F 4729 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering/Information Technology

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

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Write neat and efficient C programs wherever required.

Part A

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

1. Locate errors, if any and correct them :
   (a) scanf ("%C" & beta) ;
   (b) printf ("%C, CH") ;
   (c) print ("d. %f", & x, y).
2. Illustrate how will you declare and initialise (i) one dimensional array ; (ii) two-dimensional array.
3. What is a function ? Write an example to give the general syntax of function.
4. Can structure declarations appear inside functions ? Why ?
5. Name any three file accessing modes.

(5 × 3 = 15 marks)

Part B

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

6. Explain all the data types in C language with the help of examples.
7. How does array definition differ from that of an ordinary variable ? How are the individual array elements identified ? Explain.
8. Write a function that accepts a string and a character as arguments and returns the number of occurrences of the character in the string.

Turn over

9. Show, with the help of suitable example, how a one-dimensional array of pointer can be used to represent a collection of strings.

10. What are the two ways of opening a file ? How do you check for errors upon opening a file and output the correct error message ?

(5 × 5 = 25 marks)

Part C

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

11. Write the algorithm to check whether the given three numbers forms the side of a triangle. Draw the flow chart for the above and explain.

Or

12. Draw flow chart and write a C program to generate the Fibonacci number upto 'N'. Use formatted I/O statements and explain.

13. Write a C program to accept a1-dimensional array of integers and sort them in ascending order, using bubble sort method.

Or

14. Write an interactive C language program to calculate and print the LCM and GCD of three given numbers.

15. Write a C program to compute ${}^{n}C_{r} = \frac{n!}{r!\,(n-r)!}$ using the function which evaluates the factorial.

Or

16. The trace of a matrix is the sum of the main diagonal elements and the normal is the square-root of the sum of the squares of all the elements of the matrix. Write a C language to accept a N × N matrix and print its trace and normal using functions.

17. Using pointers, write an interactive C program to copy one string to another, without using the string library functions.

Or

18. Write a C program to sort the mark sheets of 'N' students. The mark sheet consists of the register number, name, marks of eight subjects and the total marks (to be calculated in the program). Make use of a structure to develop the program.

19. What is meant by dynamic memory allocation ? Explain with the help of examples, the differences between malloc (), calloc () and realloc () in terms of the functions they perform. Explain their uses in C programs.

Or

20. Write a C program that reads characters from the standard input file until EOF is encountered. Use the variables digend and othend to count the number of digits and the number of other characters, respectively.

(5 × 12 = 60 marks)

3

F 4739 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering

CS 010 304—COMPUTER ORGANISATION (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What is complement arithmetics ? What are its advantages ?
2. What are floating point numbers ? How they are represented ?
3. Differentiate between micro and macro instructions.
4. What is cache ? List its merits and demerits.
5. What is virtual memory ? Explain its need.

(5 × 3 = 15 marks)

Part B

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

6. Explain, with an example, a BCD adder.
7. Explain the construction of a 1 bit ALU.
8. Give and explain the sequence of operations for fetching a word from memory.
9. With the help of figures, explain the read and write operations in a static memory cell.
10. Explain the following terms :

(i) Temporal locality of data ; (ii) spatial locality of data ; and (iii) page faults.

(5 × 5 = 25 marks)

Part C

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

11. Design an array of cells to implement 2's complement combinational array multiplier using Booth's algorithm. Give the cell details and the array structure showing input and output signals. Assume 4 bit multiplier and multiplicand.

Or

Turn over

12. Design the logic circuit for the correction step of the non-restoring division method. Explain the behaviour of steps and terminologies used.

13. (a) What are the various arithmetic operations that can be performed on floating point numbers ? Explain giving examples.

(6 marks)

(b) With necessary flow charts, explain how floating point multiplication is performed in computer.

(6 marks)

Or

14. Construct a 32 bit ALU from 1 bit ALU and explain the same ALU which performs AND, OR and addition on $\overline{a}$ and b and $\overline{a}$ and $\overline{b}$.

15. With necessary diagrams, explain how control signals are generated through hardwired control.

Or

16. Explain the following operations in a simple implementation action scheme :

(i) ALU control ; (ii) Designing main control unit.

