3E2071

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3E2071

B.Tech. IIIrd Semester (Main/Back) Examination, Feb. - 2011

Computer Engineering & Information Technology

3IT1 & 3CS1 Mathematics - III

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Use of following supporting material is permitted during examination (Mentioned in form No.205).

1. Graph Paper *2. Normal distribution Table.*

Unit - I

1. a) Assuming that the petrol burnt (per hour) in driving a motor boat varies as the cube of its velocity, show that the most economical speed when going against a current of C km/hr in $\left(\frac{3}{2}\right)C$ km/hr.

b) State Kuhn - Tukkar condition and use K.T. conditions to

Min. $Z = f(x, y, z) = x^2 + y^2 + z^2 + 20x + 10y$

S.t. $x \geq 40$

$x + y \geq 80$

$x + y + z \geq 120$

OR

a) Find the optimum solution of the following constraint multivariable problem.

Min $z = x_1^2 + (x_2 + 1)^2 + (x_3 - 1)^2$

S.t. $x_1 + 5x_2 - 3x_3 = 6$

b) Minimize $f(x) = \frac{1}{2}\left(x_1^2 + x_2^2 + x_3^2\right)$

S.t $g_1(x) = x_1 - x_2 = 0$

and $g_2(x) = x_1 + x_2 + x_3 - 1 = 0$

by Lagrange multiplier method.

Unit - II

2. a) A firm manufactures headache pills in two sizes A and B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate and 1 grain of codeine ; size B contains 1 grain of aspirin, 8 grains bicarbonate and 6 grains of codeine. It has been found by users that it require at least 12 grains of aspirin, 74 grains of bicarbonate and 12 grains of codeine for providing immediate effects. Determine graphically the least number of pills a patient should have to get immediate relief.

b) Solve the following L.P.P.

Min. $z = x_1 - 3x_2 + 2x_3$

S.t $3x_1 - x_2 + 3x_3 \leq 7$

$-2x_1 + 4x_2 \leq 12$

$-4x_1 + 3x_2 + 8x_3 \leq 10$

and $x_1, x_2, x_3 \geq 0$

OR

a) Use duality to solve the following LPP :

Min $Z = 3x_1 + x_2$

S.t. $x_1 + x_2 \geq 1$

$2x_1 + 3x_2 \geq 2$

and $x_1, x_2 \geq 0$

b) A company is spending Rs. 1000 on transportation of its units to four warehouses from three factories. What can be the maximum saving by optimal scheduling. Solve the following transportation problem.

Factory ↓	← Warehouses → W_1	W_2	W_3	W_4	Factory Capacity
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Warehouse Requirement	5	8	7	14	34

Unit - III

3. a) Find the sequence that minimize the total elapsed time required to complete the following jobs on two machines M_1 and M_2.

Jobs :	A	B	C	D	E	F	G	H	I
M_1 :	2	5	4	9	6	8	7	5	4
M_2 :	6	8	7	4	3	9	3	8	11

b) Use graphical method to minimize the time needed to process the following jobs on the machines shown below. For each machine find the job which should be done first. Also find the total elapsed time to complete both the jobs.

Job 1 :	Sequence of machines	A	B	C	D	E
	Time (hrs)	3	4	2	6	2
Job 2 :	Sequence of machines	B	C	A	D	E
	Time (hrs)	5	4	3	2	6

OR

a) A project schedule has the following characteristic :

Activity :	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time(days):	4	1	1	1	6	5	4	8	1	2	5	7

i) Construct a network diagram.

ii) Compute the earliest event time and Latest event time

iii) Determine the critical path and total project duration

iv) Compute total float and free float for each activity.

b) A project has a following time estimates :

Activity	Estimated durations (days)		
(i, j)	Optimistic (t_o)	Most likely (t_m)	Pessimistic (t_p)
(1, 2)	1	1	7
(1, 3)	1	4	7
(1, 4)	2	2	8
(2, 5)	1	1	1
(3, 5)	2	5	14
(4, 6)	2	5	8
(5, 6)	3	6	15

i) Draw the project network.

ii) Find the expected duration and variance of each activity.

iii) Find the early and late occurrence time for each event and the expected project length.

iv) Calculate the variance and standard deviations of project length.

v) What is the probability that the project will be completed 4 days earlier than expected?

