F 9294 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 303
IT 010 306 } PROBLEM SOLVING AND COMPUTER PROGRAMMING (CS AND IT)

(Regular)

Time : Three Hours Maximum : 100 Marks

Write neat and efficient C programs whenever necessary.

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Write the C equivalents for the following arithmetic expressions :

   (i) $a+\frac{b}{c}-d.$

   (ii) $\frac{a}{cd}-b.$

   (iii) $a+\frac{1}{1+\frac{1}{1+a}}.$

2. Write the syntax and one example to show the declaration and intialisation of a two-dimensional array.
3. What is function prototype ? What is its use ?
4. What happens when a pointer to a structure is incremented ?
5. Describe two bitwise shift operators. What requirements must the operators satisfy ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Describe any *five* data types in C with the help of examples.
7. Write a program that accepts a number from 0 to 9 alongwith a string to be displayed a specified number of times. Use "switch-case" construct.
8. What is the null character and what is it used for, in the context of strings ?

Turn over

9. Can structure declarations appear inside functions ? Explain with an example.
10. Explain static memory allocation and dynamic memory allocation.

(5 × 5 = 25 marks)

Part C

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

Module I

11. (a) Explain the various conversion specifications for data I/O in C. (6 marks)

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

    (6 marks)

Or

12. With appropriate examples, explain the relational, logical and arithmetic operators in C. Give their precedence.

Module II

13. Write a C progrm to generate prime numbers between the range *m* and *n*.

Or

14. A and B are two given one-dimensional arrays. Read them and sort them in ascending order. Then merge them into a single sorted array C in the ascending order.

Module III

15. What is recursion ? Explain in detail, with examples, two types of parameter passing in functions.

Or

16. Develop separate C functions to implement a calculator that performs +, –, *, / and % arithmetic algebraic operations on two input numbers.

    Functions names : Read ( ), Calculate ( ), Display ( ).

    The main function should contain only function calls.

Module IV

17. Write a C program that reads several different names, addresses, age, qualification, and rearranges the names into alphabetic order and then write out the list in the alphabetic order using structure variation within the program.

Or

18. Write a C program to read N integers and find the sum of squares of all these elements using pointer.

ModuleV

19. Open a data file in write mode. Enter the students list in the file. Copy the data from the first file to another file. Make both files read only files.

Or

20. Discuss the four storage class specifications and list out the comparative details of the four storage classes with respect to their scope, initialisation, life time and their usage with examples.

(5 × 12 = 60 marks)

F 9305 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Information Technology

IT 010 303—DISCRETE AND INTEGRATED ELECTRONIC CIRCUITS (IT)

(Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 *marks.*

1. Explain the working of an LC filter.
2. Explain how a transistor is operated as a switch.
3. Draw and explain a voltage follower circuit using OP-AMP.
4. Discuss the conditions for oscillation.
5. Draw and explain the transfer characteristics of a schmitt trigger.

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. Draw and explain a zener voltage regulator.
7. Discuss the Q-point sabilization methods for BJT.
8. What are the characteristics of an ideal OP-AMP ?
9. Discuss the different types of feedback used in BJT amplifier.
10. Explain with a circuit diagram the principle of an RC integrator circuit.

(5 × 5 = 25 marks)

Part C

Each carries 12 *marks.*

11. Derive expressions for the load voltage and load current of a half wave rectifier.

Or

12. Explain with a circuit diagram, the working of a shunt voltage regulator. Derive an expression for its regulation.
13. Discuss with circuit diagrams the bias stabilization techniques used in BJT circuits.

Or

Turn over

14. Explain with a circuit diagram, the principle of operation of a single stage BJT amplifier. Derive its amplification factor.

15. Explain with a circuit diagram the principle of operation of an OP-AMP instrumentation amplifier.

Or

16. What are the different parameters of an OP-AMP ?

17. Discuss the effects of feedback on amplifier performance.

Or

18. Explain with circuit diagram, the working of a Colpitt's oscillator.

19. Derive and plot the response of a low pass RC circuit to (i) sine wave and (ii) square wave.

Or

20. Explain with circuit diagram the principle of operation of an OP-AMP mano-stable multivibrator. Derive the expression for its period of oscillation.

(5 × 12 = 60 marks)

F 9311 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 305/IT 010 304—SWITCHING THEORY AND LOGIC DESIGN (CS, IT)

(Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 *marks.*

1. What is a Decade counter ?
2. Draw the circuit of a JK flip-flop using NAND gates.
3. What is a Multiplexer ?
4. Convert the decimal numbers to the equivalent binary numbers (a) 43 (b) 0.4375 (c) 2048.0625.
5. Write the characteristics of TTL gates.

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. Draw a TTL gate and explain its working as a NAND gate.
7. Explain with a neat figure the master slave JK flip-flop.
8. State and prove De Morgan's theorem.
9. Explain the working of an Asynchronous Decode counter.
10. What are Universal gates ? Explain.

