G 5566 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 701 – VLSI DESIGN

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Write short notes on process of silicon wafer preparation.
2. Discuss about JFET.
3. Draw the structure of NAND gate using complementary transmission gate realization.
4. Mention the scaling factors or MOS circuits.
5. Comment on the concept of doping process of GaAs technology.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the various lithography techniques.
7. Give an account on isolation of monolithic components.
8. Enumerate the concept of Complementary pass transistor logic.
9. Draw and explain the CMOS logic circuit for SR flip-flop.
10. Illustrate the channeling effect of GaAs crystal structure in detail.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Discuss in detail about mechanism of ion implantation.

Or

12. Comment on the following :

    (a) Metallization.

    (b) Patterning.

    (c) Wire bonding.

(4 + 4 + 4 = 12 marks)

13. With a neat cross sectional view, explain the working of an nMOS enhancement type and depletion type transistor.

Or

14. Discuss the design of monolithic resistors with suitable expressions.

15. Devise the operation of full adder circuit using CMOS with suitable stick diagram.

Or

16. Elaborate various structures of CMOS in detail.

17. Draw and explain the arrangements (circuit diagram, logic symbols and stick diagrams) of two input nMOS, CMOS and BICMOS NOR gates.

Or

18. Discuss about the limitations of scaling and effects of miniaturization in detail.

19. Explain the various steps involved in GaAs fabrication,

Or

20. Write short notes on :

    (a) PLA.

    (b) FPGA.

[5 × 12 = 60 marks]

G 5596 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 703—MICROWAVE ENGINEERING (EC)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. State properties of S matrix.
2. Define output power, efficiency and tuning range of reflex klystron.
3. What are different modes of operation of gunn diode ?
4. List the uses of vector network analyzer.
5. List the characteristics of planar transmission lines.

(5 × 3 = 15 marks)

Part B

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

6. Explain how a circulator can be converted to an isolator.
7. Compare the conventional tubes and microwave devices.
8. Describe the structure of a microwave bipolar transistor.
9. Explain any one method of microwave impedance measurement.
10. Explain slotline waveguide.

(5 × 5 = 25 marks)

Part C

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

11. Explain the working of a two hole directional coupler and obtain its S matrix.

Or

Turn over

12. Explain the following :—

    (a) ABCD parameters.

    (b) H-plane tee.

    (c) Ferrite devices.

13. Explain the process of velocity modulation in two cavity klystron amplifier. Derive expression for the same.

Or

14. With diagram, explain the amplification process in travelling wave tube. What is the significance of electronic and circuit equations ?

15. (a) Explain the construction and working of a PIN diode.

    (b) How it can be used as an amplitude modulator and a phase shifter ?

Or

16. Explain the principle of operation of tunnel diode with neat diagrams.

17. With neat diagrams, explain the procedure of microwave frequency and scattering parameters.

Or

18. Explain the procedure of VSWR measurement and also explain the return loss measurement using directional coupler.

19. Explain hybrid MICs and monolithic MICs. Also compare both MICs.

Or

20. Describe the different losses that occur in microstrip lines.

(5 × 12 = 60 marks)

G 5610 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Electronics and Communication Engineering

EC 010 704 – ELECTRONIC INSTRUMENTATION [EC]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Explain the term Calibration.
2. Explain classification of Transducers.
3. Draw the block diagram of telemetry system.
4. Briefly explain Digital voltmeter.
5. List the instruments used to measure Torque.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain Basic measuring system with block diagram.
7. Write short note about Load cell.
8. Explain Instrumentation Amplifier.
9. Briefly explain basic principles of Data Acquisition System.
10. Explain RTD.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Explain in detail about Dynamic characteristics of instruments.

Or

12. Explain : (i) Zero drift and sensitivity drift.
    (ii) Absolute error and Percentage error.

(6 + 6 = 12 marks)

Turn over

13. Write short note on :

(i) Piezo Electric Transducer.

(ii) Thermocouple.

(6 + 6 = 12 marks)

Or

14. Explain in detail about Encoders.

15. Explain AC bridges.

Or

16. (i) With the help of neat diagram, explain Weign bridge.

(ii) What is meant by Wagner's ground connection? Explain with a suitable diagram.

(6 + 6 = 12 marks)

17. Explain in detail about Digital recorders.

Or

18. Write short note on :

(i) Distortion Analyzer.

(ii) Spectrum Analyzer.

(6 + 6 = 12 marks)

19. Explain in detail the various methods of Force measurement.

Or

20. Explain with neat sketches :

(i) Construction and working of a pH electrode.

(ii) The construction and working of rotary vane flow meter.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

G 5623 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 705—EMBEDDED SYSTEMS (EC)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Define embedded systems.
2. Give the uses of NULL pointers with two examples.
3. Define asynchronous communication. Give an example.
4. Give two applications of watchdog timer.
5. Define Thread.

(5 × 3 = 15 marks)

Part B

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

6. Discuss the requirements of embedded systems.
7. Distinguish between macros and functions with an example.
8. Write short notes on PCI.
9. Explain DAC interfacing.
10. Write notes on Semaphores.

