F 3628

Reg. No.....

Name .....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electronics and Communication Engineering/Applied Electronics and Instrumentation

VLSI TECHNOLOGY (LA)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Compare electron beam lithography and X-ray lithography ?
2. What is Dry oxidation ? What are its advantages ?
3. Write a note on junction isolation.
4. Write a note on Schottky diodes.
5. Discuss the need for design rules.
6. Compare a metal gate with a sigate in CMOS transistor ?
7. Explain the VIC of an inverter.
8. Write a note on the importance of power supply rail distribution.
9. Explain why GaAs technology is preferred in the fabrication of LEDs.
10. Write a note on channeling effects.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain Czochralski process ? What are its advantages ? (12 marks)

Or

(b) Explain different printing techniques in lithography ? (12 marks)

12. (a) Explain the fabrication process of a MOS resistor. (12 marks)

Or

(b) Explain how threshold voltage of a MOS transistor can be controlled ? (12 marks)

13. (a) Explain twin well process in CMOS technology ? (12 marks)

Or

(b) Explain the effect of scaling as the electrical parameters of a MOS structure ? (12 marks)

14. (a) Explain a Bi CMOS NAND gate with npn pull down. (12 marks)

Or

(b) Design and layout a two input CMOS NAND gate ? (12 marks)

15. (a) Explain device modelling. What are its significances ? (12 marks)

Or

(b) Explain the doping process in GaAs technology. (12 marks)

[5 × 12 = 60 marks]

F 3646 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electronics and Communication Engineering

OPTICAL FIBRE COMMUNICATION SYSTEMS (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Explain critical incident angle.
2. Define and explain numerical aperture.
3. Write notes about optic fiber connectors.
4. Write the concept of dispersion limit in optical fibers.
5. Write the principle of operation of LASER. What are the different types of LASERs?
6. What are the different lensing schemes and explain.
7. Write the basic principle of EDFA.
8. Explain the requirements of a transceiver.
9. Write note about refractive index profile measurement.
10. Explain about OTDR.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Describe the effect of index profile on propagation.

Or

12. Explain the significance of V number A multimode SIF with core diameter 80 μm and relative index difference Δ is 1.5% is operating at a wave length of 0.85 μm. If core refractive index is 1.48, calculate the normalized frequency for fiber and the number of guided modes.
13. Distinguish between a splice and a connector. How can one avoid loss due to Fresnel reflection at a joint?

Or

Turn over

14. What are the various reasons of alternations is optical fiber transmission ? Explain.

15. Briefly explain the principle of operation of LED? Explain the characteristics of LED.

Or

16. Give the operating principle of (i) Photomultiplier tube (ii) PIN Diode.

17. Discuss different types of system architecture.

Or

18. Distinguish between WDM and DWDM.

19. Explain Fiber attenuation measurement.

Or

20. Explain the dispersion measurement.

(5 × 12 = 60 marks)

F 3685 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electronics and Communication Engineering

BIOMEDICAL ENGINEERING (Elective-I) (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Explain the Cardio Vascular system of the body.
2. Explain the types of electrodes used for EEG measurement.
3. Define the important lung capacities and explain them.
4. Describe with diagram the operation of a blood cell counter.
5. What are the basic modes of ultrasound transmission ? Explain.
6. What is echoencephalography ? Explain.
7. Explain X-ray films with its requirements for selection.
8. Explain principle of operation of Computed Tomography.
9. Briefly explain the planning and location of different instrumetns in the intensive care unit.
10. Explain the microshock hazards with figure.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. Draw the block diagram of the MAN-Instrument system and explain each component in detail with examples.

Or

12. Describe in detail the parameters to be considered in the design of biomedical instruments.
13. Explain with diagram any *three* methods of direct blood pressure measurement. What are its advantages ?

Or

Turn over

14. Explain in detail the electrodes and the lead configurations for the ECG measurement with figure.

15. Explain in detail the phased array Ultrasonograph. What are its applications ?

Or

16. Explain with diagram the ultrasonic blood flow meter indetail. What are the precautions to be taken ? What are its disadvantages ?

17. Draw the block diagram of an X-ray image intensifier system and explain with its constructional details.

Or

18. Explain with diagram the C-arm machine. Compare it with an X-ray machine.

19. Draw the block diagram of a biotelemetry system and explain each component in detail. Also explain any *two* applications in the biomedical field.

Or

20. (a) Explain with diagram the isolated power distribution system. (6 marks)

    (b) What is meant by hemodialysis ? Explain any *two* types of dialysers. (6 marks)

[5 × 12 = 60 marks]

F 3683 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

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

OBJECT ORIENTED PROGRAMMING IN C++ (Elective – I) (L, A, S)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List and explain the applications of object-oriented languages.
2. What is a structure? Explain.
3. What do you mean by encapsulation? Explain.
4. Briefly explain nesting of member functions.
5. When do we make a virtual function "pure"? Explain.
6. Explain the uses of abstract classes.
7. Explain function overloading.
8. What is default arguments? Explain with example.
9. Explain dynamic initialization of an object.
10. List and explain applications of Friend functions.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the basic concepts of object oriented language.