(5 × 5 = 25 marks)

Part C

11. (a) Design a binary to Gray code converter. (12 marks)

Or

(b) Simplify using Quine Mccluskey method $f = \sum (1,7,11,12,13,15)$. (12 marks)

12. (a) Explain with a neat figure a carry propagate adder. (12 marks)

Or

(b) Explain the working of a comparator circuit. Design a comparator circuit to compare two 2 bit numbers.

(12 marks)

Turn over

13. (a) With neat figures explain :

(i) D flip-flop using NAND gates. (4 marks)

(ii) T flip-flop using NAND gates. (4 marks)

(iii) Race around condition. (4 marks)

Or

(b) A sequential circuit has 4 flip-flops A, B, C, D and input x. It is described by the following state equations :

$A(t+1) = (CD' + C'D)\,x + (CD + C'D')\,x'$

$B(t+1) = A$

$C(t+1) = B$

$D(t+1) = C$

(i) Obtain the sequence of states when $x = 1$ starting from state ABCD = 0001. (6 marks)

(ii) Obtain the sequence of states when $x = 0$ starting from state ABCD = 0000. (6 marks)

14. (a) Design a 4 bit binary synchronous up counter. (12 marks)

Or

(b) Explain with neat figures Ring counter and Johnson counter. (12 marks)

15. (a) Explain the Boolean difference method for fault detection. (12 marks)

Or

(b) Write short notes on the following logic families :

(i) RTL. (ii) ECL. (12 marks)

(5 × 12 = 60 marks)

F 9289 (Pages : 2) Reg. No.....12 copies

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

EN 010 302—ECONOMICS AND COMMUNICATION SKILLS (AI, AN, AU, CE, CS, EC, EE, EI, IC, IT, ME, PE and PO)

(Regular)

[Common to all Branches]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Name three Commercial banks. Describe their main functions.
2. Explain the meaning of Globalisation.
3. What is incidence of tax ? Explain.
4. What are the causes of inflation ?
5. List any *six* arguments in support of protectionism.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain how Commercial banks aid Economic Development of a country.
7. Discuss the various effects and defects of privatisation.
8. What is meant by direct and indirect taxes ? Give *four* examples each with your reasons.
9. Define National Income and per capita income and account for the low level of per capita income in under-developed countries.
10. Why is international trade distinguished from domestic or inter-regional trade ?

(5 × 5 = 25 marks)

Part C

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

Module I

11. State and explain the major financial institutions in India providing financial assistance to industries.

Or

Turn over

12. Explain the various credit control methods ? What are the methods used by the RBI to control the creation of credit by Commercial banks.

Module II

13. Discuss the impact of multinational companies in Indian economy.

Or

14. Describe the growth and development of Information Technology industries in India.

Module III

15. Explain clearly the characteristics of good tax system.

Or

16. Define tax and explain its features. Distinguish between incidence and shifting of a tax. What are the factors influencing the shifting of a tax ?

Module IV

17. How is National Income estimated ? Bring out the difficulties involved in National Income estimation in under-developed countries.

Or

18. Define inflation and explain the types of inflation. What are the effects of inflation ? How is inflation controlled ?

Module V

19. What is free trade ? What are its advantages ? What is the case against free trade ?

Or

20. Distinguish between Balance of Trade and Balance of Payments. Why must the balance of payments balance in the long run ?

(5 × 12 = 60 marks)

F 9267 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science/Information Technology

PROBLEM SOLVING AND COMPUTER PROGRAMMING (RT)

(2009 admissions—Improvement ; 2004—2009 admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are the differences between source and object programs ? Give examples.
2. List and explain the steps that a programmer follows in writing a C program.
3. How will you enter the data (show the format) for the following scanf statements : $a = 5$, $b = 7$, $c = 9$?
   (i) Scanf ("%d? %d? %d", & a, & b, &c) ;
   (ii) Scanf ("%da %da %d" &a, &b, &c) ;
4. What are the basic data types available in C ? Explain with examples.
5. Consider $x = (j + k > 5)$? $(j + k)$: 5 ; what will happen when this statement is executed if :
   (a) $j = 5$ and $k = 3$.
   (b) $j = 1$ and $k = -3$.
6. Write one or more C statements to do the following :—
   If J has a value zero, then transfer control to statement 10. Otherwise add the value of J to the value of S and return to statement 20. Draw the flow chart for the above.
7. Explain one-dimensional and two-dimensional arrays, along with their syntax.
8. How can an entire structure be passed to a function ?
9. What happens when a pointer to a structure is incremented ?
10. What are the two approaches to updata a data file ? Which one is better ? Why ?

(10 × 4 = 40 marks)

Part B

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

Module 1

11. (a) What is an algorithm ? Describe the boxes used in a flowchart representation and mention each symbol purpose ?
    (b) Give the significance of high level and low level language ?

Or

12. With neat flow diagram, explain the various steps involved in the process of creating, compiling and naming C program.

