F 4063 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 701—VLSI DESIGN (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the advantages of wet oxidation ?
2. What are the uses of monolithic resistors ?
3. What is latch up in CMOS ?
4. Define miniaturization.
5. What is channeling effect ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain annealing.
7. How is threshold voltage controlled ?
8. Explain the principle of stick diagram.
9. Give the circuit diagram of SR flip-flop.
10. What are the objectives and nature of doping process ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain the various steps in IC fabrication.

Or

12. Explain different types of lithography clearly describing the differences and significance of each type.

13. Explain the differences between junction isolation and dielectric isolation.

Or

14. Explain the structure, design of FET and JFET. Distinguish them.

15. Explain how Boolean operations are realized using transmission gates. Explain with example.

Or

16. With a neat circuit diagram explain the structure of NAND-NOR-4 bit shifter.

17. Explain the structure of BiCMOS circuits with a diagram.

Or

18. Write a note on scaling of MOS structures.

19. Explain the Gallium Arsenide technology with its applications.

Or

20. Write a note on : (i) PLA ; (ii) FPGA.

(5 × 12 = 60 marks)

F 4093

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

ECE 010 703—MICROWAVE ENGINEERING (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. State reciprocity theorem.
2. What is a slow wave structure ? Give some typical structure which support slow waves.
3. Briefly describe any two applications of PIN diode.
4. Define return loss.
5. Define Quality factor of microstrip lines.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the working of a two hole directional coupler.
7. List the differences between TWT and Klystron tube.
8. Write down the power frequency limitation equations of microwave power transistors with descriptions.
9. Write down the procedure for measuring VSWR.
10. Explain coplanar waveguide.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain the working of a microwave isolator with neat diagrams.

Or

12. Derive S matrix for : (i) A magic tee ; and (ii) E-plane tee.

Turn over

13. Explain the working of reflex klystron with neat diagrams. Also draw applegate diagram for 13/4 mode.

Or

14. With neat diagram, explain the working of cylindrical magnetron oscillator.

15. Explain the principle of operation of Gunn diode oscillator and amplifier.

Or

16. Explain briefly the following : (a) IMPATT diode ; (b) TRAPATT diode ; and (c) Avalanche diode oscillator.

17. Explain the methods for measurement of frequency and impedance with necessary diagrams.

Or

18. With neat diagram, explain microwave power measurement.

19. Explain strip lines and microstrip lines. Differentiate between these two.

Or

20. Explain the technologies behind hybrid MICs and monolithic MICs in detail with sufficient diagrams.

(5 × 12 = 60 marks)

F 4107 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 704—ELECTRONIC INSTRUMENTATION (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the features of transducers ?
2. What is Telemetry ?
3. What is the basic principle of PLC ?
4. Why is engineering measurement required ?
5. What is Strain ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 marks.

6. Write a note on instrument calibration.
7. Distinguish digital and analog transducers.
8. Explain, how guarded Wheatstone bridge is enhanced than its previous version ?
9. What are the basic principles of data acquisition system ?
10. Write a note on pH measurement.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain the performance characteristics of instruments.

Or

12. With a neat block diagram explain the structure of basic measuring system.

Turn over

13. Explain the differences between electromechanical and optoelectrical type transducers.

Or

14. What are the selection criteria for transducers ? Explain the structure of digital and optical encoders.

15. With a neat block diagram explain the structure of electrical telemetering system.

Or

16. Explain the working principle and applications of Shering Bridge and Wein's Bridge.

17. Explain different techniques of recording.

Or

18. Write a note on (i) distortion analyzer ; (ii) wave analyzer.

19. Explain the techniques for measuring force and mass.

Or

20. Explain the techniques for measuring pressure and temperature.

(5 × 12 = 60 marks)

F 4120 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 705—EMBEDDED SYSTEMS (EC)

(New Scheme—2010 Admission onwards)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. What are the different categories of embedded systems ?
2. What are the advantages of Embedded C compiler ?
3. List out the characteristics of PCI bus.
4. What is the principle of power factor measurement ?
5. List the functions of a Kernel ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the applications of Embedded system in Biomedical field.
7. Write a short note on distributed Embedded hardware.
8. Draw and explain CAN data frame format.
9. Explain the use of DS 1232 timer.
10. What do you mean by completely dynamic scheduling and completely static scheduling in a RT system ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. **Draw the block diagram** of a typical Embedded system and explain the functions of each block.

Or

12. **Explain the applications** of various types of embedded systems in consumer electronics.

13. **With appropriate examples**, explain how macros and functions can be used in Embedded system ?

Or

14. With the help of example, show how code optimization is done ?

15. Draw and explain the HDLC frame formats. Explain the functions of I-frame, S-frame and U-frame ?

Or

16. (a) List high speed I/O buses. Explain the function of any *one* serial high speed bus. (7 marks)

(b) Explain the principle of voice-over-IP. (5 marks)

17. With the help of neat circuit diagram, explain how an 8 bit ADC can be interfaced to 8051 ? Write assembly language program to measure the input and output of the same.

Or

18. With necessary circuit diagram, describe how the speed of a d.c. motor can be controlled using 8051 ?

19. List three ways in which RTOS handles the ISR in a multitasking environment. What are the advantages of two or three level handling of the interrupts ?

