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B.E. (Electronics) (Part - II) (Semester - VIII)

Examination, November - 2019

MICROWAVE ENGINEERING

Sub. Code : 67777

Day and Date : Wednesday, 13 - 11 - 2019

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) All questions are compulsory.
 - 2) Assume suitable data if necessary.
 - 3) Figures to the right indicate full marks.

SECTION - I

Q1) Attempt any two questions [16]

- a) Explain with suitable equations TE mode equations for rectangular waveguide
- b) Explain Reflex klystron with its mathematical analysis.
- c) The dimensions of a guide 2.5×1 cms. The frequency is 8.6 GHz. Find the following
 - i) Possible modes
 - ii) Cut-off frequencies
 - iii) Guide wavelength

Q2) Attempt any two questions [16]

- a) Explain different materials used for MMIC.
- b) What is magic Tee? Explain E plane tee operation with mathematical analysis
- c) A rectangular air filled copper waveguide with dimension 0.9 inch. \times 0.4 inch. Cross section and is operated at 9.2 GHz with a dominant mode. Find
 - i) cut-off frequency
 - ii) guide wavelength
 - iii) phase velocity

P.T.O.

Q3) Write short notes on any three

- a) Microwave Attenuators
- b) Bunching process in klystrons
- c) Plane wave propagation in shielded rooms
- d) Coaxial Magnetron

SECTION - II

Q4) Attempt any two of the following

[16]

- a) Explain LSA diode
- b) Explain two valley model theory in Gunn effect diode
- c) Explain processing steps for fabrication HEMT (High electron mobility transistor)

Q5) Attempt any two of the following

[16]

- a) Explain in detail measurement of microwave power using bridge circuit, thermister and barraters
- b) Explain bolometer method for measurement of microwave power
- c) Define attenuation and insertion loss. Explain substitution method for attenuation Measurement

Q6) Attempt any three of the following

[18]

- a) Explain parabolic reflector and how gain of this antenna is determined
- b) Explain micro strip antenna. List the advantages and disadvantages strip antenna over microwave antenna.
- c) Explain Directivity and beam width of slotted antenna
- d) Explain horn antenna with all type of feeding methods

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**B.E. (Electronics Engg.) (Part-IV) (Semester-VIII) (Revised)
Examination, November - 2019**

WIRELESS COMMUNICATION NETWORK

Sub. Code : 67778

Day and Date : Thursday, 14 - 11 - 2019

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Use suitable assumptions if required.
 - 3) Draw necessary figures on right side of answer sheet.

SECTION-I

- Q1) Solve any three. [18]**
- a) Explain Cellular system architecture & operation.
 - b) List out the three types of dedicated control channels in GSM.
 - c) What are the techniques used to improve coverage and capacity in cellular systems.
 - d) What are the characteristics of wireless channel?
- Q2) Solve any two. [16]**
- a) Explain the challenges in front of Wireless Communication.
 - b) Define co-channel reuse ration in detail with suitable example.
 - c) Compare between FDMA, TDMA, and SDMA.
- Q3) Solve any two. [16]**
- a) Explain the terms Handoffs & roaming, co channel & adjacent channel interference.
 - b) What are the features of cellular systems?
 - c) If total of 33 MHz band is allocated for FDD cellular system which uses two 25 KHz simplex channels to provide full duplex voice and control channels compute the no of channels available per cell if system uses.
 - i) 4 cell reuse structure
 - ii) 7 cell reuse structure
 Assume 1 MHz is allocated spectrum for control channels Distribute voice and control channels for each cell?

P.T.O.

SECTION-II

Q4) Solve any three. [18]

- a) What is blue tooth in wireless communication? Explain in brief.
- b) Explain in brief GSM (Global System for Mobile Communications) architecture.
- c) Explain the Wireless LAN. What are the benefits of WLL?
- d) State the advantages and disadvantages of IR LAN.

Q5) Solve any two. [16]

- a) Explain Signal processing in GSM, frame structure of GSM, Channels used in GSM.
- b) What is WAP and its architecture? What is WAP model?
- c) What are various Requirements of Wireless LAN?

Q6) Solve any two. [16]

- a) Explain the IEEE802.11 Architecture and Services.
- b) Why HSCSD (High-Speed Circuit-Switched Data) is essentially a new high speed implementation of GSM (Global System for Mobile Communication) data transfer.
- c) What is EDGE cellular network? What is Wireless Transport layer security?