Module 2

13. (a) Describe the format specifiers in scanf( ) function with appropriate meaning.

(b) List out sequence of rules applied for evaluating expressions.

Or

14. (a) What is a constant ? Explain the categories of constants with syntax and examples. (5 marks)

(b) What is the significance of declaring a constant unsigned ? (2 marks)

(c) What are the different ways to declare a C constant ? Give examples. (5 marks)

Module 3

15. (a) What is recursion ? Explain in detail, with examples, two types of parameter passing in functions. (8 marks)

(b) Explain any *two* string library functions with appropriate examples. (4 marks)

Or

16. Write a function to convert inches into centimeters. Then write a program that prompts the user to input a measure in inches, calls the conversion function, and prints out the measurement in centimeters.

Module 4

17. Write a function that copies a one-dimensional array of n elements into a two-dimensional array of k rows and j columns. The rows and columns must be a valid factor of the number of elements in the one-dimensional array : that is, $k * j = n$.

Or

18. Write a program that uses an array of student structures to answer inquiries. Using a menu driven interface, provide inquiries that report a student's scores, average or grade. A fourth option menu provides all data for a requested student, and a fifth one prints list of student IDs and names.

Module 5

19. (a) Write a C program to read N integers and find the sum of all these elements using pointer. (8 marks)

(b) Describe the operation that you can and that you cannot do with pointer variables. (4 marks)

Or

20. Write a C program to copy a file, inserting two space characters at the beginning of each line. (In other words, each line will be shifted two characters to the right).

[5 × 12 = 60 marks]

F 9275 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science/ Information Technology

HUMANITIES (R, T)

(2009 Admissions-Improvement
2004-2009 Admissions-Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer Part A and Part B in **separate** *answer-books.*
Part A and Part B carries 50 *marks each.*
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) What is strategic planning? What are the steps involved in strategic planning process ?

(ii) Explain the steps involved in control process.

Or

(b) (i) Elaborate the different organisation structures and give examples for each and explain the importance of delegation.

(ii) Explain the different job evaluation methods for evaluating newly appointed programmers in a software industry.

Module 2

2. (a) (i) Explain the different ISO procedures required for a process industry.

(ii) How TQM can be a useful tool for a software oganisation ? Explain.

Or

(b) (i) What are the merits and limitations of statistical quality control ? Explain.

(ii) With the help of neat diagrams, explain the control charts for variables.

Part B (Engineering Economics)

Answer **either** *(a)* **or** *(b) section of each module.*

Module 3

3. (a) (i) Discuss the various functions of Commercial banks.

(ii) "Banks are not merely traders in money but also in an important sense manufacturers of money". Comment.

Or

Turn over

(b) (i) What role can the Central Bank play in promoting economic growth with stability ? Illustrate your answer with reference to India.

(ii) "The Bank does not create money out of thin air ; it transmutes other forms of wealth into money". Discuss.

Module 4

4. (a) Discuss the need for industrialisation. Critically evaluate the development of various industries since independence of India. What is the future ?

Or

(b) (i) What are the reasons for industrial sickness ? What are the remedies ?

(ii) "Trade Unions can raise wages in a particular industry but the result will be less employment". Comment.

Module 5

5. (a) (i) Explain the meaning of incidence of tax. Distinguish it from the effect of tax.

(ii) Distinguish between progressive tax and proportional tax. Which of the two is better and why ?

Or

(b) (i) What are the differences between direct and indirect taxes ? Which would you prefer for raising Government revenues in an under-developed country and why ?

(ii) Distinguish between private and public finance. Account for the growing importance of public finance in recent times.

F 9244 (Pages : 3) Reg. No.....IT.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science/ Information Technology

ENGINEERING MATHEMATICS—II (R, T)

(2009 Admissions – Improvement
2004 – 2009 Admissions – Supplementary)

Time : Three Hours Maximum : 100 marks

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

Module 1

1. (a) Let p be "He is tall" and let q be "He is handsome". Write each of the following statements in symbolic form using p and q : (Assume that "He is short" means "He is not tall", i.e., $\sim p$)

(i) He is tall and handsome.

(ii) He is tall but not handsome.

(iii) He is neither tall nor handsome.

(iv) It is false that he is short or handsome.

(b) Find the truth tables of the following :

(i) $p \wedge (q \vee r)$

(ii) $(p \wedge q) \vee (p \wedge r)$.

Or

(c) Prove that disjunction distributes over conjunction ; i.e., prove the distribution law :

$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$.

(d) Determine the truth value of each of the following statements and also negate each of them.

(i) $\forall x, |x| = x$.

(ii) $\exists x, x^2 = x$.

(iii) $\forall x, x + 1 > x$.

(iv) $\exists x, x + 2 = x$.

Turn over

Module 2

2. (a) Let R and S be the relations on $A = \{1, 2, 3, 4\}$ defined by

$R = \{(1,1), (3,1), (3,4), (4,2), (4,3)\}$

$S = \{(1,3), (2,1), (3,1), (3,2), (4,4)\}$. Find the

(i) Composition relation $R \circ S$.

