communication? 2

(b) Explain Attenuation and Dispersion in case of Optical communication. 7

(c) A SIF in air has NA equal to 0·16 and core refractive index is 1·45 and core diameter of 60 micro-meter. Determine normalized frequency for the fiber when light at a wavelength of 0·9 micro-meter is transmitted also estimate the number of guided modes propagating in the fiber. 7

(d) Give details of types of Optical Fiber with necessary diagrams. 7

Unit-V

5. (a) Mention the acronym LASER stands for what? 2

(b) Draw the block diagrams for Surface and Edge

emitting LEDs used for optical communication and explain their working. 7

(c) Explain the phenomenon of stimulated absorption, spontaneous emission and stimulated emission and population inversion in case of laser diode. 7

(d) Draw the block diagram and explain the working of PIN and Avalanche photo diode. 7

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APR-MAY 2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(Et&T Engg. Branch)

CONSUMER ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each unit is compulsory carry 2 marks. Attempt any two parts from (b), (c) and (d) carry 7 marks.*

Unit-I

1. (a) Define Aspect Ratio. Why width is longer than height? 2

(b) What do you understand by interlaced scanning? How it reduces flicker and conserves bandwidth? 7

(c) Explain the process of vertical Resolution and Horizontal Resolution in a monochrome television system. 7

(d) What are the constituents of composite video signal? Explain with suitable waveform and indicate different levels. 7

Unit-II

2. (a) Can white light be obtained by combining the three primary colours? If so, then in what proportion? 2

(b) What is meant by Interleaving process? Explain the process by bandwidth of colour signals. 7

(c) How phase errors occur in colour transmission? Explain how it is corrected in PAL colour system? 7

(d) Write short notes on : 7

(i) High definition TV

(ii) Digital TV

Unit-III

3. (a) What unit of sound pressure is used for rating microphones? 2

(b) What are the characteristics of microphones? Explain. 7

(c) Explain the various steps involved in reconstitution of the audio signal. 7

(d) With the help of a diagram explain the working of a dynamic microphone. 7

Unit-IV

4. (a) Why is a loudspeaker called a reverse transducer? 2

(b) Explain in detail the working of a permanent magnet loudspeaker. 7

(c) A long cable used for a loudspeaker has a finite resistance of 1 Ω. The amplifier used delivers, 100 W peak power at 10 A and 10 V at the primary of an output transformer. Calculate power loss in the cable for (i) 100 V line system and (ii) non – 100 V line system. 7

(d) Explain the significance of speaker matching systems and PA system characteristics. 7

Unit-V

5. (a) What amount is detected by a Lambda sensor in exhaust. 2

(b) List the information provided by Instrument panel displays in automobiles with suitable block diagram. 7

(c) Explain sequence of operations in a washing cycle alongwith hardware and software development. 7

(b) With the help of a suitable block diagram explain the working of an LCD Timer with alarm. 7

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APR-MAY 2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(ET & T Engg. Branch)

POWER ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d).*

Unit-I

1. (a) Write the light Triggering methods for Thyristor TURN-ON. 2

(b) Sketch the two Transistor Analogy of SCR with expression and explain it. 7

(c) Describe the different modes of operation of a SCR with the help of its VI characteristics. 7

(d) Write detail notes on : (any **one**) 7

(i) IGBT

(ii) Power MOSFET

(iii) SBS/GTO

Unit-II

2. (a) Why commutation circuit is required for SCR? 2

(b) What are the problem associated with series connection of SCR's. Derive and expression for optimum value of Resistance of static equalizing circuit. 7

(c) Explain the Half wave converter with RLE loads by using suitable waveform. 7

(d) A relaxation oscillator using an UJT, is to be designed for triggering an SCR.

The UJT has the following data :

(I) $\eta = 0{\cdot}72$, $I_P = 0{\cdot}6$ mA, $V_P = 18$ V, $V_u = 1{\cdot}0$ V, $I_v = 2{\cdot}5$ mA, $R_{BB} = 5\ k\Omega$, Normal leakage current with emitter open = 4·2 mA.

(II) The firing freq = 2 kHz; $c = 0.04\ \mu F$

Calculate : 7

(i) R_1 (ii) R_1 and (iii) R_2.