Unit - IV

4. a) Find the Laplace transform of $\frac{Sin^2 t}{t}$ and

find the value of $\int_0^\infty \frac{Sin^2 t}{t^2}\, dt$.

b) Solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = t$

given that $y(0) = -3,\ y(1) = -1$

OR

a) Use convolution theorem to find the inverse Laplace transform of $\frac{s}{(s^2+a^2)^2}$

b) Solve $\frac{\partial u}{\partial t} = 2\frac{\partial^2 u}{\partial x^2}$, where $u = u(x,t)$

B.C : $u(0, t) = 0 = u(5, t)$ and $u(x,0) = 10 \sin 4\pi x$

Unit - V

5. a) Given :

θ :	0°	5°	10°	15°	20°	25°	30°
$\tan\theta$:	0.00	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

Find the value of tan 3°, tan 16°, tan 28° stating the appropriate formula used.

b) Using Runge - Kutta method, find the approximate value of $y(0.2)$ if

$\frac{dy}{dx} = x + y^2$ given that $y = 1$ when $x = 0$ take $h = 0.1$

OR

a) Given

x :	1	1.2	1.4	1.6	1.8	2.0
$f(x)$:	0	0.1280	0.5440	1.2960	2.4320	4.0

Find : $f(1.1)$, $f'(1.2)$, $f'(1.8)$

b) Use Milne's Predictor - Corrector method to solve the equation

$\frac{dy}{dx} = x - y^2$ at $x = 0.8$, given that

$y(0) = 0$, $y(0.2) = 0.02$, $y(0.4) = 0.0795$, $y(0.6) = 0.1762$.

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3E2072

B.Tech. IIIrd Semester (Main/Back) Examination, Feb. - 2011

Common for Computer Engg. & IT

Electronic Devices & Circuits

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **five** questions, selecting one question **from each** unit. Schematic diagrams must be shown wherever necessary. Any **data you feel** missing may suitably be assumed and stated clearly.*

Unit - I

1. a) What do you understand by clamping circuit with **neat** diagram explain the action of

   i) Positive clamming and

   ii) Negative clamper

   b) Describe the Hall effect? What properties of a semiconductor are determined From a Hall effect experiment? **(8+8)**

2. a) Find the output of a clipper as shown in Fig. (i). **Assume** that $V_f = 0$ and $r_f = 0$ for both diode

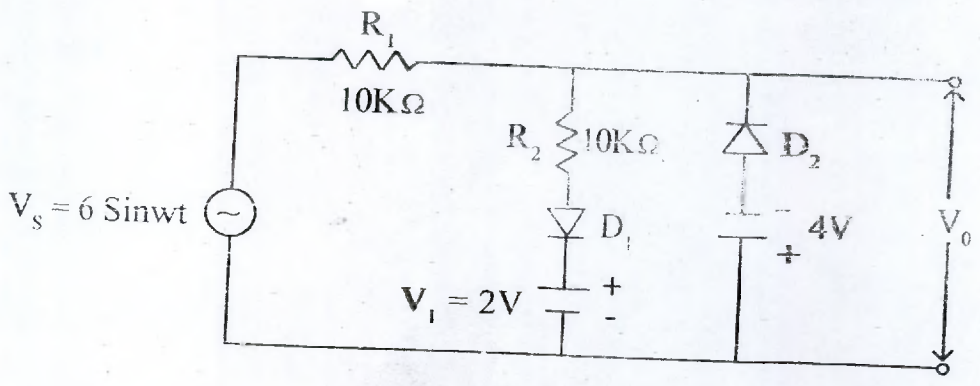


Fig. (1.)

   b) Explain the significance of Fermi level in intrinsic and extrinsic semiconductor energy band distributions? **(8+8)**

Unit - II

3. a) Find out the expression of S, S' and S" for Potential divider biasing circuit (For C.E. configuration)

   b) Draw and explain Ebers Molls representation of BJT? Also define the voltage and current used in Ebers Molls Equation for PNP transition. (8+8)

