G 2013 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering/Applied Electronics and Instrumentation

VLSI TECHNOLOGY (L A)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. How, using epitaxial growth a *n*-type silicon crystal can be obtained ?
2. What is meant by wet oxidation ?
3. Name the different isolation methods.
4. How capacitor can be produced in monolithic integrated circuits ?
5. List the names of at least 4 CMOS technologies.
6. What is the cause for "Bird's beak" ?
7. State the main objective associated with layout rules.
8. Differentiate between static and dynamic power dissipation of CMOS circuits.
9. Write expression for Id_{sat} under velocity saturation condition and explain.
10. List the features of GaAS Technology.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Discuss about the following with reference to diffusion of Impurities : —

    (i) Complementary error function.

    (ii) Gaussian Distribution profile.

    (iii) Diffusion coefficients.

Or

(b) Explain the following : —

(i) Photolithography.

(ii) Electron beam and X-ray lithography.

Turn over

12. (a) Explain the various steps for a silicon gate nMOS transistor.

Or

(b) Discuss about :

(i) Monolithic resistor.

(ii) Monolithic capacitor.

13. (a) Describe the *n*-well C-MOS process steps with the help of diagram.

Or

(b) Write notes on :

(i) Scaling of MOS structure.

(ii) Stick diagram.

14. (a) Draw the BiCMOS' NAND gate circuit with *n-p-n* pull-down and nMOS pull-down and explain.

Or

(b) Draw the schematic of array shifter using transmission gates, also draw the layout for its cell and explain.

15. (a) With the help of diagram, explain the structure of basic MESFET and its operation.

Or

(b) Discuss about the following : —

(i) Wafering using diamond ID saw.

(ii) Edge rounding.

(iii) Lapping.

(iv) Wafer scubbing.

(5 × 12 = 60 marks)

G 2042 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering

INFORMATION THEORY AND CODING (L)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. Define (i) mutual information ; and (ii) Joint entropy.
2. What is meant by redundancy and efficiency ?
3. What is the channel capacity of a binary symmetric channel with error probability 0.01 ?
4. Determine the minimum signal-to-noise ratio that is needed to support 56 K modem.
5. What is the need for source coding ? Explain.
6. State noiseless coding theorem and briefly explain.
7. Explain error detecting capabilities of linear block codes.
8. Explain briefly about Reed-Soloman codes.
9. Define constraint length of a convolutional code and explain its significant.
10. What is interleaving ? Explain about block interleaving.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Show that the upper bound on discrete entropy of a source with "M" symbols is $\log_2(M)$.

(8 marks)

(b) Explain the concept of amount of information. Also explain what is meant by infinite information and zero information.

(4 marks)

Or

Turn over

12. (a) A single unbiased die is tossed once. If the face of the die is 1, 2, 3, (or) 4, an unbiased coin is tossed once. If the face of the die is 5 or 6, the coin is tossed twice. Find the information conveyed about the face of the die by the number of heads obtained.

(6 marks)

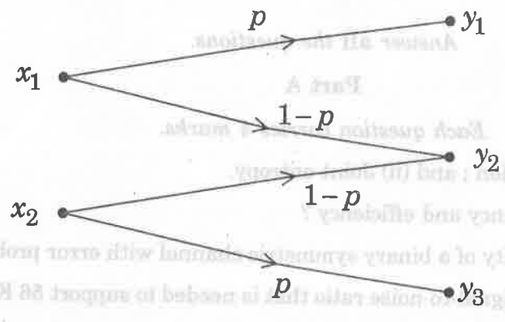
(b) Let X and Y are two discrete random variables. Show that

$$H(X/Y) \leq H(X),$$

with equality if and only if X and Y are independent.

(6 marks)

13. Find the capacity of a binary erasure channel illustrated in figure below :



(12 marks)

Or

14. (a) Derive channel capacity formula for band limited Gaussian channels. (8 marks)

(b) Draw bandwidth efficiency diagram and explain. (4 marks)

15. (a) State and prove Kraft's inequality. (7 marks)

(b) Explain about arithmetic coding. (5 marks)

Or

16. Construct the Huffman code with minimum code variance for the following probabilities and also determine the code variance and code efficiency :

$$\{0.25, 0.25, 0.125, 0.125, 0.125, 0.0625, 0.0625\}.$$

(12 marks)

17. Consider a (6, 3) linear block code whose generator matrix is given by

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

(i) Find the parity check matrix. (2 marks)

(ii) Find the minimum distance of the code. (4 marks)

(iii) Draw the encoder and syndrom computation circuit. (6 marks)

Or

18. (a) Define BCH code.

(b) A (7, 4) cyclic code has a generator polynomial : $g(X) = X^3 + X + 1$.