(ii) Composition $R^2 = R \circ R$ for the relation R.

Or

(b) Let $f : A \to B$ and $g : B \to C$ are one-to-one functions. Show that $gof : A \to C$ is one-to-one.

(c) Let R be a reflexive relation on a set A. Show that R is an equivalence relation if and only if (a, b) and (a, c) are in R implies that (b, c) is in R.

Module 3

3. (a) Let $S = \{2, 3, 4, 5, 12, 16, 24, 36, 48\}$ be ordered by divisibility. Find

(i) the predecessors and immediate predecessors of 12

(ii) the successors and immediate successors of 12.

(b) Define the dual of a statement in lattice L. Why does the principle of duality apply to L ?

Or

(c) Let $\leq$ S be a partial ordering of a set S. Define the dual order on S. How is the dual order related to the inverse of the relation $\leq$?

(d) Show why each element of a linearly ordered set can have at most one immediate predecessor.

Module 4

4. (a) Find the discrete numeric function corresponding to the generating function.

$$A(z) = \frac{(1+z)^2}{(1+z)^4}.$$

(b) Obtain the particular solution for $a_r - 5a_{r-1} - 6a_{r-2} = 1$.

Or

(c) Given that $a_0 = 0, a_1 = 1, a_2 = 4$ and $a_3 = 12$ satisfy the recurrence relation $a_r + C_1 a_{r-1} + C_2 a_{r-2} = 0$. Determine a_r.

Module 5

5. (a) Find the sum m of the degrees of the vertices of G where $V(G) = \{A, B, C, D\}$ and

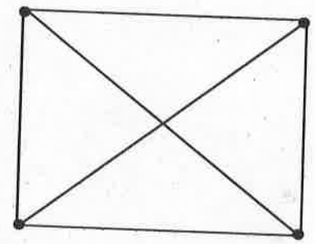
(i) $E(G) = [\{A, B\}, \{A, C\}, \{B, D\}, \{C, D\}]$.

(ii) $E(G) = [\{A, B\}, \{A, C\}, \{A, D\}, \{B, A\}, \{B, B\}, \{C, B\}, \{C, D\}]$.

(b) Find the connected components of G where $V(G) = \{A, B, C, X, Y, Z\}$ and $E(G) = [\{A, X\}, \{C, X\}]$.

Or

(c) Find all the spanning trees of the graph shown in figure below 1.



(5 × 20 = 100 marks)

(b) Consider the linear time-invariant circuit shown in Fig. 8 with input i_s. (i) calculate the driving point impedance ; (ii) calculate the transfer impedance H(s) ; and (iii) plot the poles and zeros of H(s) on the complex plane.

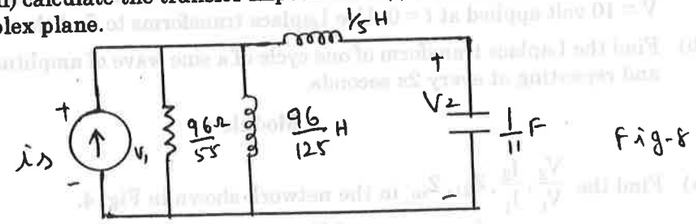


Fig-8

Or

20. (a) The z-parameters of a two-port network are $z_{11} = 20\ \Omega$, $z_{22} = 30\ \Omega$, $z_{12} = z_{21} = 10\ \Omega$. Find the transmission parameters of the network.

(b) Determine the h-parameters of the network shown in Fig. 9

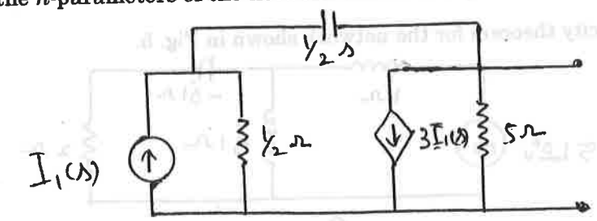


Fig-9

[5 × 12 = 60 marks]

F 9251 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Information Technology

ELECTRICAL CIRCUITS AND SYSTEMS (T)

(2009 admissions—Improvement ; 2004—2009 admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. State the dot covnention rules for coupled coils.
2. What are the advantages of state variable analysis over the classical techniques ?
3. What are the initial conditions ? Explain the procedure to evaluate the initial conditions.
4. Find the transient response of series RC circuit having sinusoidal excitation.
5. Find the Laplace Transform of $e^{-4t}\left(\cos 2t + \frac{5}{2}\sin 2t\right)$.
6. Find the initial value of the signal with Laplace Transform $\frac{7}{s(s+4)^2}$.
7. What are the applications and limitations of Thevenin's and Norton's theorems ?
8. Differentiate between transform impedance and transfer impedance functions.
9. Define poles and zeroes. Draw the pole-zero diagram of $\frac{(2s+4)(s+4)}{s(s+1)(s+5)}$.
10. Show that the overall transmission parameter matrix for cascaded two 2-port networks is the matrix products of the transmission parameters for each individual 2-port network in cascade.