4. a) Draw the circuit of transistor in common emitter configuration of BJT and sketch the output characteristics indicate the active, saturation and cutoff region. Derive the relationship between α and β for BJT?

   b) h - parameter for CE amplifier has $h_{ie} = 1100\Omega$ $h_{fe} = 50$, $h_{oe} = 25\times10^{-6}$ Mho, $h_{re} = 2.5\times10^{-4}$ if $R_L = 1K\Omega$ Determine the following parameters

   i) current gain

   ii) voltage gain

   iii) power gain

   iv) input impedance (8+8)

Unit - III

5. a) Draw the R-C coupled amplifier circuit? Calculate the current gain for low, middle and high frequencies region?

   b) The amplifier of Fig. (2) Utilizes an N-channel FET for which $V_P = -2V$, $g_{mo} = 1.60$ mA/V and $I_{DSS} = 1.65mA$. It is desired to bias the circuit at $I_D = 0.8$ mA using $V_{DD} = 24V$ assume $r_d >> R_d$ Determine

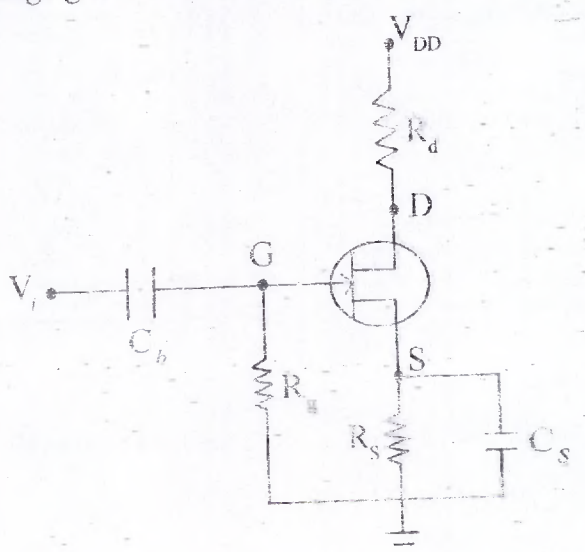
   i) V_{GS}

   ii) g_m

   iii) R_s

   iv) R_d

   such that the voltage gain is atleast 20 dB with R_s bypassed with a very large capacitance C_s (8+8)



6. a) Explain the working of n-channel MOSFET. What is the difference between enhancement and depletion mode of operation.

b) Explain Miller's theorem. Define Boot strapping with its electrical equivalent circuit? (8+8)

Unit - IV

7. a) Explain the Brakhausen criterion for sustained oscillations.

b) Prove that in a negative Feedback amplifier

$$\left|\frac{dA_F}{A_F}\right| = \frac{1}{|1+\beta A|}\left|\frac{dA}{A}\right|$$

Where A_F = gain with feedback, A = transfer gain, β = feedback factor.

(8+8)

8. a) Draw the circuit diagram of voltage shunt Feedback amplifier with its necessary effects? What are the difference between voltage shunt and voltage series Feedback amplifier?

b) Determine the operating frequency of a Hartley oscillator if $L_1 = 100\,\mu H$ $L_2 = 1\,mH$ mutual inductance between coils $M = 10\,\mu H$ and $C = 10$ PF

(8+8)

Unit - V

9. a) Draw the circuit of the wein bridge oscillator. Derive the expression for frequency of oscillation for such as oscillator

b) The parameter of a crystal oscillator equivalent circuit are $L_S = 0.3$ H, $C_S = .08$ PF $R_S = 5\,K\Omega$ and $C_p = 1.9$PF Determine the resonance frequencies F_S and F_p (8+8)

10. a) With the help of circuit diagram explain the working of "Astable multivibrator" give its waveform what are the basic difference among the three types of multivibrator circuits

b) Draw the circuit of a Schmitt Trigger using BJT and explain its working with input voltage versus the output voltage curve. **(8+8)**

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B.Tech. IIIrd Semester (Main/Back) Scheme Examination, Feb. - 2011