17. Explain with suitable examples, direct mapped, set associative, fully associative caches and list their merits and demerits.

Or

18. Using an associative memory, design a parallel algorithm to implement 2's complement conversion of a field in the words having a specified key value.

19. What are page faults and TLB misses ? How they are handled ? Explain.

Or

20. Consider a virtual memory system with the following properties :

(i) 40 bit virtual byte addresses.

(ii) 32 kB pages.

(iii) 36 bit physical byte address.

What is the total size of the page table for each process on this processor assuming that the valid, protection, dirty and use bits take a total of 4 bits and that all the virtual pages are in use ? Assume that disk addresse are not stored in the page table.

(5 × 12 = 60 marks)

F 4751 3

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

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 305 / IT 010 304 SWITCHING THEORY AND LOGIC DESIGN [CS, IT]

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Convert the hexadecimal number F3A0C1 to binary and Octal.
2. Distinguish between a combinational logic circuit and sequential logic circuit with examples.
3. Show how SR flip-flop can be converted to JK and D flip-flop.
4. Draw a 3 bit ring counter using D flip-flops.
5. Explain hazards in sequential circuits.

(5 × 3 = 15 marks)

Part B

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

6. Simplify the function $f = \Sigma (0, 1, 4, 5, 6)$ using K-map and list prime implicants and essential prime implicants.
7. Realise a 3-bit BCD to Gray Code converter using PLA.
8. Explain 0's and 1's catching problem in master-slave JK flip-flop with necessary waveforms.
9. Explain a 4-bit Johnson counter and its applications.
10. Explain the terns FAN-IN and FAN-OUT. Discuss them in the context of TTL and CMOS.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. Minimise $f = \Sigma (0, 1, 6, 7, 9, 13, 14, 15, 16, 17, 32, 33, 38, 39, 46, 47, 48, 49, 57, 61)$ and draw the minimal circuit using NOR gates only.

Or

12. (a) Implement binary to Gray code converter using basic gates. Construct truth table and simplify equations using K-map. (9 marks)

(b) Distinguish between weighted and non-weighted codes giving examples. (3 marks)

13. (a) Configure a 16 to 1 MUX using 4 to 1 MUX and explain. (6 marks)

(b) Construct a 3 to 8 line decoder using 2 to 4 line decoder and explain the operation. (6 marks)

Or

14. (a) Implement $f = \Sigma (0, 1, 2, 6)$ using 4 to 1 MUX. (6 marks)

(b) With neat diagrams, describe the working of a 4 bit parallel adder. (6 marks)

15. Draw the circuit diagrams and truth tables of (i) SR flip-flop ; (ii) D latch ; (iii) Master slave SR flip-flop ; and (iv) Master slave JK flip-flop using only basic gates. (2 + 2 + 4 + 4 = 12 marks)

Or

16. A synchronous sequential machine has a single control input x and clock and two outputs A and B. On consecutive rising edges of the clock, the code on A and B changes from 00 to 01 to 10 to 11 and repeats itself it $x = 1$, if at any time , $x = 0$, it holds to the present state. Draw the state diagram and implement the circuit using T-flip-flop.

17. Design a MOD 10 binary down ripple counter using D flip-flops.

Or

18. Design a synchronous counter to run through the following count using JK flip-flop :

0, 3, 4, 5, 7, 9, 11, 13, 15, 12, 6, 0, ...

19. Find a minimum test set for the network implementing the function $f = x_1x_2 + x_2x_3' + x_2x_4$ implemented using AND-OR circuit.

Or

20. (a) Explain the circuit diagram of a TTL NAND gate with tristate logic. (9 marks)

(b) Explain a method to interface CMOS to TTL. (3 marks)

[5 × 12 = 60 marks]

F 4762

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

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering

CS 010 306—ELECTRONIC DEVICES AND CIRCUITS (CS)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Write the expressions for the ripple factor when (i) L ; (ii) C ; and (iii) LC filters are used.
2. A CE amplifier uses a dc load R_C and separate RC-coupled load resistor R_L. Which load line is steeper, ac or dc ? Why ?
3. Draw the circuit diagram of a voltage follower and list its A_v and R_i.
4. What is the advantage of crystal oscillator ? Give any one application.
5. List any three applications of bistable multivibrator.