(i) Draw the block diagram of encoder and syndrome calculator. (6 marks)

(ii) Find generator and parity check matrices in systematic form. (6 marks)

19. (a) A convolutional encoder is described by the following matrix :—

$$G = \begin{bmatrix} 1 & 1+D^2 & 1+D+D^2 \end{bmatrix}.$$

(i) Draw the encoder diagram.

(ii) Draw the trellis diagram for the input length of 5 bits.

(2 + 6 = 8 marks)

(b) Explain about Viterbi algorithm. (4 marks)

Or

20. (a) Explain various types of ARQ. (6 marks)

(b) Write short note on : Interpolation and muting. (6 marks)

[5 × 12 = 60 marks]

G 2068 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering/Applied Electronics/Instrumentation/Electronics and Instrumentation

OBJECT ORIENTED PROGRAMMING IN C++ (Elective I) (LAS)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Define object oriented languages and write their features.
2. Explain need of objects.
3. Write notes on data inheritance.
4. What are destructors ? Give example.
5. What are abstract classes ? Explain their use.
6. Discuss the usage of virtual functions.
7. Discuss about operator overloading.
8. Describe overloading functions.
9. Explain inline functions and also create one.
10. What are different types of function declarations ? How will you declare a function outside the class ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the basic requirements of object oriented languages.

Or

12. Discuss about "Need of Objects".
13. Explain in detail about encapsulation with examples.

Or

14. Write notes on Building classes.

Turn over

15. Discuss about Polymorphism.

Or

16. Write short notes on virtual functions.

17. Discuss about overloading operators in C++.

Or

18. Discuss about the selection of member functions for operator overloading.

19. Discuss about Inline functions outside class definitions.

Or

20. Explain in detail the Applications of Friend functions.

(5 × 12 = 60 marks)

G 2069 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering

NEURAL NETWORKS (Elective I) (L)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. What is meant by Neural Network ? List out their applications.
2. What is single layer and multi layer network ?
3. What are the characteristics of back propagation Algorithm ?
4. Define temporal instability.
5. What is meant by counter propagation Network ? Give examples.
6. State Grossbery learning rule.
7. Write notes on Cauche training.
8. What are the benefits of Statistical methods ?
9. What is recurrent network ? and explain their characteristics.
10. Define ART.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the activation functions used in ANN.

Or

12. Draw the structure of a Multilayer perceptron and explain its training method.
13. Explain Back propagation training Algorithm.

Or

Turn over

14. Write notes on :

    (a) Network paralysis. (6 marks)

    (b) Temporal instability. (6 marks)

15. Explain training algorithm used in CPN.

Or

16. Explain training algorithm used in Full CPN Network.

17. Explain in detail Boltzmann's training Algorithm.

Or

18. Explain how artificial specific heat method is used for optimization problems ?

19. Write notes on :

    (a) Hopfield nets.

    (b) BAM.

Or

20. Explain different types of learning in the ART Net.

(5 × 12 = 60 marks)

G 2070 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering

BIOMEDICAL ENGINEERING (Elective-I) (L)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Part A

Answer **all** *the questions.*

Each question carries 4 *marks.*

1. Define and explain resting and action potentials.
2. What are transducers ? Explain their need.
3. Explain the principle of ECG recorder with a neat sketch.
4. What is spirometer ? Explain in detail.
5. Explain the characteristics of Ultrasound.
6. State and explain Doppler effect.
7. Explain the potential applications of X-ray machine.
8. What is the principle of photographic imaging ? Explain.
9. Explain the components of ICU in detail.
10. What is CAPD ? Explain in detail.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Describe in detail the Respiratory system with a neat diagram.

Or

12. Explain the following in detail : —

    (i) EMG. (4 marks)

    (ii) Blood purification. (4 marks)

    (iii) Resting and action potentials. (4 marks)

Turn over

13. Explain in detail the respiratory measurement with a neat diagram.

Or

14. Discuss in detail about Gas exchange measurements.

15. Draw the block schematic of A mode and B mode instruments. Explain them in detail.

Or

16. Explain in detail the principle of ultrasonic imaging.

17. Explain in detail the principle of C arm machine with a neat diagram.

Or

18. Differentiate the features of MRT scan from CT scan. Explain the difference.

19. Explain in detail the principle of operation of CAPD with a neat diagram.

Or

20. Write technical notes on :

    (i) Bedside monitors. (4 marks)

    (ii) Pump Oxygenerators. (4 marks)

    (iii) Need for grounding. (4 marks)

[5 × 12 = 60 marks]

G 2004 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering and Applied Electronics and Instrumentation

MICROCONTROLLER BASED SYSTEM DESIGN (L A)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. Compare CMOS with TTL logic family.
2. Draw the block diagram of PAL.
3. How many banks of memory are there in 89C51 microconollers ? How these banks are selected ?
4. Name the flag bits of 89C51 and explain the use of each one.
5. Draw the simplified schematic of flash Type ADC.
6. Draw the schematic of weighted resistor Type DAC (4-bit) and list the drawbacks of this type of DAC.
7. How the device connected to the PCI bus identifies its address space ?
8. Discuss about 2 wire serial EEPROM.
9. Name the parameters of stepper motor which are programmable, also explain how these parameters can be digitally controlled.
10. What is meant by bouncing effect of a key ? How it can be debounced ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Draw the internal architecture of XILINX configurable logic block in simplified form and explain the function of each block.