Computer Engineering & Information Technology

3IT3 & 3CS3 Data Structures & Algorithms

Time : 3 Hours Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. **Units** of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) How to Define complexity? Explain time and space complexity with simple algorithm and also explain various characteristics of algorithm. **(2+4+2)**

   b) For the following array B compute

   i) The dimension of B

   ii) The space occupied by B in memory

   iii) The address of B [7, 2]

   Array : B column index 0 : 5

   Base address : 1003 Size of memory location : 4 byte Row index 0 : 15

   (2+2+4)

OR

2. a) What do you understand by Asympotatic Notation? Explain the notation Big 'O' Thetha, Omega with suitable example. **(2+6)**

   b) Each element of an array a [-20.....20, 10.....35] Required 1 byte of storage. If the array is coloumn major implemented and the beginning of the array is at location 500. Determine the address of element a [0,30]. **(8)**

Unit - II

3. a) How to define Queue? What are the application of Queue? And also explain algorithm for insertion and deletion in circular Queue. **(2+1+5)**

   b) Write an algorithm to evaluate the prefix expression. **(8)**

OR

4. a) How to define priority Queue? Explain one way and array representation of priority Queue. **(2+6)**

   b) Transform following prefix expression to infix **(4+4)**
   i) ++ A - * $ BCD/+EF * GHi
   ii) + - $ ABC * D ** EFG

Unit - Iil

5. a) Explain insertion and deletion in Doubly linked list with algorithm. **(4+4)**
   b) Write an algorithm to implement stack operation using linked list. **(8)**

OR

6. a) Explain comparision of arrays and linked list as data structure. **(4)**

   b) What do you mean by searching? Differentiate between sequential search and binary search with suitable example. **(12)**

Unit - IV

7. a) How to define Non-linear Data structure? Explain algorithm for post order traversing in binary tree. **(2+6)**
   b) What is the importance of threads in Binary tree? How they are represented in memory? Explain with example. **(4+4)**

OR

8. a) How to define the AVL search tree? Explain insertion and deletion in AVL search tree with example. **(2+5+5)**
   b) Suppose the following sequence list the nodes of Binary Tree T in preorder and inorder respectively.
   Preorder : G, B, Q, A, C, K, F, P, D, E, R, H
   Inorder : Q, B, K, C, F, A, G, P, E, D, H, R
   Draw diagram of tree. **(4)**

Unit - V

9. a) How to define graph? Explain representation of graph using adjacency matrix and list. **(2+4+4)**
   b) Explain quick sort algorithm in detail with example. **(6)**

OR

10. a) Define the graph traversal and which graph traversal is better? Explain breadth first traversal of graph. **(4+4)**
   b) How to define sorting? Explain internal and external sorting. Also write algorithm for bubble sorting. **(2+3+3)**

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3E2074

B.Tech. IIIrd Semester (Main/Back) Scheme Examination, Feb. - 2011

Computer Engineering & Information Technology

3IT4 & 3CS4 Object Oriented Programming

Time : 3 Hours Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Write down the syntax for accessing members of structure using structure variables with suitable example. **(8)**

   b) Explain pointer to structure with suitable example. **(8)**

OR

2. a) What is the difference between Structured Programming and Object-Oriented Programming. **(6)**

   b) Explain syntax of passing structure to functions. Also implement structures as user defined data types. **(10)**

Unit - II

3. a) Distinguish between the following terms :-

   i) Objects and Classes

   ii) Data abstraction and data encapsulation.

   iii) Inheritance and Polymorphism

   iv) Dynamic binding and message passing. **(2×4=8)**

   b) Write a simple program to access and manipulate data members in C++. **(8)**

OR

4. a) Explain constructors with suitable example. Also describe the role of destructors in C++ language. (8)

   b) What is Friend Function? Write a program that implements Friend Function concept. (8)

Unit - III

5. a) What is operator overloading? Why is it necessary to overload an operator? What is an operator function? Describe the syntax of an operator function. (8)

   b) Explain overloading Stream Function with suitable. Example. (8)