(5 × 3 = 15 marks)

Part B

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

6. Draw the circuit of a series pass voltage regulator and explain how the output voltage is kept regulated even when the load current increases.
7. With circuit diagrams, explain the biasing conditions of a BJT switch.
8. Define and explain (i) input bias current ; (ii) input offset voltage ; and (iii) slew rate.
9. Define negative feedback. Derive expression for the gain with negative feedback of an amplifier.
10. Explain the different methods of triggering bistable multivibrator circuits.

(5 × 5 = 25 marks)

Turn over

Part C

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

11. With block diagram, explain the various functional units in 7805. Using 7805 and 7905, draw a dual power supply to get ± 5 V.

Or

12. Draw the complete circuit diagram of a bridge rectifier which uses a π filter and 7805 to generate + 5V output. Explain.

13. With the low frequency small signal *h*-parameter model, derive the expressions for R_i, R_o, A_i and A_v of a CE transistor.

Or

14. With a circuit diagram, explain the function of each component in a voltage divider bias CE amplifier. Write expressions for the (i) Q point ; (ii) S_I and (iii) A_v of your circuit, in terms of the component values.

15. What is virtual short in an op-amp circuit ? How does this help in circuit analysis ? What is the error encountered by considering virtual ground concept ? Explain the above considering an inverting amplifier circuit.

Or

16. Draw and design an op-amp circuit to get an output $V_0 = V_1 - V_2 + V_3 - V_4$, where V_1, V_2, V_3 and V_4 are analog input voltages.

17. (a) What are the four possible topologies of a feedback amplifier ? Also identify the transfer gain for each topology ?

(6 marks)

(b) With necessary equations, explain the effect of negative feedback on the input resistance of voltage series and current shunt negative feedback amplifiers.

(6 marks)

Or

18. (a) Describe a Hartley oscillator circuit and explain how oscillations are produced with the help of tank circuit.

(7 marks)

(b) Explain the factors which affect the frequency stability of a crystal oscillator. (5 marks)

19. Draw the circuit diagram of RC integrator. With necessary equations and waveforms, describe its response to (i) step ; (ii) square ; and (iii) sine wave inputs.

Or

20. Draw the internal functional block diagram of 555 timer. With suitable circuit diagram and waveforms, explain how it can be used to produce 0 – 6 V, 1 kHz, 50 % duty cycle square waves.

[5 × 12 = 60 marks]

F 4791 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering/Information Technology

PROBLEM SOLVING AND COMPUTER PROGRAMMING (R, T)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Write neat and efficient C programs wherever needed.

Part A

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

1. Distinguish between structural and object oriented programming.
2. Write an algorithm to find the number of digits in a given integer.
3. List any *four* keywords and give their meanings.
4. What is a C token ? What are the different types ?
5. Summarise the styntatic rules associated with the "for" statement.
6. Show how the execution of a "while" loop is terminated.
7. Explain any *two* string handling functions in C.
8. Summarize the rules for writing a one dimensional array definition.
9. How the end of a file is determined ?
10. Explain how can a function return a pointer to its calling routine.

(10 × 4 = 40 marks)

Part B

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

11. Give the algorithm, flow chart and C program to check whether a given number is prime or not.

Or

12. (a) What are the merits and demerits of procedural programming and modular programming ?

    (b) Draw a flow chart to check whether a given number is odd or even.

Turn over

13. (a) What are variables ? What are the rules to be followed in declaring variable ? Explain with valid and invalid examples.

    (b) With suitable examples, describe the different data types in C.

Or

14. Write a C program to determine whether $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) are vertices of a triangle and if yes, calculate its area.

15. Write a C program (i) using recursion, (ii) without using recursion to calculate the factorial of an integer.

Or

16. Write a function to accept 100 characters through keyboard, test and display whether each one is a digit, lower case alphabet, uppercase alphabet or special character.

17. Write a function which receives a square matrix N × N as an argument and returns the square of it to the calling program.

