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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

SOLID-STATE ELECTRONICS (R, T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions briefly.

Each question carries 4 marks.

1. Define thermal runaway. Suggest *two* distinct methods to eliminate the same.
2. Sketch the frequency response curve of a RC coupled amplifier and explain.
3. Draw the characteristics of E-MOSFET and explain.
4. What are the merits and demerits of JFET compared to BJT?
5. An Hartley oscillator has $R_1 = 18 \text{ k}\Omega$, $R_2 = 100 \text{ k}\Omega$, $R_c = 5.1 \text{ k}\Omega$, $R_E = 910 \Omega$, $C_{c1} = C_{c2} = 0.1 \mu\text{F}$, $C = 100 \text{ pF}$, $L_1 = 1 \text{ mH}$, $L_2 = 2 \text{ mH}$, $V_{CC} = 10 \text{ volt}$. Calculate the oscillation frequency.
6. Distinguish between positive and negative feedback in amplifiers. What are the conditions for sustained oscillations?
7. Draw the circuit of an RC differentiator and explain how it differentiates the input signal.
8. Draw the circuit of an astable multivibrator using BJT.
9. Explain the working principle of LED.
10. With the help of constructional diagram, explain the working of a DIAC.

(10 × 4 = 40 marks)

Part B

Answer either section (a) or (b) from each module.

Each full question carries 12 marks.

Module 1

11. (a) Draw the complete circuit diagram of a potential divider bias BJT amplifier. Explain how it can amplify the weak input voltage as well as current signal.

(12 marks)

Or

- (b) (i) Derive the expression for the current stability factor of a potential divider bias circuit.

(6 marks)

- (ii) Draw the complete circuit diagram of a Darlington pair amplifier and explain its properties.

(6 marks)

Turn over

Module 2

12. (a) Draw the constructional diagram of a JFET. Show the shape of the depletion region at pinch-off and explain its drain characteristics.

Or

- (b) Draw the drain characteristics and transconductance characteristics of a Depletion mode MOSFET and explain the shapes of their characteristics.

(12 marks)

Module 3

13. (a) With the help of neat complete circuit diagram, explain how Barkhausen criteria are satisfied in a Colpitts oscillator circuit. Give the conditions for oscillation of this circuit.

Or

- (b) Draw the complete circuit of a RC phase shift oscillator and explain the working. Write the expression for the oscillation frequency.

(12 marks)

Module 4

14. (a) (i) Draw and design a clipping circuit to limit the output voltage exactly from -3 to -8 volt using silicon diodes. Explain the working of the circuit.

(8 marks)

- (ii) Draw and explain the block diagram of a Bootstrap sweep generator. List the properties of the amplifier in it.

(4 marks)

Or

- (b) With the help of a neat circuit diagram, explain the working of a base triggered, self biased monostable multivibrator using BJT. Also sketch the input-output waveforms.

(12 marks)

Module 5

15. (a) (i) With the help of necessary diagrams, explain the working of two distinct types of LCDs.

(8 marks)

- (ii) Explain the principle and necessity of an optocoupler.

(4 marks)

Or

- (b) With a neat constructional diagram and VI characteristics, explain the working of SCR. Discuss its applications.

(12 marks)

[5 × 12 = 60 marks]

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B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science and Engineering

LOGIC SYSTEM DESIGN (R)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Perform the 1's complement subtraction of the following binary numbers :—
(i) $1100 - 1111$; (ii) $0110 - 0010$.
2. Convert the following decimal numbers into equivalent binary :
(i) 625.05 ; (ii) 0.003901 .
3. Convert the following into canonical forms :
(i) $\bar{A}BC + ABC\bar{D} + \bar{B}\bar{D}$.
(ii) $(\bar{A} + \bar{B})(\bar{A} + C)(B + C)$.
4. Simplify $y(w\bar{z} + wz) + xy + \bar{x}yz$ using Boolean Algebra.
5. Draw and explain the excitation table of JK flip-flop.
6. Compare and contrast between synchronous and asynchronous counters.
7. Using Full adder blocks, represent the following four bit addition :
 $1101 + 1110$.
8. What is the principle of operation of a carry look-ahead adder ? State its merits.
9. State and clearly explain any one application of shift register.
10. Draw the circuit diagram, output sequence and timing diagram of a 4 bit Johnson counter.
(10 × 4 = 40 marks)

Part B

*Answer either Section (a) or (b) from each module.
Each full question carries 12 marks.*

Module 1

11. (a) (i) Distinguish between Weighted and Unweighted codes. Give one example each and justify your answer.