Unit-III

3. (a) What is Inversion mode of converter? 2

(b) Compare the Symmetrical and Asymmetrical circuit of bridge converter (single phase). 7

(c) Draw the full wave three-phase bridge converter and explain with suitable waveform. 7

(d) What is 1 ϕ dual converter? Explain its working with waveform. 7

Unit-IV

4. (a) Write the Chopper Control Technique. 2

(b) Explain Mc-Murrey full bridge inverter with suitable circuit diagram and waveform. 7

(c) Write short note on : (any **one**) 7

(i) Buck-Boost chopper

(ii) Jones chopper

(d) A step-up chopper has input voltage of 220 V and output voltage of 660 V. If the conducting time of thyristor-chopper is 100 μ s. (i) Compute the pulse width of output voltage. (ii) In case O/P voltage pulse width is halved for constant frequency operation, find the average value of new O/P voltage. 7

Unit-V

5. (a) Write application of cycloconverter. 2

(b) Draw and explain of single phase AC voltage controller with RL load. 7

(c) Explain the principle of Integral cycle control with their voltage expression. 7

(d) Describe the basic principle of working of single-phase to single-phase step-down cycloconverter. 7

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APR-MAY 2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(ET & T Engg. Branch)

CRYPTOGRAPHY & SECURE COMMUNICATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each question is compulsory carry 2 marks. Attempt any two parts from (b), (c) and (d) each carries 7 marks.*

Unit-I

1. (a) List of all additive inverse pairs in modulas 20.

(b) Find the multiplicative inverse of each of the following integers in Z_{180} using the extended Euclidean algorithm.

(i) 38

(ii) 24

(c) Define greatest common divisor of two integers. Which algorithm can effectively find the greatest common divisor and how?

(d) Define discrete logarithms and explain their importance in solving logarithmic equation.

Unit-II

2. (a) Define active attacks and passive attacks.

(b) Encrypt the message "today is holiday" :

(i) Using Caesar cipher

(ii) Using playfair cipher with keyword 'CSVTU'

(c) Explain DES algorithm with respect following points :

(i) General structure

(ii) Initial permutation

(iii) Number of rounds and round function

(iv) Strengths of DES

(d) Consider a Deffie-Hellman scheme with a common prime $q = 11$ and a primitive root $\alpha = 2$:

(i) Show that 2 is a primitive root of 11.

(ii) If user B has public key $Y_A = 9$, what is A's private key $X_A = ?$

(iii) If user B has public key $Y_B = 3$, what is the shared secret key K, shared with A?

Unit-III

3. (a) What is the role of compression function in Hash function?

(b) What basic arithmetical and logical functions are used in SHA?

(c) What is the difference between a message authentication code and a one-way hash function?

(d) What are some threats associated with a direct digital signature scheme?

Unit-IV

4. (a) What is the difference between transport mode and tunnel mode?

(b) What are the services provided by the IPSec? Discuss the IP security architecture?

(c) Explain the role of key management in IPSec.

(d) List and explain in brief the four techniques used by firewalls to control access and enforce a security policy.

Unit-V

5. (a) What protocols comprise SSL?

(b) What are services provided by the SSL record protocol? Differentiate SSL connection and SSL session.

(c) How does the dual signature provide linking between two messages that are intended for two different recipients? Explain.

(d) List and briefly define the principal categories of SET participants.

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APR-MAY2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(Et&T Engg. Branch)

MICROELECTRONIC DEVICES & VLSI TECHNOLOGY

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) is compulsory. Attempt any two parts from (b), (c) and (d) from each questions.

Unit-I

1. (a) What are the advantages of Integrated circuits over discrete component circuits. 2

(b) Explain float zone process with suitable diagram. 7

(c) The segregation coefficient of oxygen is 0·25. Find the concentration of oxygen in the silicon irgot at a fraction solidified of 0·3. The concentration of oxygen in the silicon at the top of the crystal is $12{\cdot}5 \times 10^{17}$ atoms/cm^3 at fraction solidified of 0·1. 7

(d) Explain CZ-Method. 7

Unit-II

2. (a) What is the purpose of film deposition? 2

(b) Compare wet oxidation with dry oxidation. 7

(c) Explain kinetics of thermal oxidation. 7

(d) Calculate the oxide thickness when it is grown by wet oxidation & when it is grown by dry oxidation at a temp of 1000°C. Assume for wet oxidation $A = 0{\cdot}226\ \mu m$, $B = 0{\cdot}287\ \mu m^2/h$ $\tau = 0$ and for dry oxidation $A = 0{\cdot}165\ \mu m$, $B = 0{\cdot}047\ \mu m^2/h$ & $\tau = 0{\cdot}37\ h$. 7

Unit-III

3. (a) Why ion implantation is preferred over diffusion? 2

(b) Explain diffusion mechanics. 7

(c) Draw and explain ion implantation system. 7

(d) Explain low energy and high energy implantation. 7

Unit-IV

4. (a) Define Etching. 2

(b) Explain molecular Beam Epitaxy. 7

(c) Explain X-ray Lithography with neat diagram. 7

(d) Explain process simulation & integration. 7

Unit-V

5. (a) What do you understand by threshold voltage? 2

(b) Explain spice modeling of MOSFET. 7

(c) Explain scaling of MOSFET. What are the benefits of sealing. 7

(d) Explain short channel effects. 7

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APR-MAY 2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(Electronics & Telecommunication Engg. Branch)