OR

6. a) What is a Conversion Function? How is it created? Explain its syntax with suitable example. (8)

   b) Differentiate between unary and binary operators. Also explain overloading binary operators using Friend Function. (8)

Unit - IV

7. What is inheritance? Explain different kind of inheritance with suitable example. (16)

OR

8. a) What is polymorphism? Explain function overloading with suitable example. (8)

   b) What is Virtual Function? Explain function overriding or run time polymorphism with suitable example. (8)

Unit - V

9. Write short note on (any **two**) :- (8×2=16)

   a) Exception Handling

   b) Templates

   c) Multiple Inheritance

OR

10. a) Explain Virtual Base Class with suitable example. (8)

    b) Describe pointers to classes and class members in details. (8)

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3E2075

B. Tech. IIIrd Semester (Main/Back) Scheme Examination, Feb. - 2011

Computer Engineering & Information Technology

3IT5 & 3CS5 Digital Electronics

Time : 3 Hours Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **five** questions, selecting **one** question from **each** unit. Schematic diagrams must be shown wherever necessary. Any data **you feel** missing may suitably be assumed and stated clearly.*

Unit - I

1. a) Convert the decimal number 250.5 to base 3, base 4 and base 7. (6)

   b) Find the 10's complement of $(935)_{11}$. (2)

   c) Find the equivalent Gray Code for $(478)_{10}$. (2)

   d) Obtain the weighted binary code for base - 10 digits using weights of 5421. (2)

   e) Find the complement of the following boolean functions by finding dual of them :

      i) $F(A,B,C) = (A + B' + C)(A + B')(B + C')(A + B + C)$.

      ii) $F(w,x,y,z) = y'z + wxy' + wxz' + w'x'z$. (4)

OR

a) Represent the decimal number 2047 as

   i) Radix - 2 number

   ii) BCD code

   iii) 8, 4, -2, -1 code

   iv) Excess -3 code (4)

b) Represent $(-17)_{10}$ in

   i) Sign Magnitude form

   ii) 1's complement representation (2)

c) Find the radix 'r' for the following equations to be valid :

   i) $\sqrt{71} = 8$

   ii) $\frac{53}{3} = 15$ (4)

d) Perform the following :

i) $(72532)_{10} - (3250)_{10}$ 10's complement subtraction.

ii) $(28)_{10} + (95)_{10}$ BCD Addition.

iii) $(74)_8 - (35)_8$ 7's Complement subtraction. (6)

Unit - II

2. a) Explain the functioning of following gates using appropriate circuit - diagram:

i) CMOS NAND Gate

ii) CMOS NOR Gate (6)

b) Tabulate the comparison between different logic families on the basis of their typical characteristics. (6)

c) Write a short note on :

'Propagation Delay in Digital logic gates'. (4)

OR

a) Explain the functioning of following gates using appropriate circuit - diagram:

i) TTL Gate with open - collector.

ii) TTL Gate with Totem - pole output. (8)

b) Explain the function performed by the wired - OR gate with its circuit diagram. (4)

c) Explain the following :

i) Power Dissipation

ii) Noise Margin (4)

Unit - III

3. a) Simplify the boolean function by using quine - McCluskey method :

$F(A, B, C, D) = \sum_m (1, 3, 7, 11, 15) + d\ (0, 2, 5)$. (8)

b) Simplify the following boolean function using K-map and give simplified expression in SOP form :

$F\ (A, B, C, D) = \Pi\ (0, 1, 2, 3, 4, 10, 11)$ (4)

c) Minimize the following expressions by using the basic laws of boolean algebra:

i) $Y = AB + \overline{AC} + A\overline{B}C(AB + C)$

ii) $Y = \overline{A}BC + \overline{B}CD + AC + \overline{A}\,\overline{B}\,C\,\overline{D}$ (4)

OR

a) The following boolean expression (6)

$F = Z(w' + y)$

is a simplified version of the expression

$F = (w' + y)(x' + z)(w' + z)$

Find the don't care conditions, if any.

b) Simplify the following boolean function, using the don't care conditions d, with K-map and realize the simplified expression with NOR gates only. (8)

$F = A'B'D' + A'CD + A'BC$
$d = A'BC'D + ACD + AB'D'$

c) Express the function

$F = A + \overline{B}C$ (2)

i) in canonical SOP form

ii) in canonical POS form.