(4 marks)

Turn over

- (ii) Convert 23.625_{10} to Octal and hexadecimal numbers. (4 marks)
 (iii) Explain Excess-3 codes and its applications. (4 marks)

Or

- (b) (i) Perform the following multiplication in binary :—
 (1) 110.11×10.1 ; (2) 111001.01×101 ; (3) 1010101.11×11.01 .
 (3 × 2 = 6 marks)
 (ii) Explain any *one* alphanumeric code and its applications. (6 marks)

Module 2

12. (a) Minimize using K map method and implement the logic circuits using minimal number of Universal logic gates :

(i) $f_1 = \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{C}D + ABC\overline{D} + ABC$. (6 marks)

(ii) $f_2 = \Sigma (3, 4, 5, 6, 7, 8, 10, 13, 15)$. (6 marks)

Or

- (b) Simplify using Quine-McClusky method $f = \Sigma (0, 2, 4, 6, 9, 13, 21, 23, 25, 29, 31)$. Find the essential prime implicants and draw the minimal logic circuit diagram using fundamental logic gates.

(12 marks)

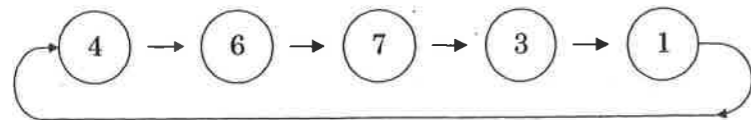
Module 3

13. (a) Design a Mod-16 up counter using positive edge triggered JK flip-flops with minimal combinational logic circuits. Explain the circuit diagram with the help of its timing diagram.

(12 marks)

Or

- (b) Design a synchronous counter having the following sequence :—



Show the circuit and timing diagram.

(12 marks)

Module 4

14. (a) With a neat circuit diagram, explain the working of a carry propagation adder. Mention its merits and disadvantages.

(12 marks)

Or

- (b) Design the circuit diagram of a full adder using NAND gates only. (12 marks)

Module 5

15. (a) Draw the circuit diagram of a 4 bit shift-left and shift-right register with mode control and explain its working? What are its applications?

(12 marks)

Or

- (b) With a neat circuit diagram, explain the working of a 4 bit universal shift register.

(12 marks)

[5 × 12 = 60 marks]

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B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

ENGINEERING MATHEMATICS—II (R, T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer one full question from each module.
Each full question carries 20 marks.

Module 1

1. (a) (i) Write in symbolic form :
- (1) Some boys are not white.
 - (2) All the world loves a lover.
- (ii) Determine the validity of the following argument :—

$$p \rightarrow \neg q, r \rightarrow q, rr \neg p.$$

Or

- (b) (i) State and explain the duality law, describing tautological implications.
- (ii) Show that $(\exists x)(F(x) \wedge S(x)) \rightarrow (y)(M(y) \rightarrow W(y))$ if $(x)(F(x) \rightarrow \neg S(x))$ follows.

Module 2

2. (a) Consider the binary operations $*$: $R \times R \rightarrow R$ and o : $R \times R \rightarrow R$ defined as $a * b = |a - b|$ and $aob = a, \forall a, b \in R$. Show that $*$ is commutative but not associative, o is associative but not commutative. Also show that $\forall a, b, c \in R, a * (boc) = (a * b) o (a * b)$. Does o distribute over $*$? Justify your answer.

Or

- (b) (i) Give examples of two functions $f : N \rightarrow Z$ and $g : Z \rightarrow Z$ such that gof is injective but g is not injective.
- (ii) Let $f : [-1, \infty) \rightarrow [-1, \infty)$ is given by $f(x) = (x + 1)^2 - 1, x \geq -1$. Show that f is invertible. Also find the set $S = \{x : f(x) = f^{-1}(x)\}$.

Module 3

3. (a) (i) If p and q are elements in a bounded distributive lattice (L, \leq, \wedge, \vee) and if p^T is the complement of p , then show that $p \vee (p^T \wedge q) = p \vee q$ and $p \wedge (p^T \vee q) = p \wedge q$.

Turn over

(ii) Define a lattice and sublattice. Draw the Hasse diagram for D_{20} , the lattice of all positive divisors of 20.

Or

- (b) (i) In a lattice $\langle L, \leq \rangle$ with $a, b, c \in L$, prove that $b \leq c \Rightarrow a * b \leq a * c$.
- (ii) Define chain and subchains and show that every chain is a distribution lattice.

