

G 6925

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Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

Branch—Electronics and Communication Engineering/Applied Electronics and Instrumentation

**MICROCONTROLLER BASED SYSTEM DESIGN (L)**

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.*

**Part A**

*Each question carries 4 marks.*

1. What are the salient features of the CMOS logic family ?
2. What are FPGA's ? Explain.
3. Highlight the features of 89C2051 microcontroller.
4. What is key bouncing ? How to guard against bouncing ?
5. Explain the principle of a dual slope ADC.
6. Show how a weighted resistor type of DAC is implemented. Highlight its disadvantage.
7. Write notes on RS232 standard.
8. Explain how the I<sup>2</sup>C protocol works.
9. What are watchdog timers ? Explain.
10. How would you measure very low frequencies and very high frequencies using a microcontroller ?

(10 × 4 = 40 marks)

**Part B**

*Each question carries 12 marks.*

11. With the help of diagrams, explain the principle of PLA and PAL.

*Or*

12. (i) Discuss the FPGA architecture.  
(ii) Draw an ECL gate and explain its operation.
13. With suitable Schematic show how an alphanumeric LCD display is interfaced to a microcontroller. Discuss how to drive the display in software.

*Or*

**Turn over**

14. Discuss the interrupt structure and interrupt handling in 89C51.

15. Show how an ADC can be interfaced to a microcontroller. Write code snippet to read the ADC.

Or

16. Explain any two types of DAC. Compare them.

17. (a) Discuss USB.

(b) Write notes on 24C04.

Or

18. Explain RC232 and RS485 protocol in detail.

19. Show how a 4 x 4 keyboard matrix is connected to a microcontroller. Write program to reliably read the keys.

Or

20. Discuss L293 motor driver. Show how it is interfaced and controlled.

(5 x 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

Branch : Electronics and Communication Engineer/Applied Electronics and Instrumentation

VLSI TECHNOLOGY (L A)

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.*

**Part A**

*Each question carries 4 marks.*

1. Compare Si and Ge as raw materials for IC fabricator.
2. Write a note on wire bonding.
3. Write a note on vias.
4. Write a note on monolithic resistors.
5. Write a note on lateb up in CMOS transistor?
6. Write a note on thick diagrams.
7. Write a note on data path operators.
8. Write a note on Bi CMOS logic.
9. Write a note on the features of GaAs technology.
10. What is the need for device modelling?

(10 × 4 = 40 marks)

**Part B**

*Each question carries 12 marks.*

11. (a) Explain the epitaxial growth process. What are its features?

*Or*

- (b) Explain ion implantation. What are its advantages?

12. (a) Explain Si gate technology. Compare it with metal gate technology.

*Or*

- (b) Explain the different techniques for the isolation of components in IC fabrication.

**Turn over**

13. (a) Explain the fabrication steps in a BiCMOS process.

Or

(b) List the design rules for Metal 1, Vias F Poly in a CMOS process.

14. (a) Design of layout a two input CMOS NOR gate.

Or

(b) Explain the different components of power dissipation in a CMOS circuit.

15. (a) Explain the working of a MESFET.

Or

(b) Explain the fabrication steps in GaAs technology.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

**Branch : Electronics and Communication Engineering**

**MICROWAVE AND RADAR ENGINEERING (L)**

**(Improvement/Supplementary)**

**Time : Three Hours**

**Maximum : 100 Marks**

*Answer all questions.*

**Part A**

*Each question carries 4 marks.*

1. Can we consider a waveguide as a filter ? Explain, Why ?
2. Mention the applications of magic Tees.
3. Define VSWR.
4. What is the role of a repeater in a Microwave Communication System ?
5. Compare the working of Vacuum tube and Semiconductor Microwave devices.
6. Draw the VI characteristics of a Tunnel diode.
7. Enumerate the applications of Radar.
8. Explain, what is meant by "echo" ?
9. Mention the applications of GPS.
10. Explain Doppler effect.

(10 × 4 = 40 marks)

**Part B**

*Each question carries 12 marks.*

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

*Or*

12. With neat and relevant diagrams, explain the working of a Faraday rotation isolator.
13. Explain the bunching process in a two Cavity Klystron with relevant diagrams.

*Or*

**Turn over**

14. Plot and explain the output power and frequency characteristics of a Reflex Klystron.
15. Explain the principle of operation of TRAPATT diodes.

Or

16. Explain the working of a Gunn diode as an oscillator and also as an amplifier at microwave frequencies.
17. Derive the Radar range equation, clearly explaining the assumptions, if any.

Or

18. Explain different types of displays used in Radar Systems.
19. Draw the diagram and explain the working of a typical aircraft landing system.