Or

12. With the help of diagram, explain the operation of CMOS (i) NAND gate and (ii) NOR gate.

Turn over

13. Discuss about the interrupt structure of 89C51 in detail.

Or

14. Draw the LCD interface circuit to 89C51 and explain its function ; also write the assembly language program.

15. Draw the DAG interface circuit to 89C51. Explain how different waveforms can be generated using this DAC interface circuit.

Or

16. Explain the function of SA (successive approximation Type) type ADC chip using its a simplified internal circuit in block diagram form.

17. Discuss in detail about the serial bus standards :

    (i) I^2C bus.

    (ii) USB bus.

Or

18. Explain how a 3-wire serial EEPROM can be interfaced to a micro-controller.

19. Design a position control system using a micro-controller.

Or

20. Explain with the help of diagram, how a stepper motor can be interfaced to a micro-controller and also write an assembly language program to make the shaft of motor to move 10 steps in clockwise direction and then stop.

(5 × 12 = 60 marks)

G 2021 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering

MICROWAVE AND RADAR ENGINEERING (L)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. Differentiate Isolator from circulator.
2. Obtain the S matrix of an ideal lossless matched shunt tee.
3. Explain a method to compute high VSW R with a neat diagram.
4. What are repeaters? Explain the types.
5. What are biasing and decoupling circuits for FET? Explain them with diagram.
6. Explain the potential applications of tunnel diodes.
7. What are the advantages and application of Radar systems?
8. What is Blind speed? Explain.
9. Name a Microwave antenna. Explain its principle.
10. Explain the principle of direction finders with a neat sketch.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. State and prove all the properties of S-parameters.

Or

12. Draw a neat sketch of hybrid junction. Explain its principle. Obtain the S-matrix for an Ideal, lossless, matched hybrid junction.

13. Explain the procedure to measure Impedance with a neat block diagram.

Or

14. Draw a neat schematic diagram of HTWT. Explain its amplification process. Derive an expression for power gain.

Turn over

15. Explain the principle of Microwave BJTs and FETs with neat diagrams.

Or

16. Explain in detail the V–I characteristics of tunnel diode with neat energy band diagrams.

17. Derive simple form of Radar Range equation. Explain its limitations.

Or

18. Compare and contrast the features of MTI and pulse Doppler Radar.

19. Explain the principle of ILS and GCA with neat diagrams.

Or

20. Write technical notes on :
    (a) LORAN.
    (b) Hyperbolic Navigation.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

G 2031 (Pages 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Seventh Semester

Branch : Electronics and Communication Engineering

OPTICAL FIBRE COMMUNICATION SYSTEMS (L)

(Supplementary)

Time : Three Hours Maximum :100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. Define and explain acceptance Conc. Obtain an expression for Qa.
2. Draw the Index profile diagrams for all the glass fibers and explain.
3. What is ISI in optical fibers ? Explain with a neat sketch.
4. Differentiate connectors from optical splicers.
5. Enumerate and explain the requirements of an Ideal Optical Source.
6. What are lambertian and non-lambertian sources ? Give examples.
7. What is WDM ? Explain its types.
8. Explain the need for optical amplifiers.
9. Explain the basic principle of OTDR with a schematic diagram.
10. Explain the future developments of optical fibers.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Compare and contrast all the parameters of Step Index and Graded Index glass fibers.

Or

12. Explain the significance of V-number. Derive expressions for V-number for Step Index and Graded Index fibers.

13. Differentiate Intermodal dispersion from Intramodal dispersion. Derive an expression for r.m.s. pulse broadening in single mode step Index fibers.

Or

Turn over

14. Explain any *two* permanent splicing and two semi-permanent splicing, techniques with neat diagrams.

15. Explain the operating principle of semiconductor Laser with a neat diagram. Derive its threshold gain.

Or

16. Discuss the lensing schemes for improving power coupling efficiency with neat diagrams.

17. Differentiate WDM from TDM. Explain the principles of WDM and TDM with neat diagrams.

Or

18. Differentiate SOA from EDFA. Explain the principle of operation of EDFA with a neat schematic diagram.

19. Draw a neat block diagram of OTDR and explain its principle of operation in detail.

Or

20. Explain the principle of cutback method of fiber attenuation measurement with a neat block diagram.

(5 × 12 = 60 marks)