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B.E. (Electronics) (Part - IV) (Semester - VIII)**Examination, November- 2019****POWER ELECTRONICS & DRIVES****Sub. Code : 67779****Day and Date : Friday, 15- 11 - 2019****Total Marks : 100****Time : 2.30 p.m to 5.30 p.m.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state it clearly.

Q1) Solve any two of the following. [18]

- a) A three phase semi converter bridge circuit is fed from 400 V, 3phase supply. The load resistance is 15 ohms. The average output voltage is 55% of maximum possible average voltage. Find.
 - i) Firing angle
 - ii) rms output current and voltage
 - iii) Average and rms thyristar current
- b) Explain the working of three phase fully controlled bridge converter with neat circuit diagram and waveforms. Also derive equation for average and rms output voltage when $\alpha=0^\circ$
- c) With the help of neat circuit diagram and waveform, explain the working of three phase half wave controlled rectifier for highly inductive load. Derive the equation for average output voltage and rms output voltage under contineous load current.

Q2) Solve any two of the following. [16]

- a) Draw the circuit diagram and waveform of IGBT based single -phase half bridge inverter. Derive the equation for the rms output voltage.

P.T.O.

- b) What are the harmonic reduction techniques for inverter output voltage? Explain any one technique in details.
- c) Explain in detail 180° mode of conduction of three phase IGBT based inverter.

Q3) Solve any two of the following. [16]

- a) Explain the operation of single phase to single phase cycloconverter feeding R. load. Draw the waveforms for frequency divide by 5.
- b) State and explain the gating signal requirements for 3phase cycloconverter.
- c) Compare circulating and non circulating mode operation of cycloconverter.

Q4) Solve Any Two. [16]

- a) Explain the parts of electric drives.
- b) Explain speed control of separately excited DC motor using single phase half controlled rectifier with appropriate waveform.
- c) Name different braking methods used in induction motor? Explain dynamic braking system in detail with circuit diagram.

Q5) Solve any two. [16]

- a) What are the advantages of electric drives.
- b) Explain the speed control of induction motor by static rotor resistance control.
- c) A 210V motor (separately excited) runs at 1000rpm at no load. When armature draws full load current of 10 AMP. Assume that at no load armature current is zero & armature resistance $R_a = 1\Omega$. Then find the duty cycle (ratio) for $N = 1200\text{rpm}$, I/P voltage of D.C. chopper is 200V.

Q6) Write note on any three. [18]

- a) Auto transformer starter.
- b) Plugging or reverse voltage braking of induction motor.
- c) Speed control of D.C. series motor using rectifier.
- d) Selection criteria of a electric drive.



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B.E. (Electronics) (Semester - VIII)
Examination, November - 2019
HIGH PERFORMANCE COMPUTER NETWORK
(Elective - II)
Sub. Code : 67786

Day and Date : Tuesday, 19 - 11 - 2019

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) All questions are compulsory.
 - 2) Draw diagram wherever necessary.

Q1) Attempt any two **[18]**

- a) Compare and contrast OSI & TCP-IP model.
- b) Explain IEEE(802.11) wireless LAN.
- c) With neat sketch explain SMDS.

Q2) Attempt any two **[16]**

- a) State & Explain signaling system -7
- b) Explain B-ISDN protocol architecture.
- c) Differentiate between ISDN and ATM.

Q3) Attempt any two **[16]**

- a) Draw and explain ATM cell Header for UNI.
- b) Draw and explain various Adaptation Layers.
- c) Explain ATM signaling.

P.T.O.

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[16]

Q4) Attempt any two

- a) With neat Figure explain optical Link in detail
- b) What is WDM? Explain WDM System with neat diagram
- c) Explain with neat diagram Optical Cross connect

Q5) Attempt any two

[16]

- a) Compare Packet Switching and Frame Relay operation
- b) Explain in detail User-Network Interface Protocol architecture to support frame mode Bearer service
- c) What is Congestion? Explain Approaches to congestion control in frame relay

Q6) Write short note on any three

[18]

- a) Traffic Rate Management
- b) MPLS
- c) LAPF
- d) Frame Relay Access Modes

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B.E. (Electronics Engineering) (Part - IV) (Semester - VII)
Examination, November - 2019
INFORMATION THEORY AND CODING TECHNIQUES
Sub. Code : 67526

Day and Date : Saturday, 23 - 11 - 2019
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 100

- Instructions :**
- 1) All questions are compulsory.
 - 2) Use of scientific calculator is allowed.
 - 3) Assume suitable data if necessary.
 - 4) Figures to the right indicate full marks.