Unit - IV

4. a) Design a 4-bit parallel ADDER/SUBTRACTOR circuit with ADD/SUB control line. (6)

b) Design and implement a Full-Subtractor circuit using 3-to-8 decoder and external gates. (4)

c) Design and implement a combinational circuit for addition of two one-digit BCD numbers. (6)

OR

a) Implement the following function using a multiplexer having two select lines A and B.

$F(A, B, C, D) = \sum_m (1, 3, 5, 6, 9, 11, 13, 15)$. (6)

b) Construct a 5×32 decoder with four 3×8 decoders and a 2×4 decoder. (6)

c) For three - inputs, prove that Exclusive - OR function and Equivalence function, both are same. (4)

Unit - V

5. a) Design a Synchronous counter using D-flip flops for the following binary sequence :

0, 1, 3, 7, 6, 4 and repeat. **(8)**

b) Design a 4 - bit, Mode - controlled Bidirectional shift register using SR flip flops and explain its working in both directions. **(8)**

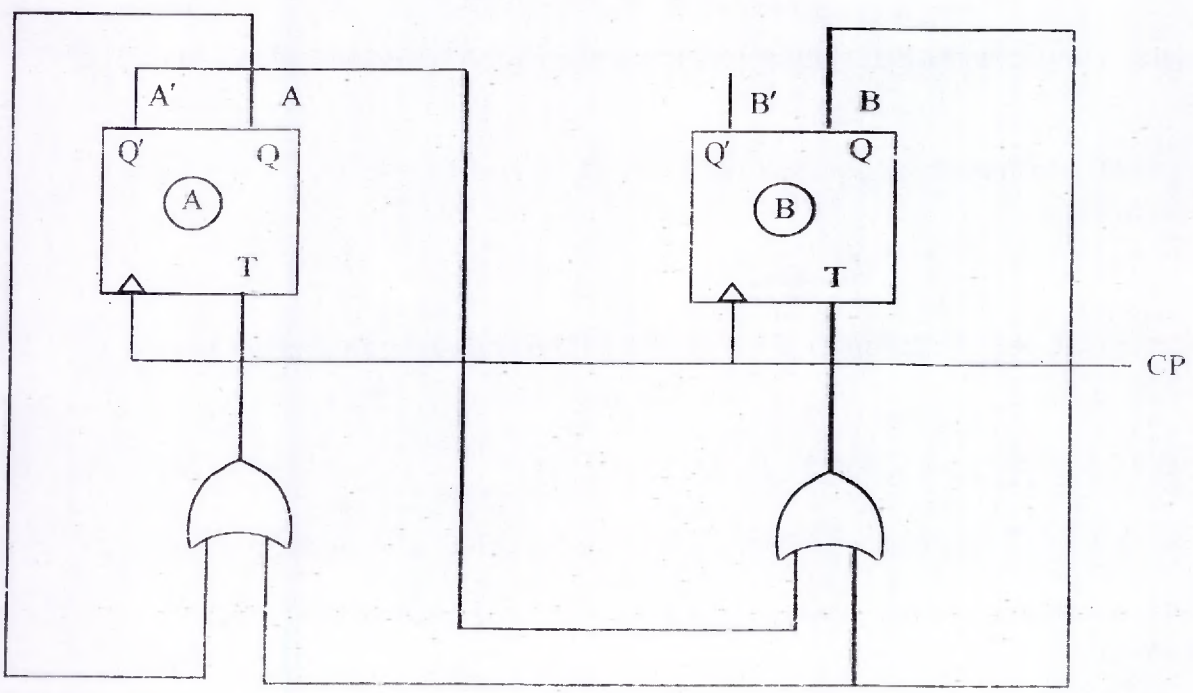
OR

a) Design an asynchronous Decade Counter. Explain the steps of designing and draw its state diagram also. **(8)**

b) Reduce the state - table given below and draw the state - diagram for reduced table. **(4)**