Or

20. Explain in detail, the construction and working of any *one* microwave antenna.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

Branch : Electronics and Communication Engineering

**OPTICAL FIBRE COMMUNICATION SYSTEMS—(L)**

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.*

*Each question carries 4 marks.*

**Part A**

1. Explain critical propagation angle.
2. What is normalized frequency ? Explain its significance.
3. What are the loss of signal attenuation mechanisms in a fiber ?
4. Write note about optic fiber couplers.
5. Draw the structure of LED and explain.
6. Define and explain :
  - (i) Responsivity.
  - (ii) Quantum efficiency of an Optical Detector.
7. What is DWDM ? Explain.
8. What are the advantages of optical amplifiers ?
9. What is the significance of cut off wavelength ?
10. Explain the principle of Cut back method for fiber attenuation ?

(10 × 4 = 40 marks)

**Part B**

*Each question carries 12 marks.*

11. (a) (i) State Snell's Law for refraction and outline its significance in fibre optic.  
(ii) Explain the propagation modes in single mode fibers.

Or

**Turn over**

12. (i) Compare the parameters of single mode fibre, multimode step index fiber and multimode graded index fiber.

(ii) Give an account of Plastic Fibers.

13. Define inter modal dispersion. Derive an expression for rms pulse width for a rectangular pulse propagating in a multimode step index Fiber.

Or

14. Briefly describe the main component parts of an Optical Fiber Cable.

15. Write the principle of operation of LASER. Discuss the different types of LASERS.

Or

16. Write notes on :

(i) APD Principle.

(ii) Lensing schemes for coupling improvement.

17. What is ASE ? Explain. Write notes about SOA.

Or

18. What are link power budget and rise time budget analysers ?

19. What is meant by OTDR ? Discuss with the aid of a diagram, how this method may be used in field measurements ? What are the merits of this technique ?

Or

20. Explain the measurement of refractive index profile with diagram.

(5 × 12 = 60 marks)



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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

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

**OBJECT ORIENTED PROGRAMMING IN C++ (L A S) (Elective-I)**

(Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 4 marks.*

1. What are the features of object-oriented programming? Explain.
2. What is an object? Explain the way of representing an object.
3. Differentiate between Derived class and Base class.
4. What is a destructor? Explain.
5. What is a virtual function? Explain.
6. What are Abstract classes? Explain.
7. Write the rules for overloading operators.
8. What is a Friend function? Explain its working with an example.
9. Explain dynamic memory allocation.
10. List and explain applications of Inline functions.

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

*Each question carries 12 marks.*

11. Explain in detail the evolution of object oriented languages.  
*Or*
12. Describe with necessary examples the process of language translation.
13. Explain with examples the different levels of Inheritance.  
*Or*
14. With examples, describe member function definitions.

**Turn over**

15. Explain simulation using abstract classes.

Or

16. What is polymorphism? Explain.

17. Explain with examples :

(a) Overloading unary operators.

(b) Overloading binary operators.

Or

18. How do you select member functions for operator loading? Explain.

19. Explain in detail about object oriented data bases.

Or

20. Describe the features of C++.

[5 × 12 = 60 marks]

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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

Branch : Electronics and Communication Engineering

**BIOMEDICAL ENGINEERING (L) (Elective-I)**

**(Improvement/Supplementary)**

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 4 marks.*

1. Draw the schematic of a Man-instrument system and explain each component briefly.
2. Briefly explain the respiratory system and the blood purification.
3. List the main types of blood tests and explain each briefly.
4. Explain with figure the measurement of pressure using sphygmomanometer.
5. What are the properties of ultrasound? Explain.
6. Describe briefly the application of ultrasound in Gynecology and Obstetrics.
7. Describe the generation of X-rays.
8. What is meant by fluoroscopy? What are its disadvantages?
9. What is the necessity of isolated power distribution systems? What are its advantages over the grounded systems?
10. Explain with block schematic the bedside monitors.

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

*Each question carries 12 marks.*

11. What are the resting and action potentials? Describe in detail with the action potential waveform, the generation and propagation of bioelectric potentials.

(12 marks)

*Or*

12. Explain with figure the different types of electrodes used for the measurement of ECG and EMG.

(12 marks)

**Turn over**

13. Explain with block diagram the continuous flow analyzer. What are its advantages over the discrete sample method?

(12 marks)

Or

14. What are spirometers? Explain different types of spirometers with necessary diagrams.

(12 marks)

15. (a) Explain the principle of ultrasonic imaging with its applications.

- (b) What are the display modes in ultrasonic imaging? Explain with diagram the different display modes.

(4 + 8 = 12 marks)

Or

16. Explain with diagram the echocardiography in detail.

(12 marks)

17. Draw the block diagram of an X-ray machine and explain.

(12 marks)

Or

18. Draw the block diagram of a computed Tomography scanner and explain each block in detail.

(12 marks)

19. Explain in detail with diagrams the micro-shock hazards and macroshock hazards.

(12 marks)

Or

20. (a) What is meant by hemodialysis? Explain in detail different types of dialysers.

- (b) Write a short note on artificial heart.