Or

18. Write a C program to find the longest word in a given string.

19. Given a text file, write a C program to create another file deleting all the vowels.

Or

20. Using pointers, write a program to find the number characters in a given string.

(5 × 12 = 60 marks)

F 4782 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Branch : Computer Science and Engineering / Information Technology

SOLID STATE ELECTRONICS (R, T)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are the factors that affect the low frequency response of RC coupled BJT amplifier ? Explain.
2. What are the properties of Darlington pair ? State its applications ?
3. Design a self bias circuit for JFET to have an a.c. gain of 10, I_{CQ} = 0.8 mA using V_{DD} = 24 volt. Assume $r_d >> R_D$. Draw the circuit diagram.
4. With the help of a neat circuit diagram, explain the feedback biasing arrangement for an enhancement type MOSFET.
5. State and explain the concept of Barkhausen criteria.
6. Why are LC resonant circuit impractical at audio frequencies ? Explain.
7. What is meant by voltage time base generator ? Explain its principle.
8. What are the applications of clipper circuit ? Give an example of the circuit.
9. Explain the principle and applications of optocoupler ?
10. Distinguish between latching current and holding current of SCR. Give their typical values.

(10 × 4 = 40 marks)

Part B

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

11. (a) Draw the circuit of a 2-stage RC coupled BJT amplifier and explain its working.

    (b) If two identical stages of RC coupled amplifiers having f_L = 20 Hz and f_H = 20 kHz are cascaded, calculate the lower and upper cut-off frequencies of the resultant circuit.

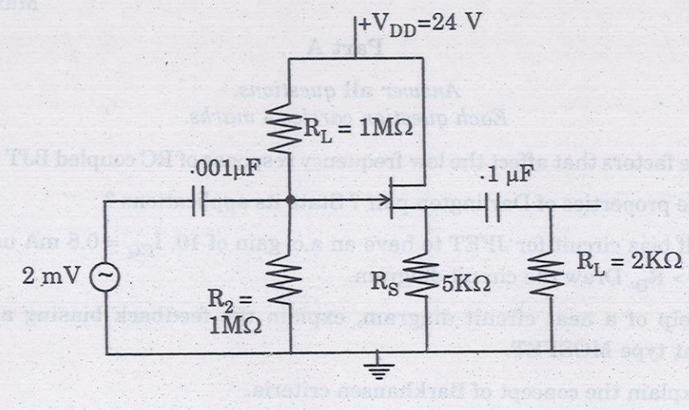
Or

12. (a) What is the effect of coupling capacitor in two-stage RC coupled BJT amplifier ?

    (b) Show that at frequency f_H, the voltage gain drops to 70.7 % of the voltage gain at mid frequency.

13. (a) Draw the small signal low frequency model of a JFET and explain its various elements. Give their typical values.

    (b) Find the voltage gain, input and output resistances of the following circuit. If the input voltage is 2 mV, calculate the value of the output voltage. g_m = 5.5 mV.



Or

14. Sketch the cross-sectional view of an enhancement MOSFET. Explain its operation with the help of its drain and mutual characteristics.

15. Draw the circuit diagram of an Hartley oscillator. Explain how Barkhausen conditions are satisfied. Design the circuit to generate 2 MHz sinusoidal output.

Or

16. Draw and explain the circuit of Wienbridge oscillator. Describe how oscillations are initiated and later sustained in the circuit ? Will the oscillations take place if the bridge is balanced ? Explain.

17. (a) Draw and explain the RC differentiator circuit. Prove that the output is differential of the input. Derive the condition for the differentiation.

    (b) With appropriate circuit diagrams, explain the different methods to trigger a bistable multivibrator.

Or

18. With neat circuit diagram and waveforms, describe the working of an emitter coupled monostable multivibrator. Derive the expression for the gate width. What are its applications ?

19. (a) What is a Triac ? How it is different from a thyristor ? Explain the different modes of operations of a triac.

    (b) Explain the two-transistor analogy of a thyristor. Derive the equation for anode current.

Or

20. (a) With a circuit diagram explain how 7805 as a 0.5 A current source ?

    (b) With a circuit diagram, describe how 7805 can be used as an adjustable voltage source ?

(5 × 12 = 60 marks)