Present State	Next State		Output	
	$x = 0$	$x = 1$	$x = 0$	$x = 1$
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f	0	1

c) Derive the state-table and state-diagram of the sequential circuit of the figure given below. What is the function of the circuit. **(4)**



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B.Tech. IIIrd Semester (Main/Back) Scheme Examination, Feb. - 2011

Computer Engineering & Information Technology

3IT6.2 & 3CS6.2 Fundamentals of Linux & Shell Programming

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Write the Commands for the following : **(1×11=11)**

i) Display the Calendar of 26 January 2011.

ii) List all processes running on the system.

iii) Count the number of words and characters in the File.

iv) To Find the name of your machine.

v) Checking the Spelling of the phrase "Shell Programming".

vi) Remove all '.doc' file in your machine .

vii) How do locate lines beginning and ending with a dot Command?

viii) How grep works in your machine?

ix) How cut usess and echo $RTU works in your machine?

x) What does PS and PWd Command in your machine?

xi) Write commands to backup all the data from the account "Administrator" every day at 24:00 hrs.

b) Draw the Architecture of UNIX system and describe each layer. (5)

OR

a) What information is Presented when the following Commands are entered :

i) mail user 1 user 2 < myprog.C

ii) wall

iii) grep 'india $' abc.

iv) uniq < abc

v) uname - r

vi) df

vii) tee x.sh

viii) tr '*' 'S' x.dat / tee x.dat

ix) du

x) Wc myfile

xi) Ulimit lozy

xii) Umaskozz

(1×12=12)

b) What would be the effect of the following commands? (1×4=4)

i) fg ss + ctlz

ii) bg tt + ctlc

iii) alias c = clear

iv) du ../..

Unit - II

2. a) What are the advantages of file expression? Discuss file operators with suitable examples.

b) Using Sed, How do you convert files with toggle characters, like + rajasthan +, to look like [i] rajasthan [/i]?

c) Using Sed, how do you perform a case-insensitive Search.

d) Explain the advance editing technique in 'vim'. (16)

OR

a) Show the Octal representation of these files Permissions.

i) rwx ..... X .... W .....

ii) .....

iii) ..... Xr X

iv) ..... rWX .....

(2×4=8)

b) Explain about File Security in Unix (4)

c) How do you delete only the first occurance of a pattern? (4)

Unit - III

3. a) Explain the X-Window System. How is different from other Windows?

b) Explain the Client/Server system. Draw the Architecture of X-window Client/Server System. (4×4=16)

OR

a) Explain the X-dient on a remote machine and Applications. What is the Role of Window Manager.

b) What is the use of rpm and Yum Commands in Packages. Explain the different-different Browsing internet. (4×4=16)

Unit - IV

4. a) Write short notes on basic Korn Shell statements.

b) Write short note on relational expression Patterns of Korn Shell.

c) Write a Shell Script that, given a filename as the argument, deletes all even lines (lines 2,4,6 - - - *n*) in the files.

d) Write a shell script to lock your terminal till you enter a password. (4×4=16)

OR

a) Distinguish between Bourne Shell, C Shell and Korn Shell

b) How will you repeat the last Command in

i) Korn Shell

ii) Bash?

c) Write a Shell Script to Print "Rajasthan Technical University" in inverted colours on the screen.

d) Write a Shell script that gives the memory details of the system and how does Shell executes external Commands. (4×4=16)

Unit - V

5. a) Explain the control structures in Shell Programming.

b) Explain the null values in interactive C Shell.

c) Explain about expressions in awk. Shell Script in detail.

d) Explain Source code management RCS and CVS. (4×4=16)

OR

a) What are the different types of operators used in awk Shell script? Explain.

b) Mention different types of loop statements in awk Shell Script.

c) Program a Linux machine to handle ten logins Simultaneously. Name them as USer1, USer2, USer3,..... USer10. All these login terminals should have the same password as "RTUKOTA" and access rights should also be similar.

d) Explain about aliases. (4×4=16)

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3E1461

3E1461

B.Tech. IIIrd Semester (Back, Old Scheme) Examination, Feb. - 2011

Computer Engineering (Common for CP & IT)