(8 + 4 = 12 marks)

[5 × 12 = 60 marks]

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**B.TECH. DEGREE EXAMINATION, APRIL 2011**

**Seventh Semester**

**Branch—Electronics and Communication Engineering**

**INFORMATION THEORY AND CODING (L)**

**(Improvement/Supplementary)**

**Time : Three Hours**

**Maximum : 100 Marks**

*Answer all questions.*

**Part A**

*Each question carries 4 marks.*

1. If there are  $M$  equally likely and independent symbols, then prove that the amount of information carried by each symbol will be :  
$$I(x_i) = N \text{ bits}$$
where  $M = 2^N$  and  $N$  is an integer.
2. Define channel capacity. Represent the channel capacity of a Binary symmetric channel.
3. State Shannon's theorems. Mention its significance in coding and transmission of source symbols.
4. Give the relation between channel capacity  $C$ , bandwidth  $W$  and signal to noise ratio  $S/N$  of a AWGN channel. Explain the trade off between it.
5. What is source coding ? Define code length and code efficiency. Give the relation between it.
6. Describe entropy coding. Give the condition for entropy coding. Name different methods of entropy coding.
7. Explain the error detection and correction capabilities of hamming codes.
8. What are cyclic codes ? Why they are called subclass of block codes ?
9. What is constraint length of convolution encoders ?
10. Explain FEC and ARQ systems of error control.

(10 × 4 = 40 marks)

**Part B**

*Each question carries 12 marks.*

11. State and prove properties of mutual information.

(12 marks)

Or

**Turn over**

12. (a) For a BSC channel given  $\alpha = 0.5$  and  $p = 0.1$ . Calculate  $I(X, Y)$ . Repeat the problem for  $p(x_1) = \infty = 0.5$  and  $p = 0.5$ . Analyse the results.

(6 marks)

- (b) An analog signal band limited to 10 kHz is quantized in 8 levels of a PCM system with probabilities of  $1/4, 1/5, 1/5, 1/10, 1/10, 1/20, 1/20$  and  $1/20$  respectively. Find the entropy and rate of information.

(6 marks)

13. (a) Explain a Discrete memoryless channel with its channel matrix. (4 marks)

- (b) A channel has the following channel matrix :—

$$[p(y/x)] = \begin{bmatrix} 1-p & p & 0 \\ 0 & p & 1-p \end{bmatrix}$$

- (i) Draw the channel diagram.  
 (ii) If the source has equally likely outputs, compute the probabilities associated with the channel outputs for  $p = 0.2$ .

(8 marks)

Or

14. (a) Explain the capacity of a channel with infinite bandwidth. Derive the relation. (8 marks)

- (b) Calculate the capacity of AWGN channel with bandwidth of 1 MHz and a S/N of 40 dB.

(4 marks)

15. (a) Distinguish between uniquely decodable codes and instantaneous codes. (4 marks)

- (b) Consider a DMS with symbols  $x_i$  for  $i = 1, 2, 3, 4$ . Table below lists four possible binary codes. In it check for Kraft inequality for all codes. Also show that code A and D are uniquely decodable and B and C are not.

| $x_i$ |     | Code A | Code B | Code C | Code D |
|-------|-----|--------|--------|--------|--------|
| $x_1$ | ... | 00     | 0      | 0      | 0      |
| $x_2$ | ... | 01     | 10     | 11     | 100    |
| $x_3$ | ... | 10     | 11     | 100    | 110    |
| $x_4$ | ... | 11     | 110    | 110    | 111    |

(8 marks)

Or

16. (a) Give Shannon-Fano coding Algorithm. (4 marks)

- (b) Given  $x_i = (x_1, x_2, x_3, x_4, x_5, x_6)$  are symbols emitted by a DMS with probabilities

$$p(x_i) = (0.3, 0.25, 0.20, 0.12, 0.08, 0.05)$$

respectively. Make Shannon-Fano code. Also find  $H(x)$  L and efficiency.

(8 marks)

17. (a) Explain the encoding method of a (7, 4) linear block code. (6 marks)

- (b) Define generator and parity check matrices of a (7, 4) linear block code. Explain how to generate a linear block code using G-matrix. Explain with an example.

(6 marks)

Or

18. (a) Explain generator and parity check matrices of a cyclic code. (4 marks)

- (b) With block diagram, explain the working of  $(n, k)$  cyclic code. Describe the syndrome calculator and its working.

(8 marks)

19. (a) Draw and explain the working of a convolution encoder with constraint length 2 and rate  $2/3$ .

(6 marks)

- (b) Draw code tree, trellis and state diagram of the above encoder. (6 marks)

Or

20. (a) Explain the maximum likelihood decoding and viterbidecoding algorithms of a convolution encoder. (8 marks)

- (b) Describe about block and convolution interleaving methods. (4 marks)

[5 × 12 = 60 marks]