F 3155 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

Branch : Electronics and Communication Engineering / Applied Electronics and Instrumentation

MICROCONTROLLER BASED SYSTEM DESIGN (LA)

(Regular/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 4 *marks.*

1. What are the advantage offered by FPGA based system design?
2. Explain the steps used for implementing combinational circuit using PLA?
3. How do you set the highest priority for serial interrupt?
4. What are the interrupt sources available in 89C251? Are there any interrupts that cannot be disabled?
5. Explain the merits and demerits of flash converter over the dual slope converter.
6. List and briefly describe any four specifications of a DAC.
7. Describe the RS232 standard?
8. Draw the timing diagram of MOV [SI], AL instruction.
9. Explain the use of DS1232 watch dog timer.
10. Explain how the power factor can be measured using the timers of 89C51?

(10 × 4 = 40 marks)

Part B

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE I

11. Draw the structure of 3 × 4 × 2 PLA structure. Explain its working and applications?

Or

12. With neat diagram explain FPGA architecture? How FPGA is classified? Give examples.

Turn over

MODULE II

13. With neat circuit diagram, explain how a 7 segment LED display can be interfaced with 89C 2051?

Or

14. Explain the special features of 89C 2051. Also describe how memory space is divided into many groups with the help of a neat sketch?

MODULE III

15. With neat diagrams, explain the working of a sigma delta converter? Compare its performance with dual slope converter?

Or

16. With a neat circuit diagram, explain the optically isolated triac interface to 89C51? Explain the assembly program for the above interface?

MODULE IV

17. Describe the RS 485 standard, clearly explaining the various data and control signals.

Or

18. Explain the 3 wire serial EEPROM interface with the microcontroller with the help of necessary diagrams. Compare it with 2 wire system?

MODULE V

19. With the help of neat circuit diagram and assembly language program, describe how the stepper motor is interfaced with microcontroller?

Or

20. Give the features of L293 motor driver? With neat circuit, show how it can be used with the microcontroller?

(5 × 12 = 60 marks)

F 3165 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

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

VLSI TECHNOLOGY (LA)

(Regular/Supplementary/Mercy Chance)

Time : Three Hours Maxim : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 4 *marks.*

1. Compare ion implantation with diffusion.
2. Write the complementary error function used to describe the diffus n process and explain each term and its significance.
3. What is self-aligned polysilicon gate NMOS process? Explain.
4. Differentiate between trench isolation and silicon on insulator isolation.
5. What are the advantages of n-well CMOS technology?
6. Draw the stick diagram of a CMOS inverter.
7. Draw the layout diagram for two-input NOR gate.
8. Compare n-well CMOS and BiCMOS technologies.
9. Why alloyed contacts are preferred in MESFET fabrication? Explain.
10. Write a descriptory note on channelling effect.

(10 × 4 = 40 marks)

Part B

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE I

11. Explain with neat diagrams, the different lithographic steps involved in selective diffusion over a wafer.

Or

Turn over

12. What is epitaxial growth? Discuss the different techniques used to grow epitaxial layer.

MODULE II

13. Explain in detail, with neat diagrams, the process of junction-isolated bipolar components in monolithic IC.

Or

14. With neat sketches, explain the *p*-well process for CMOS fabrication. Also give details of masks required at each step.

MODULE III

15. Explain with necessary sketches, the twin-tub CMOS process in detail. What is latch up and what are the remedies?

Or

16. Sketch and explain the different steps showing the fabrication of junction isolated BiCMOS integrated circuit process. Also comment on BiCMOS structure with multiple wells.

MODULE IV

17. Draw neat layout for:

    (i) 3 input AND gate. (6 marks)

    (ii) 2 input NOR gate. (6 marks)

Or

18. (a) Derive an expression for the dynamic power dissipation in a CMOS inverter. (6 marks)

    (b) What are λ-based design rules? Write the λ-rules for poly, diffusion layers, metals, and contacts. (6 marks)

MODULE V

19. Explain the doping process done in GaAs? What are its merits?

Or

20. Write neat diagrams describe the crystal structure of GaAs.

(5 × 12 = 60 marks)

F 3174 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

Branch : Electronics and Communication Engineering

MICROWAVE AND RADAR ENGINEERING (L)

(Regular/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 4 *marks.*

1. Deduce the S-matrix for a directional coupler.
2. Explain the properties of an H-plane T.
3. Draw the applegate diagram for Klystron amplifier and explain.
4. Explain strapping in magnetrons.
5. Using energy band diagrams, explain the tunnel diode characteristics.
6. Explain the different modes of operation of a microwave NPN transistor.
7. What is minimum detectable signal? Discuss the issues involved while setting the threshold level in a radar receiver.
8. Discuss the limitations to MTI performance.
9. Explain the role of satellites in navigation.
10. Explain the direction finding using loop antenna.