Q1) Attempt any three of the following (6 marks each).

- a) What is mutual information? State and prove the properties of mutual information.
- b) Derive the expression for the Entropy and State the properties of Entropy.
- c) Prove the following.
 - i) $H(X, Y) = H(X/Y) + H(Y) = H(Y/X) + H(X)$
 - ii) $I(X ; Y) = H(X) + H(Y) - H(X/Y)$
- d) An AWGN Channel has bandwidth of 4 KHz and noise power spectral density $n/2$ is 10^{-12} W/HZ, the signal power required at the receiver is 0.1 mW. Calculate the capacity of the channel.

Q2) Attempt any two of the following (8 mark each).

- a) For the given channel matrix, determine the all entropies and mutual information, Given $P(Y1) = 0.6$, $P(Y2) = 0.3$ and $P(Y3) = 0.1$.

$$P(Y/X) = \begin{bmatrix} 0.8 & 0.5 & 0.1 \\ 0 & 0.2 & 0.5 \\ 0.2 & 0.3 & 0.4 \end{bmatrix}$$

- b) What do you mean by joint and conditional entropy? Derive relation between joint and conditional entropy.

P.T.O.

- c) A transmitter has an alphabet of four letters $[x_1, x_2, x_3, x_4]$ and the receiver has an alphabet of three letters $[y_1, y_2, y_3]$, The joint probability matrix is

$$P(X, Y) = \begin{matrix} & \begin{matrix} x_1 & x_2 & x_3 & x_4 \end{matrix} \\ \begin{matrix} y_1 \\ y_2 \\ y_3 \end{matrix} & \begin{bmatrix} 0.25 & 0.1 & 0 & 0 \\ 0 & 0.25 & 0 & 0 \\ 0 & 0.15 & 0.05 & 0 \\ 0 & 0.05 & 0.15 & 0 \end{bmatrix} \end{matrix}$$

Calculate all the entropies.

Q3) Attempt any Two of the following (8 marks each).

- a) The parity check matrix of a particular (7, 4) linear block code is given by

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

- i) Find the generator matrix $[G]$
 - ii) List all the code vectors.
 - iii) What is the minimum distance between code vectors?
 - iv) How many errors can be detected? How many errors can corrected?
- b) A discrete memory less source has five symbols $X_1, X_2, X_3, X_4,$ and X_5 with probabilities $p(x_1) = 0.4, p(x_2) = 0.2, p(x_3) = 0.15, p(x_4) = 0.15$ and $p(x_5) = 0.1$.
- i) Construct Shannon fano code and Huffman Code.
 - ii) Calculate code efficiency of both codes and compare the result with comment.
- c) Consider the (7,4) Hamming code defined by the generator polynomial $g(x) = 1 + x + x^3$. The code word 1000101 is sent over a noisy channel, producing the received word 0000101 that has a single error. Determine the syndrome polynomial $s(x)$ for this received word. Find its corresponding message vector m and express m in polynomial $m(x)$.

Q4) Attempt any three of the following (6 marks each).

- The generator polynomial for a(7,4) cyclic hamming code is given by $G(X) = X^3 + X + 1$ construct all the systematic cyclic code.
- Prove that the syndrome S is the sum of those columns of the matrix H corresponding to the error locations.
- What are the functions of parity check matrix and generator matrix in linear block codes? How they are used to generate code vectors from message block?
- Explain the procedure for constructing extension field $GF(2^4)$ using suitable primitive polynomial.

Q5) Attempt any Two of the following (8 marks each).

- A convolutional encoder using three shift registers and $r = 1/3$ has three generating vectors as: $g_1 = [1 \ 1 \ 0]$, $g_2 = [1 \ 0 \ 1]$, and $g_3 = [111]$
 - Sketch the encoder configuration
 - Determine the generator matrix
 - Determine the output code sequence of the encoder for the message sequence is (1 0 1 1)
 - Draw code tree and state diagram
- Write a note on
 - Primitive element
 - Code trellis
- Find the generator polynomial for (7, 5) RS code over $GF(8)$, Also determine the code polynomial and code if the message vector is $(\alpha^2, \alpha^5, \alpha^8)$

Q6) Attempt any two of the following (8 marks each).