(10 × 4 = 40 marks)

Part B

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

Module 1

11. (a) For the circuit shown in Fig. 1, determine the current I through the 10 Ω resistor by (i) nodal analysis (KCL) and (ii) mesh analysis (KVL) and verify the result.

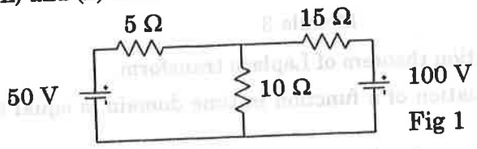


Fig 1

(8 marks)

(b) Define capacitance and its unit of measurement. Derive the dimensions of inductance from basics.

(4 marks)

Or

12. (a) 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.

(4 marks)

(b) Calculate I and the currents in all branches of the network shown in Fig. 2.

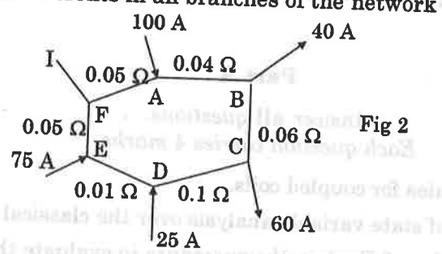


Fig 2

(8 marks)

Module 2

13. (a) A voltage of $v(t) = 60 \sin t$ is applied to an RL series circuit with R = 10 Ω, L = 0.1 H at $t = 0$. Find the expression for $i(t)$ for $t \geq 0$.

(b) A resistance R and a 2 μF capacitor are connected in series across a 100 V direct supply. Across the capacitor is a neon lamp that strikes at 50 V. Calculate R to make the lamp strike 5 sec. after the switch is closed.

Or

14. (a) If $v_s = 40t$ volts for $t > 0$ and $i_L(0) = 5$A, find and sketch $i_{in}(t)$ for $t > 0$ in the circuit shown in Fig. 3.

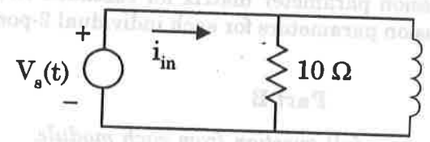


Fig 3

(7 marks)

(b) Show that the variation of current in a series RC circuit for a dc excitation is exponential. Plot the response curve.

(5 marks)

Module 3

15. (a) State and prove convolution theorem of Laplace transform.

(b) Prove that the differentiation of a function in time domain is equal to multiplication of its Laplace transform by S.

Or

16. (a) A series RLC circuit, with R = 5 Ω, L = 0.01 H, and C = 500 μF has a constant voltage V = 10 volt applied at $t = 0$. Use Laplace transforms to find the resulting current.

(b) Find the Laplace transform of one cycle of a sine wave of amplitude 10 volt peak and period α and repeating at every 2π seconds.

Module 4

17. (a) Find the $\frac{V_2}{V_1}, \frac{I_2}{I_1}, Z_{21}, Z_{in}$ in the network shown in Fig. 4.

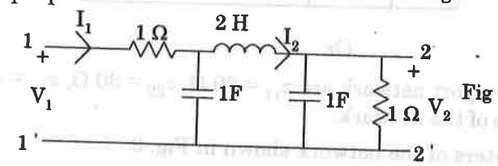


Fig 4

(b) Verify reciprocity theorem for the network shown in Fig. 5.

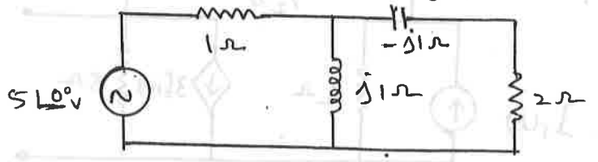


Fig-5

Or

18. (a) Calculate the current in the 6 Ω resistor of the circuit in Fig. 6 using superposition theorem.

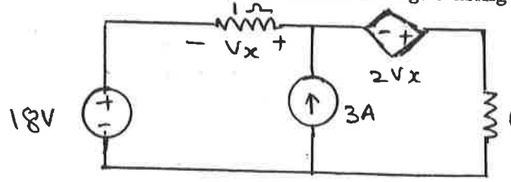


Fig-6

(b) For the network shown in Fig. 7, obtain the voltage transfer function in S domain :

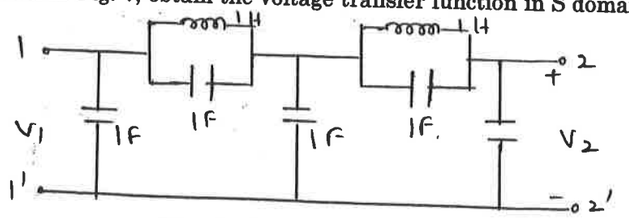


Fig-7

Module 5

19. (a) Consider a network function as ratio of two polynomials. Describe the step-by-step procedure of obtaining the pole-zero plot. How would you obtain the magnitude and angle of the function ?