(10 × 4 = 40 marks)

Part B

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE I

11. Discuss in detail, the TE modes in rectangular waveguides. Also describe the power transmission in rectangular waveguides.

Or

Turn over

12. With a neat diagram, explain the operation of a 4-port circuit and derive the S-matrix for the same.

MODULE II

13. With a neat diagram, explain the construction and working of a travelling wave tube. Obtain an expression for the power gain of a TWT amplifier.

Or

14. Explain with suitable sketches the principle of velocity modulation and trenching process in a reflex Klystron. Derive the expressions for the power output and efficiency of reflex Klystron.

MODULE III

15. Describe the physical structure of IMPATT diode and explain how its negative resistance varies with transit angle. Also discuss their power output and efficiency.

Or

16. (a) Describe the principle of an N-type GaAs Gunn diode oscillator using two-valley model. (8 marks)

(b) Bring out the differences between transferred electron devices and avalanche transit time devices. (4 marks)

MODULE IV

17. With neat block diagram, explain the working principle of a FM-CW radar. Discuss its applications.

Or

18. With necessary diagrams and equations, explain.

(i) working principle of MTI radar. (4 marks)

(ii) butterfly effect. (2 marks)

(iii) delay line canceller. (2 marks)

(iv) coherent MTI radar with power amplifier transmitter. (4 marks)

MODULE V

19. (a) With neat diagrams, explain LORAN-A system. (6 marks)

(b) With a neat block diagram, explain the doppler navigation system. (6 marks)

Or

20. With a neat block diagram, explain Navstar GPS, along with its receiver block diagram. Describe its signal structure, data message and velocity determination.

[5 × 12 = 60 marks]

F 3185 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

Branch : Electronics and Communication Engineering

OPTICAL FIBRE COMMUNICATION SYSTEMS (L)

(Regular / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Define critical angle. What is its significance?
2. What is meant by index profile?
3. Compare the characteristics of single mode and multi-mode fibres.
4. What is pulse Spreading?
5. What are the characteristics of LED?
6. Write a note on lensing schemes used.
7. What is WDM? What are its advantages?
8. What are the characteristics of SLAs?
9. Explain the principle of operation of OTDR.
10. Discuss the importance of the measurement of the Cut-1 off wavelength of fibres.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. What are the parameters of an optical fibre? Explain how they affect the propagation of wave.

Or

12. Explain the effect of index profile on wave propagation through a cable.
13. Explain the different types of attenuation in optical fibres.

Or

Turn over

14. Describe the different types of optical couplers. Compare their characteristics.

15. Explain with diagrams, the construction, principle of operation and characteristics of APD.

Or

16. Explain with diagrams the methods of launching power from source to fibre.

17. Explain with diagrams the protection techniques used in FOC systems.

Or

18. Write an account on optical fibre networks.

19. Explain with diagrams the measurements of (a) bandwidth; and (b) fibre attenuation.

Or

20. Explain with diagrams an application of fibre optic systems.

(5 × 12 = 60 marks)

F 3222 (Pages : 2) Reg. No.....2 10 24.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

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

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

(Regular / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer all *questions.*

Part A

Each question carries 4 *marks.*

1. What are objects?
2. Explain any *three* applications of object oriented programming.
3. What is encapsulation?
4. With example, define constructors.
5. What is an abstract class?
6. What are virtual functions?
7. What is a friend function?
8. What is function overloading?
9. What are the features of small talk language?
10. What is dynamic object allocation?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the concept of object oriented languages in detail.

Or

12. Discuss the evolution of object oriented language.

Turn over

13. Explain the concept of inheritance with examples.

Or

14. Write about member functions.

15. Explain in detail about virtual functions and its usage.

Or

16. Define abstract class and abstract method in detail.

17. Explain the concept of operator overloading with example.

Or

18. Explain how we can select a member function for operator overloading.

19. Explain the main features of C++ and compare it with data oriented languages.

Or

20. What are the main applications of friend functions?

(5 × 12 = 60 marks)

F 3223 (Pages : 2) Reg. No.....2 copy.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

Branch : Electronics and Communication Engineering

NEURAL NETWORKS (Elective I) (L)

(Regular / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Compare the characteristics of biological neuron and artificial neuron.
2. Explain linear separability.
3. What are the parameters of the back propagation algorithm?
4. Differentiate between Local minima and Global minima.
5. What are the applications of full counter propagation networks?
6. Explain how the weight vectors are pre-initialized in a CPN.
7. Draw the architectural diagram of Boltzmann network.
8. What are the characteristics of artificial specific heat method?
9. What are the characteristics of Hopfield nets?
10. Write a note on thermodynamic systems.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain with diagrams the activation functions used in ANN.