Or

12. Define an object. Explain the need of object in detail.
13. Explain with example Public inheritance and Private inheritance.

Or

14. Explain Copy constructors and Parametrized constructors with examples.

Turn over

15. Briefly explain virtual functions and its usages.

Or

16. Discuss in detail about polymorphism.

17. Explain the different overload methods available in C++.

Or

18. Explain the selection of Friend function for operator overloading.

19. Explain in detail the dynamic object allocation.

Or

20. Explain Inline functions outside class definitions with examples.

(5 × 12 = 60 marks)

F 3684 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electronics and Communication Engineering

NEURAL NETWORKS (Elective – I) (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Differentiate between a biological neuron and an artificial neuron.
2. Define and explain linear separability.
3. What is meant by Local minima and Global minima?
4. Explain network paralysis.
5. Discuss the characteristics and applications of forward only CPN.
6. What are the statistical properties of counter propagation networks?
7. How is Cauchy machine formed from Boltzmann machine?
8. Explain the principle of specific heat method of neural network.
9. What is an auto associative net?
10. What are the three states of ART network?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. What are the different types of learning? Explain in detail.

Or

12. Explain the architecture, working and characteristics of perceptron network.
13. Explain the training algorithm used for back propagation networks.

Or

14. Explain with figures a specific application of back propagation network.

Turn over

15. Explain the architecture and training process of a forward only CPN.

Or

16. Discuss the application algorithm used in full CPN.

17. Explain the training algorithm of Cauchy's machine.

Or

18. Explain in detail an application of Boltzmann's machine.

19. Discuss in detail the delta rule used for pattern recognition.

Or

20. Explain with diagram the architecture of an ART 2 network.

(5 × 12 = 60 marks)

F 3619 (Pages : 2) Reg. No ECE

Name .....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Brnach : Electronics and Communication Engineering and Applied Electronics and instrumentation

MICROCONTROLLER BASED SYSTEM DESIGN (LA)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Which logic family is the fastest ? What design aspect is the primary reason for its speed ? What are its main drawbacks ?
2. Write notes on Totempole output stage.
3. What are the advantages and disadvantages of a C compiler over an assembler for microcontroller applications ?
4. What do you understand by code optimisation ?
5. Explain quantization errors in ADC's.
6. What are optically isolated triac interfaces ? What is its use ?
7. Explain the PCI bus.
8. Discuss low voltage differential signelling.
9. Explain the need for key debouncing. How is it implemented in software ?
10. How can power factor be measured using a microcontroller ? Explain.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Draw the schematics for the basic gates of TTL and CMOS (NAND or NOR) families. Explain their operation.

Or

12. (i) Discuss the 16 LB chip.
    (ii) Explain dual port RAM.
13. With suitable schematics show how a 4 digit 7 segment display is interfaced to 89C2051. Discuss the logic to be followed in writng the code to drive the display.

Or

14. Discuss the architecture of 89C2051 μC.
15. Explain the principles of any *two* types of ADC. Compare them.

Or

Turn over

16. With essential schematic and programming details, explain a temperature control system.

17. (i) Explain SPI with protocol details.

(ii) Discuss the role of MA × 232 line interface.

Or

18. Highlight the features of 93C46. Draw a simple interface schematic and give coding details.

19. (i) Illustrate how an AT keyboard can be interfaced to a microcontroller.

(ii) Write notes on real time clocks.

Or

20. (i) Write notes on DS 1232 watch dog timer.

(ii) Show how a stepper motor can be driven using a microcontroller. Write a program to drive the motor through 90°. State any assumptions made.

(5 × 12 = 60 marks)

F 3636 (Pages : 2) Reg. No.....

Name .....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electronics and Communication Engineering

MICROWAVE AND RADAR ENGINEERING (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
Each question from Part A carries 4 *marks.*
Each question from Part B carries 12 *marks.*

Part A

1. Define the cut-off frequency of a waveguide.
2. Name the commonly used directional couplers.
3. Briefly explain velocity modulation.
4. What are the limitations of conventional vacuum tubes at microwave frequencies ?
5. Name any *five* semiconductor microwave devices.
6. Compare the Gunn oscillator and a Reflex Klystron, as microwave sources.
7. Enumerate different types of Radars.
8. Explain, what is meant by "Clutter" ?
9. Explain a microwave dish.
10. Name the important navigational aids.

(10 × 4 = 40 marks)

Part B

11. With the help of neat diagrams, explain the power division among various arms of a shunt Tee. Also write down its S-matrix.

