F 9139 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. What is the basic principle of ray theory ?
2. What is meant by total "internal reflection" ?
3. Compare the characteristics of step index and GI fibre cables.
4. Enumerate the types of Fibre coupling methods.
5. Compare the characteristics of PIN diode and APD.
6. What are the modulation techniques used in FOC ?
7. What is a Point-to-point link ?
8. Discuss the required characteristics of optical amplifiers.
9. Discuss the features of OTDR.
10. Write a note on the future developments in the field of FOC systems.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain with diagrams the principle of wave propagation through an optical fibre.

Or

12. Discuss on the effect of index profile on light wave propagation through fibre.
13. Discuss on the modes of propagation in SI and GI Fibres.

Or

14. Describe the different types of fibre joints. Compare their characteristics.

Turn over

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

Or

16. Explain with diagrams the modulation circuits used for LED.

17. Explain the steps involved in the design of a fibre optical link.

Or

18. Discuss on the principle and types of optical receivers.

19. Explain with diagrams with measurements of :

    (a) Fibre attenuation ; and

    (b) Cut-off wavelength.

Or

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

(5 × 12 = 60 marks)

F 9175 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Seventh Semester

Branch—Electronics and Communication/Applied Electronics and Instrumentation/Electronics and Instrumentation

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

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is an Object ?
2. What are the main features of OOP ?
3. What is Encapsulation ?
4. What are Destructors ? Give example.
5. What is an Abstract class ?
6. What is a Virtual function ?
7. Describe overloading functions.
8. Explain, what is a member function.
9. What are different types of function declarations ?
10. Discuss the applications of friend functions.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the concept of Object oriented programming languages.

Or

12. Discuss the evolution of OOP.
13. Define the concept of virtual functions and its uses.

Or

14. Explain using examples the concept of Polymorphism.

Turn over

15. Discuss in detail about the building classes.

Or

16. Explain the concept of constructors and destructors using examples.

17. Explain in detail about operator overloading.

Or

18. How the operator overloading helps in object oriented programming ?

19. What are the main features of C++ ?

Or

20. Define : Inline functions, friend functions and their applications.

(5 × 12 = 60 marks)

F 9176 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. Discuss the applications of artificial neural networks.
2. Define Bias and threshold.
3. What are the characteristics of back propagation algorithm ?
4. What is meant by temporal instability ?
5. Compare back propagation and counter propagation algorithms.
6. Discuss the statistical properties of Cohonen layer.
7. State the application algorithm used in Boltzmann machine.
8. What are the applications of Cauchy network ?
9. What is a Recurrent network ? Give examples.
10. Discuss the characteristics of Bidirectional associative memories.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the training algorithm used for multilayer Perceptron.

Or

12. Explain with an example how Perceptron could be used for linear-inseparable situations.
13. Draw and explain the architecture of a back propagation network.

Or

14. Explain the parameter optimization techniques used for BPN.

Turn over

15. Explain with Architectural diagram the training of Kohonen layer.

Or

16. Explain with Architectural diagram the training process of Grossberg layer.

17. State and explain the application algorithm used in Cauchy's machine.

Or

18. Explain how statistical nets are used for non-linear optimization problems.

19. Draw and explain the architecture of a Bidirectional associative memory.

Or

20. Discuss on the different types of ART nets.

(5 × 12 = 60 marks)

F 9112 (Pages : 2) Reg. No..... ECE

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Seventh Semester

Branch : 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. Draw the block schematic of PAL and explain.
2. What are CLB (Configurable Logic Blocks) ?
3. Draw the internal RAM (128 Byte) memory map of 89C2051 microcontroller.
4. Name the interrupt sources of 89C2051 microcontroller and specify their vector address.
5. Draw the schematic of R-2R ladder type DAC (4 bits) and list the advantages of this over that of weighted resistor type.
6. Explain briefly about the function of the successive approximation type ADC.
7. State the voltage levels used to representing logic-0 and logic-1 in RS 232C serial standard. What is the use of MAX = 32 IC.
8. Draw the bit format for I^2C bus.
9. What for watchdog timers are used ?
10. How the frequency of a signal can be measured using the timer of 89C51.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Draw the schematic of TTL NAND gate and explain its operation.

Or

12. With the help of simplified diagram, explain the internal architecture of 16L8.
13. Explain with the help of interface circuit how a relay (12 V, 500 mt) can be operated using 89C51 micro-controller, also write the assembly language program.

Or

Turn over

14. Explain the design steps of a 89C51 based traffic light controller.

15. With the help of circuit diagram, explain how a SA type ADC can be interfaced to 89C51 micro-controller, also write the assembly language program to measure analog voltage using the interface circuit.