Or

12. Draw and explain the architecture of a multilayer perceptron. Discuss its training process.
13. State and explain the application algorithm of a back propagation network.

Or

Turn over

14. Explain on the choice of the parameter used in a BPN.

15. Draw and explain the architecture of a full counter propagation network.

Or

16. Discuss on the application and training algorithms used for forward only CPN.

17. State and explain the application algorithm used in Boltzmann machine.

Or

18. Explain in detail the method used in simulated annealing.

19. State and explain the training algorithm for a continuous BAM.

Or

20. Explain the implementation of ART nets.

(5 × 12 = 60 marks)

F 3197 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Seventh Semester

Branch : Electronics and Communication Engineering

INFORMATION THEORY AND CODING (L)

(Regular/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Define Entropy. List its properties.
2. What is information rate ? Explain the significance.
3. State and explain Shannon's channel coding theorem.
4. For a binary symmetric channel, prove that $C = 1 - H(p)$.
5. What is source coding ? Explain its need.
6. What are arithmetic coding ? Explain.
7. Define generator and parity check matrices. Give structure of G and H matrices used for linear block codes.
8. Explain the error detection capabilities of cyclic codes.
9. What is CIRC ? Briefly explain.
10. What is ARQ ? Name different ARQ strategies. Explain its need in data transmission.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) An analog signal is bandlimited to 10 kHz is quantized in 8 levels of PCM system with probabilities of $\frac{1}{4}, \frac{1}{5}, \frac{1}{5}, \frac{1}{10}, \frac{1}{10}, \frac{1}{20}, \frac{1}{20}$ and $\frac{1}{20}$ respectively. Find entropy and rate of information. (6 marks)

(b) Prove that mutual information is always positive. (6 marks)

Or

Turn over

12. Consider two sources s_1 and s_2 emit messages x_1, x_2, x_3 and y_1, y_2, y_3 with joint probability P(X, Y) as shown in matrix form. Calculate H(X), H(Y), H(X/Y), H(Y/X) and H(X, Y). Hence verify the following relations :

(a) $H(X, Y) \leq H(X) + H(Y)$.

(b) $H(X) \geq H(X/Y)$ and

(c) $H(Y) \geq H(Y/X)$.

P(X, Y) ⇨

	y_1	y_2	y_3
x_1	3/40	1/40	1/40
x_2	1/20	3/20	1/20
x_3	1/8	1/8	3/8

(12 marks)

13. (a) Sketch the transition matrix of a binary erasure channel and derive the equation for channel capacity.

(6 marks)

(b) For the above channel, if the source has equally likely outputs, compute the probabilities associated with the channel outputs for $p = 0.2$.

(6 marks)

Or

14. (a) Describe the capacity of channel with infinite bandwidth. (6 marks)

(b) Sketch the transition probability diagrams of :

(i) Lossless channel.

(ii) Deterministic channel and

(iii) Noiseless channel.

(6 marks)

15. A discrete memoryless source X has five equally likely symbols.

(a) Construct Shannon-Fano code for X and calculate efficiency and redundancy of the code.

(b) Repeat using Huffman code and compare the results.

(12 marks)

Or

16. (a) For a source 's' with alphabets $\{s_0, s_1, s_2, s_3, s_4\}$ with corresponding probabilities 0.4, 0.2, 0.2, 0.1 and 0.1. Make a minimum variance Huffman Code. Find its variance.

(8 marks)

(b) State and prove Kraft's inequality. (4 marks)

17. (a) What are hamming codes ? Explain its structure and applications. (4 marks)

(b) With block diagram, explain the block diagram of decoding circuit used in cyclic code.

(8 marks)

Or

18. Consider a linear (7, 4) block code with generator matrix

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

(a) Construct encoder and syndrome computation circuit.

(b) Find parity check matrix.

(12 marks)

19. (a) Define free distance and coding gain in convolution codes. (4 marks)

(b) Given $gi^{(1)} = \{1\ 1\ 1\}$ and $gi^{(2)} = \{1\ 0\ 1\}$. Find convolution code for the input sequence (100111).

(8 marks)

Or

20. Explain Viterbi algorithm for decoding convolution codes. (12 marks)

[5 × 12 = 60 marks]