BIOMETRIC TECHNIQUES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each unit is compulsory carry 2 marks. Attempt any* ***two*** *parts from (b), (c) and (d) carry 7 marks.*

Unit-I

1. (a) What do you mean by Biometric System? 2

   (b) What are the different types of biometric systems? 7

(c) What are the various performance measures of Biometrics? 7

(d) What are the benefits of Biometrics. Write down the difference between Biometric Identification and Verification? 7

Unit-II

2. (a) What do you mean by Image Segmentation? 2

(b) Explain Contractive Transformation method for face recognition. 7

(c) What are the various challenges and advantages of Face Biometrics. 7

(d) With the help of the block diagram explain design of iris biometrics. 7

Unit-III

3. (a) What is Key Point Localization? 2

(b) Explain the various minutiae extraction techniques? 7

(c) What is Sign Language. Explain about Indian Sign Language? 7

(d) Explain SIFT Algorithm? 7

Unit-IV

4. (a) Define Cryptography. 2

(b) Explain Symmetric Key Encryption and Asymmetric Key Encryption? 7

(c) Explain RSA algorithm? 7

(d) What are the various privacy concern and issues related to biometrics. 7

Unit-V

5. (a) Define Multi-Model Biometrics. 2

(b) Explain the role of biometrics in enterprise and border security? 7

(c) What is DNA? Explain how DNA recognition works. 7

(d) Explain Biometric Standards in detail? 7

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B. E. (Eighth Semester) Examination, ~~2020~~ APR-MAY 2022

(New Scheme)

(ET&T Branch)

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions carrying equal marks. Part (a) is compulsory. Solve any two from rest of the parts per question.

Unit-I

1. (a) Define precise definition of AI. 2

(b) Explain the uninformal search strategies with example. 7

(c) What is Turing test? What are application of AI? 7

(d) Write short technical notes : 7

(i) Control strategies

(ii) Depth first search

Unit-II

2. (a) What is Greedy Best first search? 2

(b) What is A^* search? Explain various stages of A^* search with an example. 7

(c) Define state space diagram by solving missionaries and Cannibal problem. 7

(d) Explain Hill climb algorithm with its limitation. 7

Unit-III

3. (a) Define propositional knowledge. 2

(b) Explain backtracking in Prolog. Explain the use of cut, fail predicate in Prolog. 7

(c) What is Knowledge? What are the properties of a

knowledge based system? Describe various knowledge representation technique. 7

(d) Define "List" in Prolog. Write a program in Prolog :

(i) to find the length of a list

(ii) to find the first elements and last element in list 7

Unit-IV

4. (a) What is Parsing? 2

(b) What are the basic steps in natural language processing? What is Lexicon? 7

(c) Explain the syntactic and semantic analysis in Natural Language Processing (NLP). 7

(d) Write short notes on the following : 7

(i) Linear planning

(ii) Bays theorem

Unit-V

5. (a) Briefly explain the AI MYCIN. 2

(b) Explain the basic characteristics of an expert system.

Describe the architecture of an expert system with suitable diagram. 7

(c) Explain the life cycle of expert systems. 7

(d) Describe the basic components of a rule based system with suitable block diagram. 7

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APR-MAY2022

B. E. (Eighth Semester) Examination, ~~2020~~

(New Scheme)

(Et. & T Engg. Branch)

TELECOMMUNICATION SWITCHING CIRCUITS and NETWORKS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. In each question Part (a) is compulsory and from remaining you have to attempt any* ***two*** *parts (b), (c) & (d).*

Unit-I

1. (a) Define folded network and state the condition for which folded network becomes non-blocking network. 2

(b) Explain uniselector and two motion selector in brief. 7

(c) What do you mean by stored program control? Explain its types in brief. 7

(d) Given that MTBF = 2000 hrs. and MTTR = 4 hrs. Calculate the unavailability for single and dual processor system for 10 years and 30 years. 7

Unit-II

2. (a) Define TDM. 2

(b) Explain time division switching and its types in brief. 7

(c) Explain software organization of computer controlled switching system. 7

(d) Explain early electronic switching system in brief. 7

Unit-III

3. (a) Define Grade of Service (GoS).. 2

(b) Explain subscriber loop system with neat sketch. 7

(c) Explain numbering plan in brief. 7

(d) Explain In-channel signalling in brief. 7

Unit-IV

4. (a) Define MODEM. 2

(b) Explain different types of switching techniques for data transmission in brief. 7

(c) Explain with suitable diagram Link to Link layer communication. 7

(d) Write short note on : (any **one**) 7

(i) Satellite based data network

(ii) ISO-OSI architecture

Unit-V

5. (a) Define ISDN. 2

(b) Explain user level signalling and network level signalling in brief. 7

(c) Explain numbering and addressing scheme of ISDN in brief. 7

(d) Write short notes on : (any **two**) 7

(i) ISDN standards

(ii) Teleservices

(iii) Electronic Mail