Or

12. What is a directional coupler ? Also explain the coupling factor and directivity of a directional coupler, with the help of neat diagrams.
13. Explain the π-mode of oscillations in an 8 cavity magnetron, with relevant diagrams.

Or

14. Draw a block diagram of a typical terminal microwave transmitter and briefly explain the functions of each block.
15. Explain the working of a Gunn diode as an oscillator and also as an amplifier of microwave signals.

Or

16. Explain the working principles of microwave FET's and BJT's.

Turn over

17. Draw a block diagram of a CW radar and explain the functions of each block Also compare a CW and pulsed radar.

Or

18. Explain the working of an MTI radar with the help of a block diagram, explaining the functions of each block.

19. Explain the working of any one direction finder, with relevant diagrams.

Or

20. Explain the working of a parabolic antenna, defining the important antenna parameters.

(5 × 12 = 60 marks)

F 3657 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch—Electronics and Communication Engineering

INFORMATION THEORY AND CODING (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Define the terms information and entropy. Prove the statement—'If a receiver knows the message being transmitted, the amount of information carried will be zero'.
2. Define Mutual Information. Explain how it is related to entropy for a lossless channel, prove that H (X/Y) = 0.
3. Differentiate between binary symmetric and binary unsymmetric channels.
4. State Shannon-Hartley theorem. Give its significance.
5. Define the terms coding efficiency and redundancy.
6. State and prove Kraft inequality.
7. Define G and H matrix. How they are related.
8. Name any one coding method used for burst error correction. Explain.
9. What are convolution codes ? How are they different from back codes.
10. Compare different ARQ systems on the basis of operation and performance.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) The probabilities of five possible outcomes of an experiment are given by :

$$p(x_1) = \tfrac{1}{2},\ p(x_2) = \tfrac{1}{4},\ p(x_3) = \tfrac{1}{8},\ p(x_4) = p(x_5) = \tfrac{1}{16}.$$

Determine the entropy and information rate if there are 16 outcomes per second.

(6 marks)

Turn over

(b) Consider a binary symmetric channel. Show that the mutual information :

$$I(x, y) = H(y) + p \log_2 p + (1-p) \log_2 (1-p).$$

(6 marks)

Or

12. (a) Define the average mutual information in a continuous channel. (4 marks)

(b) Show that the channel capacity of an ideal AWGN channel with infinite bandwidth is given by $C_\infty = 1.44 \frac{S}{\eta}$, where s-is the average signal power and $\eta/2$ is the power spectral density of white Gaussian noise.

(8 marks)

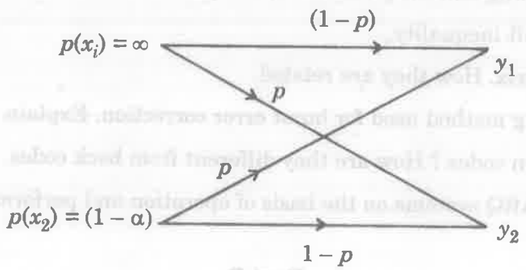
13. (a) Explain the capacity of band limited Gaussian channels. (6 marks)

(b) Consider an AWGN channel with 4 kHz bandwidth and the noise power spectral density 10^{-12} W/Hz. The signal power at the receiver is 0.1 mW. Calculate channel capacity.

(6 marks)

Or

14. Find the channel capacity of a binary erasure channel given below :



(12 marks)

15. (a) Explain different steps involved in Huffman Encoding Algorithm. (6 marks)

(b) A discrete memoryless source emits five symbols with probabilities 0.4, 0.19, 0.16, 0.15 and 0.1 respectively. Make Huffmann code. Find length of the code and cooling efficiency.

(6 marks)

Or

16. (a) Explain Shannan Fano coding Algorithm. (6 marks)

(b) Repeat problem in 15 (b) question to form Shannn Fano code. Find code length and efficiency.

(6 marks)

17. (a) Explain the generation of block codes. (4 marks)

(b) Consider (7, 3) cyclic code generated by $G(p) = p^4 + p^3 + p^2 + p^1$. Find various code words for systematic and non-systematic form.

(8 marks)

Or

18. (a) Describe standard array and syndrome decoding of linear block codes. (6 marks)

(b) Consider a linear block code whose G-matrix is given as :

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & . & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & . & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & . & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & . & 0 & 1 & 1 \end{bmatrix}.$$

Find all code vectors, parity check matrix and minimum weight of this code.

(6 marks)

19. (a) Draw a convolution encoder with constraint length – 3 and rate $\frac{1}{2}$, with G for path-1 as (1, 1, 1) and path-2 (1, 0, 1).

(4 marks)

(b) Draw code tree, trellis and state diagram for the above encoder for 5-bit message sequence.

(8 marks)

Or

20. Explain the Viterbi decoding algorithm for the above encoder in Question (19). (12 marks)

[5 × 12 = 60 marks]