F 9258 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Computer Science and Engineering/Information Technology

SOLID STATE ELECTRONICS (R, T)

(2009 admissions—Improvement ; 2004—2009 admissions—Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What is thermal runaway ? Why it does not occur in CB configuration ?
2. State and explain two different applications of emitter follower.
3. Distinguish between JFET and BJT amplifiers.
4. Draw the small signal equivalent circuit model of JFET and explain its parameters.
5. In a Colpitt's oscillator $C_1 = 0.2\ \mu F$, $C_2 = 0.02\ \mu F$. Calculate the value of inductor required to generate sine waves at 70 kHz.
6. Explain the principle of a tank circuit useful in an LC oscillator.
7. With the help of waveforms, show how the bistable multivibrator can be used as a frequency divider.
8. Explain the basic principle of linear sweep voltage generator.
9. What is the working principle and applications of an opto coupler ?
10. Draw the block diagram of a series regulator and discuss the importance of the control element.

(10 × 4 = 40 marks)

Part B

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

Module I

11. (a) (i) What is operating point of an amplifier circuit ? How can we decide it for different types of operations ?

(6 marks)

(ii) Explain a self biased circuit and compare its performance with the fixed biased circuit.

(6 marks)

Or

(b) Calculate the voltage gain, current gain, input resistance and output resistance of the following cascaded circuit. Take h_{ie} = 1K, h_{fe} = 100. (Fig. 1)

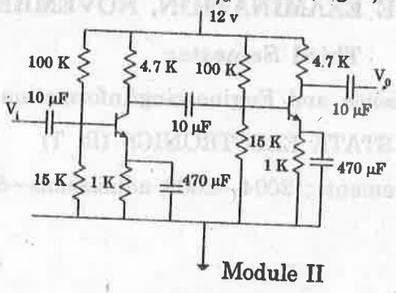


Fig.1

Module II

12. (a) Draw a neat constructional diagram of an enhancement MOSFET. Explain its working with the help of drain and transfer characteristics.

Or

(b) For the FET amplifier shown in Fig. 2, determine (i) V_G ; (ii) V_{DSQ} ; (iii) V_D and V_S ; (iv) I_{DQ} and V_{DSQ}.

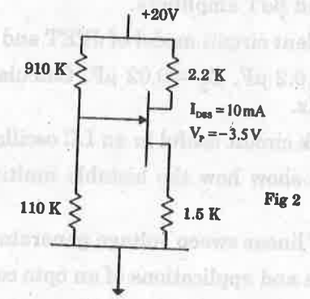


Fig 2

Module III

13. (a) Explain how the following circuit (Fig.3) generates sine wave oscillations. Calculate the frequency of the oscillation.

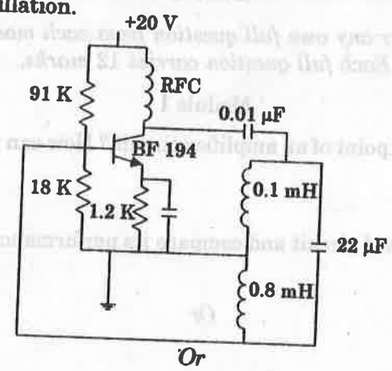


Fig 3

Or

(b) With a neat circuit diagram (using BJT) describe how a Wien bridge oscillator generates an audio frequency signal ? Give the conditions for oscillation.

Module IV

14. (a) With a neat circuit diagram, describe how a monostable multivibrator can produce a delay gating pulse. Derive the expression for the pulse width.

Or

(b) (i) Using diode circuit, explain a clipper to pass voltage from – 2 V to – 5 volt only. (6 marks)

(ii) Draw an RC integrator and prove that the output is integral of the input. (6 marks)

Module V

15. (a) (i) With a circuit diagram, describe how can you design a ± 5 V dual power supply. (8 marks)

(ii) Explain the applications of TRIAC. (4 marks)

Or

(b) (i) Describe the working of a seven segment display, showing the connection diagram. (4 marks)

(ii) With the constructional diagram and emitter characteristics, describe the working of UJT. (8 marks)

[5 × 12 = 60 marks]

F 9284 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch—Information Technology

DIGITAL ELECTRONICS (T)

[2009 Admissions–Improvement
2004–2009 Admissions–Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are self complementing codes ? Give examples.
2. Reduce the following Boolean expressions :

   (a) $A(\overline{ABC} + A\bar{B}C)$.