Or

16. Design a temperature controller using 89C51 and explain how the temperature can be controlled.

17. Write notes on :

    (i) PC printer port.

    (ii) USB bus standard.

Or

18. Explain how data can be received and transmitted serially using 89C51 micro-controller.

19. Draw the 4 × 4 matrix keyboard interface to a micro-controller and explain how to micro-controller can identify a key closure and generate its code.

Or

20. Explain how the speed of a DC motor can be controlled using micro-controller.

(5 × 12 = 60 marks)

F 9121 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. How a *p*-type crystal is prepared using epitaxial growth ?
2. What is meant by dry oxidation ?
3. Mention the need for isolation.
4. List the advantages of using polysilicon as gate material in MOS transistors.
5. What are latch up ? What is its effect on the chip ?
6. State the principle of scaling.
7. Draw the diagram of CMOS NAND gate.
8. What are the causes for static and dynamic power dissipation in CMOS circuits.
9. Compare the basic structure of GaAs MESFET with silicon MOSFET.
10. List the I and II generation GaAs devices.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain the physical mechanism of diffusion of impurities. Also state and explain Flick's I and II law of diffusion.

Or

(b) Discuss about :

(i) Chemical vapour deposition.

(ii) Metallisation.

12. (a) With the help of diagram, explain the fabrication steps for a silicon gate nMOS transistor.

Or

(b) List the various steps involved in the monolitic circuit fabrication and explain with the help of diagrams.

Turn over

13. (a) Explain the *p*-well process with the help of diagrams.

Or

(b) Discuss about BiCMOS technology.

14. (a) Draw the CMOS NAND gate circuit and its symolic layout and explain.

Or

(b) Write notes on :

(i) Bus lines and bus line arrangement.

(ii) Power supply rail distribution.

15. (a) Draw the structure of metal gate depletion mode MESFET and explain.

Or

(b) Explain the self-aligned gate E/D process in detail.

(5 × 12 = 60 marks)

F 9129 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Seventh Semester

Branch : Electronics and Communication Engineering

MICROWAVE AND RADAR ENGINEERING (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Explain the propagation of microwaves in space making use of E and H diagrams.
2. Explain the working of passive microwave devices.
3. Discuss a traveling wave tube.
4. Explain the basic principles of design of microwave links.
5. Explain characteristics of Tunnel diode and their by show its use in microwave applications.
6. Discuss transit time effect in the design of typical devices.
7. Derive the Radar range equation.
8. Explain the applications of CW Radar.
9. Explain the various applications of different types of direction finders.
10. Discuss Doppler navigation.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. What is Scattering matrix ? Formulate the S matrix for a two port junction.

Or

12. What is a directional coupler ? Discuss the effects of their terminations.
13. Explain the constructional operation of multi cavity Klystron and reflex Klystron.

Or

14. Discuss Microwave relay systems with necessary diagrams.

Turn over

15. Explain the principle of operation of the GUNN Diode. Explain one application for the same.

Or

16. Discuss the use of Semiconductor devices in microwave applications.

17. Explain how a Radar can be used for spotting and following an enemy aircraft in a military applications.

Or

18. Explain the operation and bring out the advantages of the FM CW Altimeter.

19. Discuss how artificial satellites can be used for navigation applications.

Or

20. Explain the system of global positioning. GPS as its is implemented today.

(5 × 12 = 60 marks)

F 9150 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Seventh Semester

Branch : Electronics and Communication Engineering

INFORMATION THEORY AND CODING (L)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What is mutual information ? List its properties.
2. What is channel capacity ? Describe how the efficiency and redundancy of channels are related.
3. State and explain Shannon Hartley theorem.
4. For a continuous channel with bandwidth B Hz and which is disturbed by white Gaussian noise, show that channel capacity :

$$C = B\log_2\left(1+\frac{P}{N_0B}\right) \text{ bits/sec.}$$

5. State and prove Kraft's inequality.
6. State and explain noiseless coding theorem.
7. What are Hamming codes ? Give its structure. How many errors it can correct ?
8. Define generator and parity check matrices. Give structures of G and H matrices used in encoding and decoding of cyclic codes.
9. Explain the terms interpolation and muting.
10. Describe the working of sliding window ARQ and compare its performance with stop and wait ARQ.

(10 × 4 = 40 marks)

Part B

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

11. Derive the equations of conditional entropies H (X/Y) and H (Y/X). Hence show that

H (X, Y) = H (X) + H (Y/X) OR H (Y) + H (X/Y).

