G 1963 (Pages : 2) Reg. No.....

Name.....

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 :—

$p \to \neg q,\ r \to q,\ rt \neg p.$

Or

(b) (i) State and explain the duality law, describing tautological implications.

(ii) Show that $(\exists x)\left(F(x) \wedge S(x)\right) \to (y)\left(M(y) \to W(y)\right)$ if $(x)\left(F(x) \to \neg S(x)\right)$ follows.

Module 2

2. (a) Consider the binary operations $* : R \times R \to R$ and $0 : R \times R \to R$ defined as $a * b = |a - b|$ and $aob = a, \forall a, b \in R$. Show that * is commutative but not associative, 0 is associative but not commutative. Also show that $\forall a, b, c \in R, a * (boc) = (a * b)\ o\ (a * b)$. Does 0 distribute over * ? Justify your answer.

Or

(b) (i) Give examples of two functions $f : N \to Z$ and $g : Z \to Z$ such that *gof* is injective but *g* is not injective.

(ii) Let $f : [-1, \infty) \to [-1, \infty)$ is given by $f(x) = (x + 1)^2 - 1, x \geq -1$. Show that *f* is invertible. Also find the set $S = \left\{x : f(x) = f^{-1}(x)\right\}$.

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 $p \vee \left(p^T \wedge q\right) = p \vee q$ and $p \wedge \left(p^T \vee q\right) = p \wedge q$.

Turn over

(ii) Define a lattice and sublattice. Draw the Hesse 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

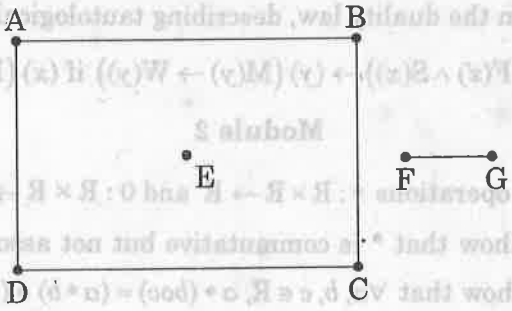
(b) (i) Find the generating function for the sequence 0, 1, 4, 9, 16, 25, ...

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

Moudule 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)

G 1976 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

SOLID-STATE ELECTRONICS (R, T)

(Prior to 2007 admisisons—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 characteritsics 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 kΩ, R_2 = 100 kΩ, R_c = 5.1 kΩ, R_E = 910 Ω, $C_{c_1} = C_{c_2}$ = 0.1μF, C = 100 pF, L_1 = 1 mH, L_2 = 2 mH, V_{CC} = 10 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 experssion 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]

G 1984 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

PROBLEM SOLVING AND COMPUTER PROGRAMMING (R, T)

(Prior to 2007 admisisons—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 $1 + (1 + 2) + (1 + 2 + 3) + \ldots + (1 + 2 + \ldots N)$ 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, addersses and telephone numbers in alphabetical order with a menu that will allow the user to selct any of the following feaures :—

(i) add a new record.

(ii) delete a record.

(iii) exit.

(12 marks)

[5 × 12 = 60 marks]

G 1991 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Computer Science/Information Technology

HUMANITIES (R, T)

(Prior to 2007 admisisons—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.

Or

(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 beteen 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.

G 1999 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Information Technology

DIGITAL ELECTRONICS (T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Explain any one alphanumeric code. Is it a weighted code or not ?
2. Obtain the canonical SOP corresponding to $f(a, b, c) = a\bar{b} + \bar{a}b + \bar{b}c$.
3. Construct the following gates using 4 : 1 MUX :—
   (i) OR ;(ii) NOT ;(iii) AND ; (iv) EX-OR.
4. Realise a 4 : 16 decoder using 2 : 4 decoders.
5. Draw 2-input XOR gate circuit using CMOS logic.
6. Draw the circuit and explain one method for interfacing TTL to CMOS.
7. What are the applications of D-flip-flop ? Explain any *two* of them.
8. Compare static and dynamic RAM.
9. What are the differences between Shift register and Counters ?
10. Draw and explain a 4 bit ring counter with its timing diagram.

(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) Simplify $f = \Sigma (0, 3, 4, 7, 9, 12, 14)$ in (i) SOP and (ii) POS forms using K-map and obtain the logic circuit diagram.

Or

(b) Using Quine-Mc Clusky tabulation method, obtain the set of prime implicants for

$f = \Sigma (4, 12, 13, 14, 16, 19, 22, 24, 25, 26, 29, 30) + \Sigma\phi (1, 3, 5, 20, 27)$.

and hence obtain the minimal form of the function.

(12 marks)

Turn over

Module 2

12. (a) Using parallel adder/subtractor design a single circuit to have both BCD to excess-3 and excess-3 to BCD code conversion. Draw the circuit diagram.

Or

(b) What is multiplexer ? Explain 4-to-1 MUX with neat diagram. Implement the function $f = \Sigma (0, 1, 3, 5, 8, 9, 12, 14, 15)$ using it.