Or

20. (a) Explain the handling of interrupt calls in the RTOS environment ? (6 marks)

(b) Differentiate between process, task and thread, giving examples. (6 marks)

[5 × 12 = 60 marks]

F 4154 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 706 L03—DIGITAL IMAGE PROCESSING (Elective II) (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the fundamental steps in image processing ?
2. What are the different types of transforms used in Image Processing ? List two properties of SVD transform.
3. Define histogram equalization. List out the drawbacks of histogram equalization.
4. Differentiate between global and local thresholding.
5. Define the procedure for Huffman shift.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Describe the elements of visual perception.
7. Write the convolution of two sequences {1, 2, 3, 4} and {–1, 2, –1} as a toeplitz matrix on a 3 × 1 vector.
8. Describe how homomorphic filtering is used to separate illumination and reflectance component.
9. What is edge detection ? Describe in detail about the types of edge detection operation.
10. Explain the need for image compression. How arithmetic encoding approach is used for compression ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain in detail about sampling and quantization.

Or

12. Describe image formation in the eye with brightness adaptation and discrimination.

13. Explain the properties of 2D Fourier Transform.

Or

14. Write the convolution of two periodic sequences {1, 2, 3, 4, . . .} and {–1, 2, –1, 0 . . .}, each of period 4, as a circular matrix operating on a 4 × 1 vector that represents the first sequence.

15. Obtain Histogram and Histogram equalization for a given image (4 × 4) – 4 bit per pixel is given by :

10	12	8	9
10	12	12	14
12	13	10	9
14	12	10	12

Or

16. Explain in detail about how median filters are used in image enhancement.

17. Discuss in detail about the threshold selection based on boundary characteristics.

Or

18. Explain region based segmentation and region growing with an example.

19. A source emits letters from an alphabet A = {a1, a2, a3, a4, a5} with probabilities, P(a1) = = 0.2, P(a2) = 0.4, P(a3) = 0.2, P(a4) = 0.1 and P(a5) = 0.1.

    (i) Find a Huffman code for this source ?

    (ii) Find the average length of the code and its redundancy ?

Or

20. Generate the tag for the sequence 1 3 2 1 for the probabilities P(1) = 0.8, P(2) = 0.02, P(3) = 0.1813. How an image is compressed using JPEG Image compression standard ?

(5 × 12 = 60 marks)

F 4078 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2016

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 702—INFORMATION THEORY AND CODING

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Write the expression for the channel capacity.
2. State the condition for unique decodability of codes.
3. Draw the channel diagram of BEC. Also write the channel matrix.
4. Give the significance of Galois field.
5. Mention the parameters of BCH codes.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Show that the mutual information is always positive.
7. What is Zip coding ?
8. With the aid of the Shannon-Hartley theorem explain why doubling the bandwidth of a channel while keeping a constant transmitting power, will not automatically double the channel capacity.
9. What is the use of syndromes ? Also explain syndrome decoding.
10. What is the difference between systematic and non-systematic codes ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each question carries 12 marks.

11. (a) Prove the property the mutual information of a channel is symmetric. (6 marks)

(b) For a binary memory source with two symbols X_1 and X_2 show that entropy H (X) is maximum when both X_1 and X_2 are equiprobable. (6 marks)

Or

12. (a) A source transmits the independent messages with probabilities P and (1 – P). Prove that the entropy is maximum when both the messages are equally likely. Plot the variation of entropy H as a function of probability 'P'. (8 marks)

(b) Derive the redundancy and efficiency of channels. (4 marks)

13. Write notes on :

(i) Block codes.

(ii) Non-singular codes.

(iii) Uniquely decodable codes.

(iv) Instantaneous codes.

Or

14. Consider a zero memory source with :

$S = \{s_1, s_2, s_3, s_4, s_5\}$,
$P = \{0.55, 0.15, 0.15, 0.10, 0.05\}$

Construct two different Huffman binary codes as directed below :

(i) Move the composite symbol as 'high'.

(ii) Move the composite symbol as 'low'.

15. (a) Mention the trade-off between signal to noise ratio and bandwidth. (8 marks)

(b) For an AWGN channel with 4 kHz bandwidth and noise power spectral density $No/2 = 10^{-12}$ W/Hz the signal power required at the receiver is 0.1 mW. Calculate the capacity of this channel. (4 marks)

Or

16. (a) State and prove Shannon-Hartley theorem for Gaussian channel. (9 marks)

(b) A system has a bandwidth of 4 kHz and a signal to noise ratio of 28 dB at the input of the receiver. Calculate (i) information carrying capacity ; (ii) the capacity of the channel, if its bandwidth is doubled while the transmitted signal power remains constant. (3 marks)

17. (a) Explain the construction of a standard array for an (n, k) linear block code. (8 marks)

(b) Describe the concept of group and fields. (4 marks)

Or

18. Consider a (7, 4) linear block code whose generator matrix is given below :

$$G = \left[\begin{array}{cccc:ccc} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{array}\right].$$

(i) Find all code vectors of this code.

(ii) Find the parity check matrix.

(iii) Find minimum weight of this code.

19. With the aid of flowchart explain stack algorithm.

Or

20. (a) Explain the encoding and decoding methods for cyclic codes giving proper block diagrams. (9 marks)

(b) Write notes on turbo coding. (3 marks)

[5 × 12 = 60 marks]