   (b) $A(B + C(AB + AC))$.
3. What is a MUX ? What are the functions of its select lines ? Explain.
4. Can more than one decoder output be activated simultaneously ? Justify your answer.
5. Explain two merits and one demerit of totem pole output arrangement. Where it is used ?
6. Why is the CMOS switching speed greater than PMOS/NMOS ?
7. Give the truth table and excitation table of JK flip-flop.
8. Draw the circuit diagram of a static RAM cell and indicate all the signal/control lines.
9. Write the sequence of states for a 4 bit Johnson counter and state its applications.
10. A decade counter does not use its maximum possible modulus and so there are several invalid states. List the invalid states.

(10 × 4 = 40 marks)

Part B

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

Module 1

11. Using Quine-Mc Clauskey method, simplify

    $f = \Sigma(0, 2, 5, 7, 9, 11, 13, 15, 16, 18, 21, 23, 25, 27, 29, 31)$.

Or

Turn over

12. Obtain the minimal SOP expression and draw the logic circuit for the function

$f = \Sigma(1, 5, 7, 13, 14, 15, 17, 18, 21, 22, 25, 29) + \sum_{\phi}(6, 9, 19, 23, 30)$.

Module 2

13. Construct the circuit diagram of a 4 bit BCD adder using full adders.

Or

14. Draw the logic diagram of a 2-to-4 decoder with an ENABLE input using

(a) NAND gates.

(b) NOR gates.

Show that the realisation using NAND gates is more convenient to distinguish the selected output with a value of 0.

Module 3

15. Draw and explain the circuit diagram of a four-input

(a) NAND.

(b) NOR gates using CMOS logic.

Or

16. (a) Draw and explain the circuit of a 3-input IIL NOR gate.

(b) Construct a circuit with TTL as a driver and CMOS as a load.

Module 4

17. (a) Sketch the logic system, using basic logic gates for a clocked SR flip-flop.

(b) Verify that the state of the system does not change in between clock pulses.

(c) Give the truth table.

(d) Justify the entries in the truth table.

Or

18. (a) Describe the function of the row-select decoder, column-select decoder and output buffers in the ROM architecture.

(b) Design a memory decoder to select 1 number of 16 KB EPROM IC and one number of 32 KB RAM IC.

Module 5

19. Draw the logic diagram of a 4-bit register with four 4D flip-flops and four 4-to-1 multiplexers with mode selection inputs, S_1 and S_0. The register operates according to the following function table.

S_1	S_0	Register Operation
0	0	No change
0	1	Complement of the four outputs
1	0	Clear register to
1	1	load parallel data.

Or

20. Design, with the help of excitation tables and k-maps, a 4 bit BCD synchronous counter ; Use Jk flip-flops.

(5 × 12 = 60 marks)

F 9288 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch—Computer Science/Information Technology

ENO 10 301 B—ENGINEERING MATHEMATICS—II (CS, IT)

(Regular)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Write in symbolic form :
   (a) Some girls are not white.
   (b) It is true that all roads lead to Kollam
   (c) Some cones are not good.
2. Using Euclidean algorithm, find gcd of 15276 and 2055.
3. Give examples of two functions $f : N \to Z$ and $g : Z \to Z$ such that $g \circ f$ is injective but g is not injective.
4. Define a Bounded lattice and a Sublattice.
5. Define
   (a) Hamiltonian cycle.
   (b) Spanning tree.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions, each question carries* 5 *marks.*

6. Construct truth table for $P \vee \neg(P \wedge Q)$.
7. If $a \equiv b \pmod{n}$ then show that $a^k = b^k \pmod{n}$ for every positive integer k.
8. I denotes the set of all integers and m is an integer. Show $R = \{ < x, y > / x - y$ is divisible by $m\}$ is an equivalence relation.
9. Define chain and subchains and show that every chain is a distribution lattice.
10. Give an example of a graph in which the length of the longest cycle is 9 and the length of the shortest cycle is 4.

(5 × 5 = 25 marks)

Turn over

Part C

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

Module 1

11. Show that :

(a) $(\exists x)(F(x) \wedge S(x)) \rightarrow (y)(M(y) \rightarrow W(y))$. (6 marks)

(b) $(\exists x)(M(y) \wedge \neg W(y))$ if $(x)(F(x) \rightarrow \neg S(x))$ follows. (6 marks)

Or

12. (a) Show that $(\forall x)(P(x) \wedge Q(x)) \rightleftarrows ((\forall x)P(x)) \wedge ((\forall x)Q(x))$ is a logically valid statement. (6 marks)

(b) Show the following implications without constructing truth tables.