(12 marks)

Module 3

13. (a) Draw the circuit diagram of a two-input TTL NAND gate and explain the working with the help of its voltage transfer curve.

Or

(b) Define and explain (i) Fan-out ; (ii) Noise margin ; (iii) Power dissipation ; and (iv) Propagation delay of a standard TTL gate, giving typical values.

(12 marks)

Module 4

14. (a) Draw the circuit diagram of Master-slave JK flip-flop with the synchronous and asynchronous inputs and constructed of using only NAND gates. Explain the working.

Or

(b) Give the structure of $3 \times 4 \times 2$ PLA. Explain its working and advantages.

(12 marks)

Module 5

15. (a) Draw the circuit of a mod-controlled up-down counter, 4 bit, using JK flip-flops. With the help of timing diagrams, explain its working.

Or

(b) Design a binary counter for generating the following repeated binary sequence $0 \rightarrow 4 \rightarrow 2 \rightarrow 1 \rightarrow 6 \rightarrow 14$ using JK flip-flops. Draw the timing diagram.

(12 marks)

[5 × 12 = 60 marks]

Module 5

15. (a) In the network in Fig. 9, find the z-parameters. Then compute the current in a 4Ω load if a $24\angle 0°$V source is connected at the input port.

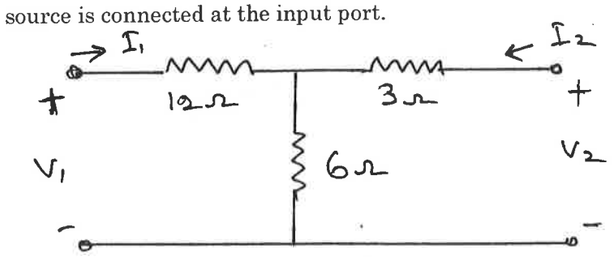


Fig. 9

Or

(b) Determine the transmission parameters for the network in Fig. 10.

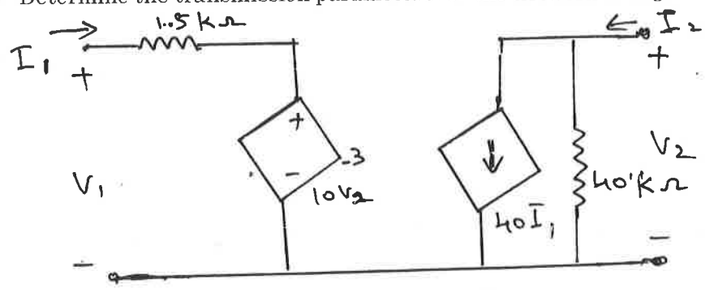


Fig. 10

(12 marks)

[5 × 12 = 60 marks]

G 1970 (Pages : 4) Reg. No.....
Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Third Semester

Branch : Information Technology

ELECTRICAL CIRCUITS AND SYSTEMS (T)

(Prior to 2007 admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Explain dot rule and coupled circuits.
2. Show that a voltage source with an internal resistance can be replaced by an equivalent current source and power delivered to an external resistance in either case is the same.
3. Derive the expression for the current response in an RL circuit excited by a sinusoidal voltage.
4. Define time constant. Obtain time constant of an RL series circuit from basics.
5. State and prove final value theorem in Laplace Transform.
6. Find the Laplace Transform of a unit step function.
7. State and explain Thevenin's theorem. What is its application ?
8. State Reciprocity theorem. What are the conditions to be satisfied if it is to be valid ?
9. Show how a pole-zero plot of a network function can be used to obtain the time response of the network.
10. Define all the h-parameters of a two-port network.

(10 × 4 = 40 marks)

Part B

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

Module 1

11. (a) (i) Use source transformation to convert the circuit in Fig. 1 to a single current source in parallel with a single resistor.

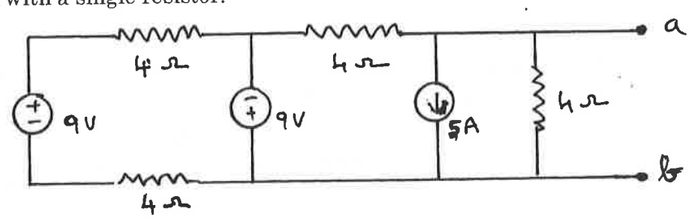


Fig. 1

(8 marks)

(ii) Find the value of resistance R in the circuit shown in Fig. 2.

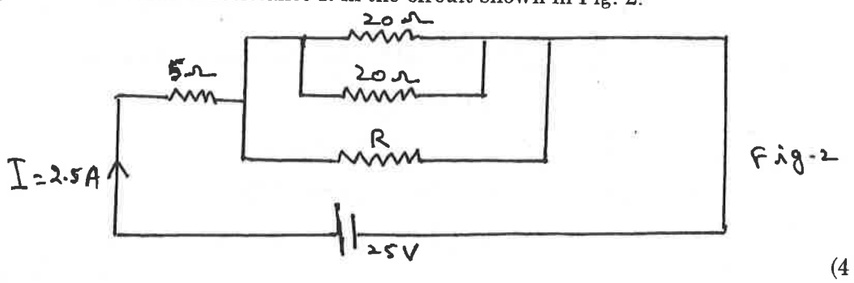


Fig-2

(4 marks)

Or

(b) Use source mobility to reduce the network shown in Fig. 3 and find the value of V_x. All resistor values are in ohms.