(12 marks)

Or

Turn over

12. (a) For a noise free channel. Prove that I (X, Y) = H (X) + H (Y). (4 marks)

(b) Consider a telegraph source having two symbols dot and dash. Duration of dot is 0.2 sec. and that of dash is 3 times the dot duration. Probability of dot occurring is twice that of dash, and the time between the symbols is 0.2 sec. Calculate the information rate of the telegraph source. (8 marks)

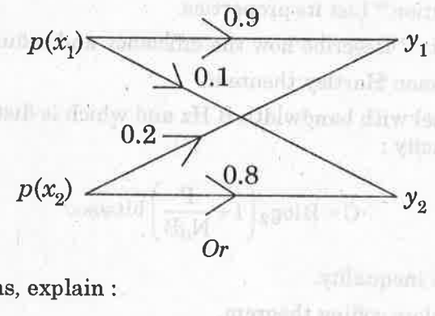
13. (a) Sketch the transition matrix of binary symmetric channel and derive the equation of I (X, Y) and find its channel capacity. (6 marks)

(b) Consider a binary channel shown below :

(i) Find channel matrix of channel.

(ii) Find $p(y_1)$ and $p(y_2)$ when $p(x_1) = p(x_2) = 0.5$.

(iii) Find the joint probability $p(x_1, x_2)$ and $p(x_2, y_1)$ when $p(x_1) = p(x_2) = 0.5$.



(6 marks)

Or

14. With transition diagrams, explain :

(i) Cascaded channels.

(ii) Binary unsymmetric channels. (12 marks)

15. (a) What are instantaneous codes ? Explain its features and advantages. (6 marks)

(b) Given a set of events $X = \{x_1, x_2, x_3, x_4\}$ with corresponding probabilities of occurrence $p(x_i) = \left\{\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}\right\}$. Make Shannon-Fano code and find efficiency of code. (6 marks)

Or

16. (a) What is ZIP coding ? Explain. (4 marks)

(b) Given $x_i = \{x_1, x_2, x_3, x_4, x_5, x_6\}$ with probabilities $p(x_i) = \{0.3, 0.25, 0.2, 0.12, 0.08, 0.05\}$. Make Huffman code. Find efficiency of this code. (8 marks)

17. (a) Explain the syndrome decoding in (n, k) linear block code. (6 marks)

(b) Draw the encoder diagram, decoding circuit of a (7, 4) linear block code generated by a

generator matrix $G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 1 \end{bmatrix}$. (6 marks)

Or

18. (a) Briefly explain about RS codes. (4 marks)

(b) What is standard array ? Describe decoding using standard array in :

(i) Linear block codes. (4 marks)

(ii) Cyclic codes. (4 marks)

19. Draw the block diagram of constraint length 3, rate ½ convolution encoder for

$$g(D) = \left\{1 + D + D^2, 1 + D^2\right\}.$$

Find the convolution code for the given input sequence $u(D) = 1 + D^2 + D^3 + D^4 + D^5$. (12 marks)

Or

20. Sketch and explain code tree and code trellis for rate ½, constraint length 3, convolution encoder with $g(D) = \left\{1 + D, 1 + D + D^2, 1 + D^2\right\}$. (12 marks)

[5 × 12 = 60 marks]

F 9177 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Seventh Semester

Branch : Electronics and Communication Engineering

BIOMEDICAL ENGINEERING (Elective I) [L]

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List the parameters to be considered in the design of medical instrumentation systems.
2. Explain the functions performed by the kidney.
3. Explain any one direct method of pressure measurement.
4. Explain how blood PO_2 measurement is done.
5. Briefly explain echocardiography.
6. Explain how blood flow is measured using ultrasound.
7. What is fluoroscopy ? Explain.
8. Briefly explain the Gantry geometry.
9. Explain the principle of dialysis in the artificial kidney.
10. Describe macro shock hazards.

(10 × 4 = 40 marks)

Part B

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

11. (a) Describe the cardiovascular system with diagram. (8 marks)
    (b) What is EMG ? Explain. (4 marks)

Or

12. What are the classifications of bio-potential electrodes ? Explain in detail with diagram and uses. (12 marks)

13. Explain with diagrams the 12 lead system of ECG measurement. (12 marks)

Or

14. (a) Draw the schematic of a colorimeter and explain with its uses. (6 marks)
    (b) Explain the different types of recorders used for ECG measurement. (6 marks)

Turn over

15. Explain with the block diagram the linear array scanner with applications.

Or

16. Explain the principle of A scan and applications of A scan with necessary schematics.

(12 marks)

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

Or

18. Explain with block schematic the CAT scanner with it uses.

(12 marks)

19. Explain with the block schematics the elements of biotelemetry system, the biotelemetry transmitter and receiver units.

Or

20. Explain with diagram the system arrangement of an Intensive Care Unit.

(12 marks)

[5 × 12 = 60 marks]