$(P \rightarrow Q) \vee (R \Leftrightarrow P) \wedge (Q \vee R)$. (6 marks)

Module 2

13. (a) If a/c and b/c then prove that $gcd\ (a, b)/c$. (5 marks)

(b) If p is a prime, then prove that $a^p \equiv a \pmod p$. (7 marks)

Or

14. (a) Show that the functions f and g which both are from N × N to N given by $f(x, y) = x + y$ and $g(x, y) = x\,y$ are onto but not one-to-one. (6 marks)

(b) Check whether the following functions are invertible. If so, compute the inverse :

(i) $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = |x|$, $\forall x \in \mathbb{R}$. (3 marks)

(ii) $g : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $g(x) = 2x - 1$, $\forall x \in \mathbb{R}$. (3 marks)

Module 3

15. (a) Show that the "set inclusiong $\subseteq$" is a partial ordering on power set of A for any set A. (6 marks)

(b) If relations R and S are reflexive, symmetric and transitive, show that $R \cap S$ is also reflextive, symmetric and transitive. (6 marks)

Or

16. (a) Define an equivalence relation. If ~ is an equivalence relation of a set X, show that the corresponding equivalence classes form a portion of X. (6 marks)

(b) Define partial order and total order relations. Give an example of a partial order which is not a total order and also *vice versa*. (6 marks)

Module 4

17. (a) If $< L, *, \oplus >$ is a distributive lattice, then prove for any $a, b, c \in L$,

$(a * b = a * c) \wedge (a \oplus b = a \oplus c) \Rightarrow b = c$. (6 marks)

(b) Define a complete lattice and complemented lattice. Draw the Hasse diagram for D_{40}, the lattice of all positive divisors of 40. (6 marks)

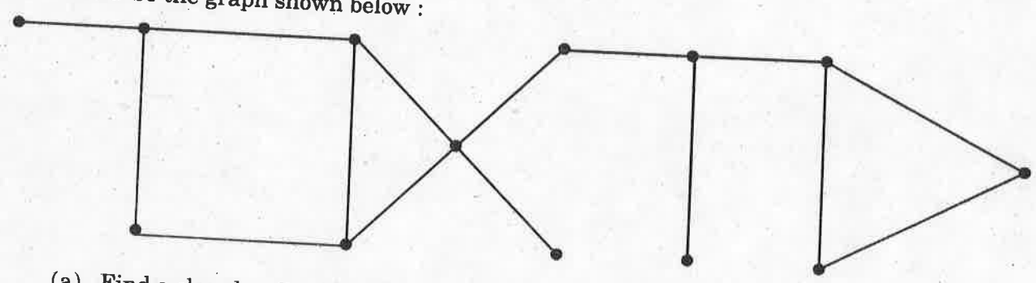
Or

18. (a) In a lattice $< L, \leq >$ with $a, b, c \in L$, show that $a \leq c \Rightarrow a \oplus (b * c) \leq (a \oplus b) * c$. (6 marks)

(b) Which of the two lattices $< S_n, D >$ for $n = 30$ and $n = 45$ are complemented ? Prove whether they are distributive. (6 marks)

Module 5

19. Let G be the graph shown below :



(a) Find a closed walk of length 6. Is your walk a trial ? (2 marks)

(b) Find an open walk of length 12. Is your walk a path ? (2 marks)

(c) Find a closed trial of length 6. Is your trial a cycle ? (2 marks)

(d) What is the length of the longest cycle in G ? (2 marks)

(e) What is the length of a longest path in G ? How many paths are there of this length ? (4 marks)

Or

20. (a) Draw all non-label-isomorphic graphs with three vertices using the label set $V = \{a, b, c\}$. (6 marks)

(b) If G be a connected graph which is not a tree and let C be a cycle in G. Prove that the complement of any spanning tree of G contains at least one edge of C. (6 marks)

[5 × 12 = 60 marks]

F 9322 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Third Semester

Branch : Information Technology

IT 010 305 PRINCIPLES OF COMMUNICATION ENGINEERING (IT)

(Regular)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 3 *marks.*

1. Why modulation is needed in communication systems ?
2. What is modulation index ?
3. What are pre-emphasis and de-emphasis ?
4. Define Noise figure.
5. State Sampling theorem.

(5 × 3 = 15 marks)

Part B

Each question carries 5 *marks.*

6. What is information ? What are the sources of information ?
7. A transmitter radiates 9 kW without modulation and 10.125 kW after modulation. Determine depth of modulation.
8. Draw the spectrum for FM and explain.
9. Calculate the overall noise figure of a three stage cascaded amplifier, each stage having a power gain of 10 dbs and a noise figure of 6 dbs.
10. What are the advantages of DPCM ?

(5 × 5 = 25 marks)

Part C

Each question carries 12 *marks.*

11. Explain with diagrams the principle of microwave communication system.

Or

12. Discuss the principle of a double superheterodyne receiver.

Turn over

13. Draw and explain the circuit of a DSB-SC modulator. What are its advantages ?

Or

14. Explain with diagrams the principle of VSB modulation. What are its applications ?

15. Draw and explain the circuit of a phase modulator.

Or

16. Explain with a block diagram the principle of an FM receiver.

17. Discuss the sources of noise in communication systems.

Or

18. Explain the characteristics of communication receivers.

19. Draw and explain the circuit diagrams for PWM generation and demodulation.

Or

20. Write a note on the spectra of pulse modulated signals.

(5 × 12 = 60 marks)