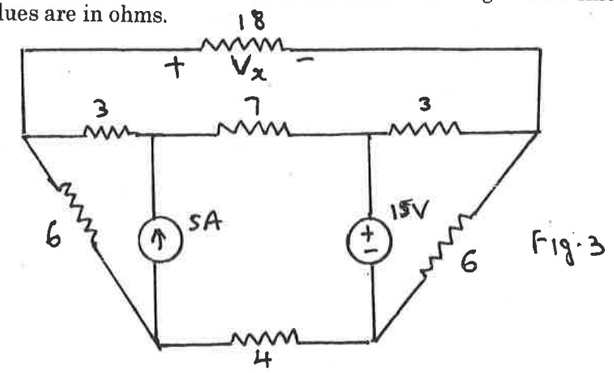


Fig-3

(12 marks)

Module 2

12. (a) In the circuit in Fig. 4, assume that the switch was closed for a long time for $t < 0$. Find $\frac{di_L(O^+)}{dt}$ and $i_L(O^+)$. Take $v(O^+) = 8$ V.

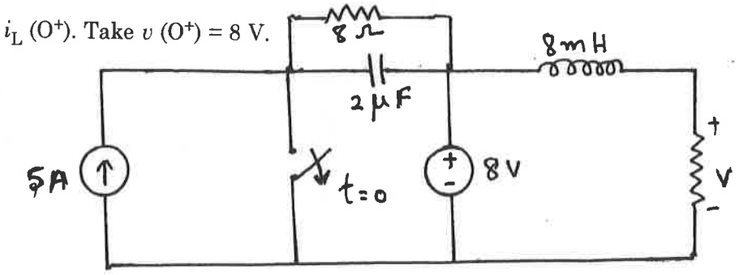
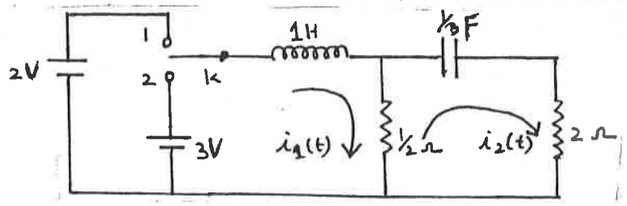


Fig-4

Or

(b) Solve for $i_1(t)$ and $i_2(t)$ in the network shown in Fig. 5. The switch K was in position 1 for $t < 0$, and the network was in steady state. At $t = 0$, the switch is closed to position 2.



(12 marks)

Module 3

13. (a) Express the function in Fig. 6 using singularity functions and then find F (*s*).

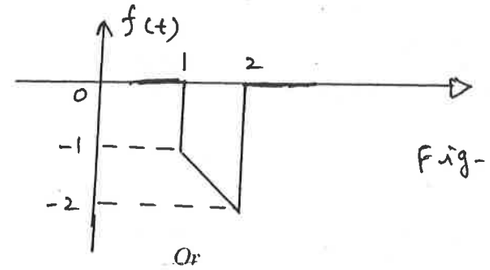


Fig-6.

(12 marks)

Or

(b) (i) If $h(t) = 2e^{-3t}u(t)$ and $x(t) = u(t) - \delta(t)$. Find $y(t) = h(t) * x(t)$ by using convolution in time domain.

(5 marks)

(ii) When an impulse $\delta(t)$ V is applied to a certain network, the output voltage is $v_o(t) = 4u(t) - 4u(t-2)$. Find and sketch $v_0(t)$ if the input voltage is $2u(t-1)$.

(7 marks)

Module 4

14. (a) Find the current i_x in the bridge circuit in Fig. 7 and hence verify reciprocity theorem.

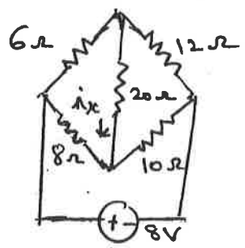


Fig-7

Or

(b) Determine the current through 1Ω resistor using superposition theorem in Fig. 8.

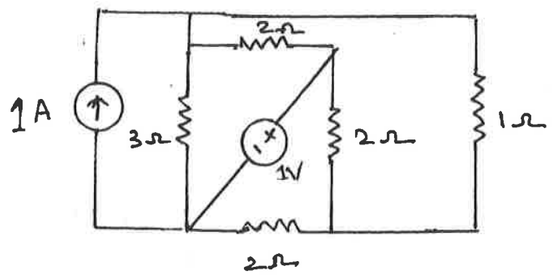


Fig-8

(12 marks)