- Design a syndrome calculator for a (7,4) hamming code, generated by the generator polynomial $G(X) = 1 + X + X^3$, if the transmitted and received code words are given by, $X = 0111001$ and $Y = 0110001$ respectively.
- The code word is received as 1100 1001 01011. Check whether there are errors in the received code word, if the divisor is 10101.
- A message 10 11 01 is to be transmitted in cyclic code with a generator polynomial $G(X) = X^4 + X^3 + 1$. Obtain the transmitted code word. How many check bits (parity bits) does the encoded message contain? Draw the encoding arrangement for the same.



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B.E. (Electronics Engg.) (Part - I) (Semester - VII) (Revised)
Examination, November - 2019
EMBEDDED SYSTEM DESIGN
Sub. Code : 67527

Day and Date : Tuesday, 26 - 11 - 2019

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :
- 1) All questions are compulsory.
 - 2) Assume suitable data if necessary.
 - 3) Figures to the right indicate full marks.

SECTION - I

Q1) Attempt any three of the following. [18]

- a) Explain ARM processor operating modes.
- b) Explain barrel shifter of ARM core with appropriate diagram.
- c) Write ASM code to disable FIQ.
- d) Explain MRS and MSR instructions with suitable examples.
- e) Write ASM code to find smallest of 5 words.

Q2) Attempt any two of the following. [16]

- a) Write ASM code to exchange the block of 10 data words.
- b) Explain I2C bus and its master transmitter mode.
- c) Draw a ARM core data flow model & explain in brief.

Q3) Answer any two of the following. [16]

- a) Describe the instructions - B, BL, BX, BLX.
- b) Write ASM code to perform division.
- c) Compare between SPI and UART.

P.T.O.

SECTION - II

Q4) Attempt any three of the following. [18]

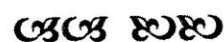
- a) Explain various types of resets used in LPC 2148.
- b) Explain the operation of Brown Out Detect facility provided on LPC 214X.
- c) How power optimization can be achieved using power control block and what are the registers associated with power control?
- d) Write C code to rollout the LEDs connected to PORT 1.16 to 1.23 in LPC 2148.

Q5) Attempt any two of the following. [16]

- a) Explain the internal block diagram of I²C interface of LPC 2148.
- b) Explain the Watchdog timer of LPC2148 with neat diagram.
- c) Explain with block diagram, the role of Memory Acceleration Module on LPC 2148.

Q6) Attempt any two of the following [16]

- a) Explain the different task scheduling algorithm.
- b) Explain the role of RTOS in development of high end microcontroller based systems.
- c) Explain role of mailboxes and message queues in inter task synchronization and communication.



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B.E. (Electronics) (Semester - VII)
Examination, November - 2019
COMPUTER NETWORK
Sub. Code : 67528

Day and Date : Thursday, 28 - 11 - 2019

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.

SECTION - I

- Q1)** Attempt any two **[16]**
- a) Draw OSI reference model and explain in brief protocols at each layer.
 - b) With a neat schematic explain distance vector routing algorithm.
 - c) Discuss design issues of data link layer.
- Q2)** Attempt any two **[16]**
- a) Explain following routing protocols
 - i) RIP
 - ii) OSPE
 - b) Explain the Modem and describe various types of modem.
 - c) Describe HDLC and explain about types of stations and frame format of HDLC
- Q3)** Attempt any three. **[18]**
- a) Explain IPv6 header format.
 - b) Explain token bucket algorithm.
 - c) Explain network topologies in detail.
 - d) Discuss sliding window protocol
 - e) Explain IEEE 802.11 frame format.

P.T.O.

SECTION - II

Q4) Attempt any two [16]

- a) Explain simple modern ciphers in detail.
- b) Explain types of DNS messages.
- c) Explain TCP operation in detail.

Q5) Attempt any two [16]

- a) Explain file transfer protocol in detail.
- b) Explain modes of operations for block ciphers.
- c) Compare TCP and UDP.

Q6) Attempt any three [18]

- a) Explain persistent and non-persistent connections HTTP.
- b) Explain UDP services.
- c) Explain Man in middle attack.
- d) Explain timers used in TCP.
- e) Write short notes on
 - i) Mono-alphabetic ciphers.
 - ii) Poly-alphabetic ciphers.



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B.E. (Electronics) (Semester - VII) (Revised)
Examination, November - 2019
IMAGE PROCESSING
Sub. Code : 67529

Day and Date : Saturday, 30 - 11 - 2019

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figure to right indicate full marks.

Q1) Attempt any Four.**[20]**

- a) Draw a histogram for a image whose, gray values are in the range [0,7] shown in table.