(5 × 5 = 25 marks)

Part C

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

11. Explain the application of embedded systems in communication devices.

Or

Turn over

12. Write notes on the application of embedded systems in the following :—

    (i) Control system. (6 marks)

    (ii) Biomedical system. (6 marks)

13. Describe the Embedded Systems Development Process.

Or

14. Write notes on Embedded C compiler and code optimization.

15. Write notes on the following :—

    (i) Series communication with 8051. (6 marks)

    (ii) Timer and counting devices. (6 marks)

Or

16. Describe voice-over IP with the required source code listing.

17. Explain the following :

    (i) Stepper motor interface. (6 marks)

    (ii) DC motor speed control. (6 marks)

Or

18. Explain matrix keyboard interfacing with a neat block diagram and source code in C.

19. Write notes on the following :—

    (i) ISR. (6 marks)

    (ii) OS services. (6 marks)

Or

20. Explain shared data problem and its solutions.

[5 × 12 = 60 marks]

G 5657 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 706 L03 – DIGITAL IMAGE PROCESSING (Elective II) [EC]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. What is meant by digital image processing? List any *four* applications of it.
2. Write the applications of SVD.
3. What is meant by image enhancement process? Give some examples of it.
4. What is meant by region growing?
5. Write the applications of image compression.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the elements of digital image processing system with a diagram.
7. Explain 2D Fourier Transform and its properties.
8. Explain in detail about Homomorphic filtering.
9. Define Thresholding. Explain anyone method in detail.
10. Explain in detail about Run Length Coding.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Describe how the continuous image can be converted into digital image using sampling and quantization process.

Or

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

Turn over

13. Explain discrete cosine transform and specify its properties.

Or

14. Compute the convolution between two sequences (2, 2, 1, 7) and (–3, 1, –3).

15. Describe histogram equalization. Obtain Histogram equalization for the following image segment of size 5 x 5. Write the inference on image segment before and after equalization.

20	20	20	18	16
15	15	16	18	15
15	15	19	15	17
16	17	19	18	16
20	18	17	20	15

Or

16. Explain the various noise distributions in image enhancements.

17. How do you perform edge defection? Give suitable algorithm and discuss how the edge points are linked?

Or

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

19. Obtain Huffman coding for the source symbols S = (S_0, S_1, S_2, S_3, S_4) and the corresponding probabilities P = (0.4, 0.2, 0.2, 0.1, 0.1).

Or

20. Explain the image compression models in detail with neat diagram.

(5 × 12 = 60 marks)

G 5581 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 702—INFORMATION THEORY AND CODING (EC)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Define entropy and state the properties of entropy.
2. What is variable length coding ? Give example.
3. State the Channel coding theorem for a discrete memoryless channel.
4. How syndrome is calculated in Hamming codes ? Give example,
5. State the advantages of cyclic codes in error detection.

(5 × 3 = 15 marks)

Part B

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

6. Derive the entropy for a binary symmetric source.

(5 marks)

7. Consider the random variable $X = \{x_1. x_2, x_3, x_4, x_5, x_6, x_7\}$ with probabilities

$\{0.49, 0.26, 0.12, 0.04, 0.04, 0.03, 0.02\}$ respectively. Determine a binary huffman code for X and find the expected code length for this encoding.

8. Consider the discrete memory less channel Y = X + Z (mod II), where

$$Z = \begin{pmatrix} 1, & 2. & 3 \\ 1/3, & 1/3, & 1/3 \end{pmatrix}$$

and $X \in \{0, 1, \ldots\ldots 10\}$. Assume that Z is independent of X find the capacity. What is the maximizing $P^*(x)$?

9. Explain the principle of linear block codes in error correction and detection.

10. Bring out the differences between block codes and convolutional codes.

(5 × 5 = 25 marks)

Part C

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

11. (a) Let X_1 and X_2 be identically distributed but not necessarily independent and

$$C = 1 - \left(H(X_2 \mid X_1)/H(X_1)\right)$$

(a) Show that $\rho = I(X_1 ; X_2)/H(X_1)$

(b) Show $0 \le \rho \le 1$

(c) When is $\rho = 0$ and when is $\rho = 1$?

(6 marks)

(b) Let $p(x, y)$ be

X \ Y	0	1
0	1/3	1/3
1	0	1/3

Find (i) H (X), H (Y)

(ii) H (X|Y), H (Y|X)

(iii) H (X, Y)

(iv) H (Y) – H (Y|X)

(v) I (X ; Y)

(vi) Draw a Venn diagram for the quantities in ⓐ through ⓒ.

(6 marks)

Or

12. Derive the relationship between entropy and mutual information. (12 marks)

13. State and prove Kraft's inequalities. (12 marks)

Or

14. Explain Shannon-Fanno elias coding with an example. (12 marks)

15. Elaborate on zero error codes with suitable examples. (12 marks)

Or

16. Discuss about the Gaussian multiple user channels in detail. (12 marks)

17. The parity check matrix of a (7, 4) linear block code is given as $H = \left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 \end{array}\right]$.

(a) Find the generator (a).

(b) List all the code vectors.

(c) Low many errors can be detected ?

(d) How many errors can be Corrected ?

(12 marks)

Or

18. (a) Discuss the methods to compute the minimum distance of a block code. (6 marks)

(b) Explain the maximum error correction Capability of a block code. (6 marks)

19. (a) The generator polynomial of (7, 4) cyclic code is $G(P) = P_3 + P + 1$. Find all code vectors for all the code is non systematic form.

(6 marks)

(b) Describe the operations of encoders used for cyclic codes. (6 marks)

Or

20. What are turbo codes ? Elaborate its encoding and decoding algorithm using sufficient examples.

(12 marks)

[5 × 12 = 60 marks]