Module 4

4. (a) (i) Find a particular solution of $a_r - 2a_{r-1} = 5r$.

(ii) Obtain the sequence corresponding to the generating function $f(x) = \frac{x}{(1-x)^3}$.

Or

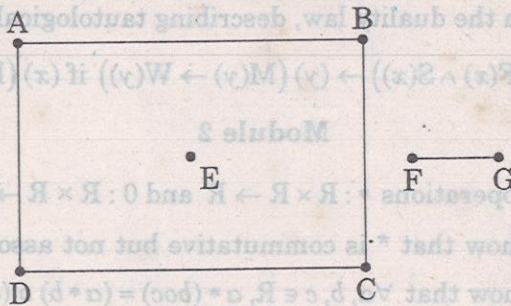
(b) (i) Find the generating function for the sequence 0, 1, 4, 9, 16, 25,

(ii) Solve the recurrence relation $a_r - 6a_{r-1} + 8a_{r-2} = 0$, where $a_0 = 0, a_1 = 2$.

Module 5

5. (a) (i) Show that a tree with n vertices has exactly $n - 1$ edges.

(ii) What is meant by connected components of a graph? Find all connected components of the graph shown below :



Or

(b) (i) Prove the Euler's theorem $V - E + R = 2$.

(ii) Prove that the sum of the degrees of the vertices of a graph G equals twice the number of edges.

(5 × 20 = 100 marks)

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B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

PROBLEM SOLVING AND COMPUTER PROGRAMMING (R, T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Write neat and efficient C programs wherever necessary.

Part A

Answer all questions briefly.

Each question carries 4 marks.

1. Define and distinguish between algorithm and flowchart.
2. Write and explain the various steps involved in computer programming.
3. What is an expression ? What are the different operators in C ?
4. Explain getche () and scanf (). What are the advantages of getche () over scanf () ? Explain.
5. Write the syntax of "switch" and "if" statements. In what ways does a "switch" statement differ from an "if" statement ?
6. What are the major components of a function definition ? Explain with an example.
7. What is the relationship between an array name and a pointer ? Illustrate how is an array name interpreted when it appears as an argument to a function.
8. With an appropriate example, show how unions, structures and arrays can be intermixed.
9. What are the three steps in accessing a file ? Explain.
10. Clearly explain the advantages of using pointers.

(10 × 4 = 40 marks)

Part B

Answer either section (a) or (b) from each module.

Each full question carries 12 marks.

Module 1

11. (a) Write the algorithm and draw a neat flowchart to test whether a given number is a palindrome or not.

(12 marks)

Or

Turn over

(b) (i) Describe the features of a good program ? How the efficiency of a program is expressed and improved. (6 marks)

(ii) Explain the top-down and bottom-up approaches giving suitable examples. (6 marks)

Module 2

12. (a) Given three sides of a triangle. Calculate and print the perimeter and area using formatted I/O statements.

Or

(b) Explain the associativity and hierarchy of all the types of operators in C language. (12 marks)

Module 3

13. (a) A company pays salary to an employee at the normal hourly rate of Rs. 50/ per hour, for the hours worked below 40 per week. For the overtime, i.e., for hours which exceed 40 per week, the pay will be at 1.5 times the normal rate. Write a C program to implement this to calculate the salary.

Or

(b) Write a C program to sum the series $1 + (1 + 2) + (1 + 2 + 3) + \dots + (1 + 2 + \dots N)$ for a given integer N. (12 marks)

Module 4

14. (a) Write a C program to delete all the vowels from a sentence. Assume that the sequence is not more than a 90 character string.

Or

(b) Four tests are given to a class of 60 students. Write a C program that calculates the average in each test and the class average of all tests. (12 marks)

Module 5

15. (a) Write a C program, using pointers to find the largest word in a given sentence.

Or

(b) Write an interactive file-oriented program that will maintain a list of names, addresses and telephone numbers in alphabetical order with a menu that will allow the user to select any of the following features :—

(i) add a new record.

(ii) delete a record.

(iii) exit.

(12 marks)

[5 × 12 = 60 marks]

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B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science and Engineering

MICROPROCESSOR SYSTEMS (R)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions briefly.

Each question carries 4 marks.

1. Explain the following signals in 8085 :—

(i) ALE ; (ii) READY ; (iii) HOLD ; (iv) $\text{IO}/\overline{\text{M}}$.