1	1	1	1	2	2	2	2
1	0	0	6	6	0	0	1
1	6	4	4	4	4	6	1
1	6	4	7	7	4	6	1
1	6	4	7	7	4	6	1
1	6	4	4	4	4	6	1
1	0	0	6	6	0	0	1
1	1	1	1	2	2	2	2

- b) Describe types of distance metric used in Image processing.
- c) Describe 8 - adjacency and m-adjacency of pixel.
- d) Explain contrast stretching? Why used in image processing.
- e) Explain spatial and intensity resolution of an image.

Q2) Attempt any Two.**[16]**

- a) Draw block schematic of fundamental steps in digital image processing and explain each block briefly.
- b) Write various application of image processing.
- c) Explain image sensors used for image acquisition.

P.T.O.

Q3) Attempt any Two.

[14]

- a) Suppose that a 3 bit image of size 64*64 pixels has an intensity distribution and specified histogram are shown in tables where the intensity levels are integer in the range [0,7]. Draw histogram and result of performing histogram specification for given image

r_1	n_1	z_4	Specified $P_z(z_4)$
$r_0 = 0$	790	$z_0 = 0$	0.00
$r_1 = 1$	1023	$z_1 = 1$	0.00
$r_2 = 2$	850	$z_2 = 2$	0.00
$r_3 = 3$	656	$z_3 = 3$	0.15
$r_4 = 4$	329	$z_4 = 4$	0.20
$r_5 = 5$	245	$z_5 = 5$	0.30
$r_6 = 6$	122	$z_6 = 6$	0.20
$r_7 = 7$	81	$z_7 = 7$	0.15

- b) Explain Log and Gamma transformation.
 c) How image averaging & image subtraction help for image enhancement.

Q4) Attempt any Four

[20]

- a) Explain mechanics of linear spatial filtering 3 by 3 filter mask.
 b) Explain smoothing linear filtering of an image.
 c) Explain Unsharp masking and Highboost filtering.
 d) Explain concept of Gradient operator used in image enhancement.
 e) Describe edge models.

Q5) Attempt any Two.

[16]

- a) Explain How to detect various gray level discontinuities in digital image.
 b) Write an algorithm used for global Thresholding.
 c) What is region based segmentation? Write basic region growing algorithm.

Q6) Attempt any Two.

[14]

- a) Explain pseudo color image processing.
 b) How to convert colors from RGB to HSI Model and vice versa.
 c) Describe CMY color model.



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B.E. (Electronics Engineering) (Semester - VII) (Revised)
Examination, December- 2019
BIOMEDICAL INSTRUMENTATION (Elective - I)
Sub. Code : 67532

Day and Date : Tuesday, 3 - 12 - 2019

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Digits to the right indicate full marks.

SECTION - I

- Q1) Attempt any three from following. [18]**
- a) Draw and explain elementary idea of cell structure.
 - b) Explain following terms with reference to human body cell:
 - i) Resting potential
 - ii) Action potential
 - c) Describe electrodes used for measurement of bioelectric potential.
 - d) With neat sketch explain working of respiratory system of human body.
- Q2) Attempt any two: [16]**
- a) Explain with the labeled diagram the functioning of cardiovascular system.
 - b) Give the complete classification of biomedical equipment. Explain any one in detail.
 - c) With neat sketch explain electrode electrolyte interface. Also explain total electrical equivalent circuit between electrode and skin.
- Q3) Attempt any two. [16]**
- a) Explain in detail structure of neuron with labeled diagram. Also explain the functioning of CNS and PNS.
 - b) What is EMG? Explain the electrical characteristics of EMG and EEG.
 - c) Explain electrical conduction system of heart and also explain generation of ECG.

P.T.O.

SECTION - II

- Q4)** Attempt any three from following. [18]
- Explain selection factors for transducers used for biomedical measurement.
 - Explain any one method for pulse rate measurement.
 - With neat sketch explain the working principle of blood flow meter.
 - Explain microprocessor applications in patient monitoring.
- Q5)** Attempt any two: [16]
- With neat sketch explain block diagram of ECG machine.
 - Explain working principle different chemical transducers.
 - With neat sketch explain different inductive and capacitive transducers used in biomedical measurement.
- Q6)** Attempt any two. [16]
- What are different lead systems used for ECG recording? Explain any one in details.
 - What are different preventive measures to reduce shock hazards?
 - List different methods used for measurement of respiration rate. Explain any one in detail.