2. Why the higher significant bits of the address lines, are not multiplexed with the data lines ?

3. Discuss the merits and demerits of register indirect addressing, with suitable examples.

4. What is a stack ? Where it is located ? What are its specialities ?

5. How Stack will be affected by the following instructions ?

(i) PUSH ; (ii) POP.

6. Define T-state machine cycle and instruction cycle.

7. Explain the purpose and functions of RST instructions.

8. Distinguish between the operation of Hardware and Software interrupts.

9. Distinguish between I/O mapped I/O and Memory mapped I/O, showing the merits.

10. What is DMA ? When it is used ?

(10 × 4 = 40 marks)

Part B

Answer either Section (a) or (b) from each module.

Each full question carries 12 marks.

Module 1

11. (a) Describe all the registers in 8085, indicating their size, and functions clearly.

Or

(b) Explain from fundamentals, how an instruction is accepted and executed in 8085. Give one example.

Turn over

Module 2

12. (a) (i) With a timing diagram, explain the operations taking place when the instruction JC is executed. (6 marks)
- (ii) List and explain the various stack operations. (6 marks)
- Or
- (b) Distinguish between Direct addressing, immediate addressing and Implicit addressing modes, giving suitable examples. Discuss their merits and demerits. (12 marks)

Module 3

13. (a) With a neat timing waveform diagram, explain the opcode fetch operation from the memory, sketching $\overline{IO/\overline{M}}$, S_0 , S_1 , A_0 to A_{15} , ALE and \overline{RD} signals, with respect to the clock signals. (12 marks)
- Or
- (b) Explain the different data transfer group instructions used in 8085 microprocessor, with appropriate examples. (12 marks)

Module 4

14. (a) Write 8085 Assembly language program to multiply two 8 bit numbers. (product is 16 bits). (12 marks)
- Or
- (b) Draw a block schematic showing how the programmable interrupt controller 8259 can be used with 8085 and various other peripherals and describe how it works ? (12 marks)

Module 5

15. (a) Explain the various pins of the DMA controller 8257. Show how it is connected to a 8085 microprocessor with a circuit block diagram. Describe how DMA data transfer is taking place. (12 marks)
- Or
- (b) With neat diagrams, show an example of an I/O system which can be interfaced to the 8085 microprocessor using interrupt driven data transfer. What are the merits and disadvantages of this method ? (12 marks)

[5 × 12 = 60 marks]

(f) Explain from fundamentals, how an instruction is accepted and executed in 8085. Give one example.

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B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

HUMANITIES (R, T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer Part A and Part B in separate answer-books.

Part A and Part B each carries 50 marks.

All full questions carry equal marks.

Part A (Principles of Management)

Answer either (a) or (b) section of each full question.

Module 1

1. (a) (i) Explain the contributions of the pioneers to the field of management science, briefly.
(ii) Distinguish between authority and responsibility in scientific management. Show their variation among the different levels of staff.

Or

- (b) (i) Explain the different types of incentives and wages.
(ii) State and describe the different types of business firms.

Module 2

2. (a) (i) State and explain the benefits of ISO-9000 certification.
(ii) How can run charts be used to improve quality of a process ?

Or

- (b) (i) Explain quality circle and benefits of quality circle.
(ii) What are the objectives of quality circle ? How it can be implemented in an organization ?

Part B (Engineering Economics)

Answer either (a) or (b) section of each full question.

Module 3

3. (a) (i) Describe the role and importance of profitability and liquidity principles in commercial banking.
(ii) Explain the role and functions of IRBI.

Or

Turn over

- (b) (i) What are the functions of national stock exchange ?
 (ii) What are the objectives of credit control ? Describe the different techniques used by Reserve Bank of India to control credit.

Module 4

4. (a) (i) State the inadequacies of the programme of industrialization in India. Suggest your remedies.
 (ii) Explain the state of organised and unorganised labour in industrial sector.

- (b) (i) What is industrial sickness ? What is the Government's policy towards it ? Explain.
 (ii) Explain the role and significance of trade unions in Indian industries.

Module 5

5. (a) (i) Explain impact and incidence. What are the factors determining the incidence ?
 (ii) Distinguish between Direct and Indirect tax with examples.

Or

- (b) (i) Explain progressive, prototionate and regressive taxes.
 (ii) What are the reasons for black money ? Suggest methods to control black money in Indian economy.

Module 3

3. (a) (i) Describe the role and importance of profitability and liquidity principles in commercial banking.
 (ii) Explain the role and functions of IRBI.

Or