3CP1 Digital Electronics

Time : 3 Hours Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. **Units** of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Perform the substraction with the following binary numbers using **(8)**

i) 2's complement ii) 1's complement

I) 11010 - 1101 II) 10010 -10011

III) 11010 - 10000 IV) 100 - 110000

b) Represent the decimal number 8620 **(8)**

i) in BCD ii) in excess -3 code

iii) in 2, 4, 2, 1 code iv) as a binary number

OR

a) Simplify the following Boolean functions **(8)**

i) $xyz + x'y + xy'z'$

ii) $(A+B)(A+\bar{A}B)C+\bar{A}(B+C)+\bar{A}B+ABC$

iii) $\left[A\bar{B}(C+BD)+\bar{A}\bar{B}\right]C$

iv) $Zx+Z\bar{x}y$

b) Find the complement of the function F = A+BC ; then show that $F.F' = 0$ and $F+F' = 1$ **(8)**

Unit - II

2. Using K-Map simplify the following Boolean function and implement in NOR lo

a) $f(A,B,C,D)=\sum(2,3,5,7,9,11,12,13,14,15)$

b) $f(A,B,C,D)=\Pi(0,1,2,3,4,10,11)$ **(16)**

OR

Simplify the following Boolean function by using the tabulation method : **(16)**

$F=\sum_m(0,1,2,8,10,11,14,15)$

Unit - III

3. a) Specify the truth table for a half subtractor circuit and realize the circuit usi AND-OR gates. How two half subtractors can be combined to obtain a full subtractor. **(8)**

b) Using half subtractor and full subtractors draw and explain the block schematic of a 4-bit parallel binary subtractor. **(8)**

OR

a) Design a BCD to Decimal decoder. **(8)**

b) Implement the following function with a multiplexer.

$F(A,B,C,D)=\sum_m(0,1,3,4,8,9,15)$ **(8)**

Unit -IV

4. Design a sequential circuit with JK flip flop to satisfy the following state equatio

$A(t+1)=\bar{A}\bar{B}CD+\bar{A}\bar{B}C+ACD+A\bar{C}\bar{D}$

$B(t+1)=\bar{A}C+C\bar{D}+\bar{A}B\bar{C}$

$C(t+1)=B$ **(16)**

$D(t+1)=\bar{D}$

OR

Convert the following Flip - Flops

a) R-S Flip Flop to J-K Flip - Flop

b) T Flip Flop to D Flip - Flop. **(8+8)**

Unit - V

5. a) Show CMOS circuit that implement the following function. **(8)**

x_0	x_1	z
0	0	0
0	1	1
1	0	0
1	1	0

b) Compare the characteristics of RTL, TTL, ECL and CMOS logic families. **(8)**

OR

a) Draw the circuit of 4 - input ECL OR-NOR gate and explain its working. **(8)**

b) Draw open collector NAND gate (T T L) circuit and explain its working. **(8)**

3E1462

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3E1462

B.Tech. IIIrd Semester (Back Old Scheme) Examination, Feb.-2011
(Common for Computer Engineering & IT)
Electronic Devices & Circuits

Time : 3 Hours | Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **five** questions, selecting **one** question from **each** unit. Schematic diagrams must be **shown** wherever necessary. Any data you feel **missing** may suitably be assumed and stated clearly.*

Unit - I

1. a) Draw V-I (Voltage - Current) characteristics for a P-N Junction diode and show how temperature change affect the characteristic?

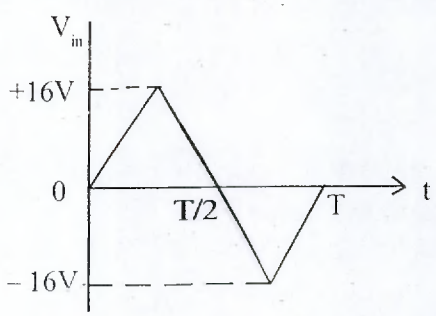
   b) What are the Voltage Multipliers? Describe its working with neat circuit diagram. **(8+8)**

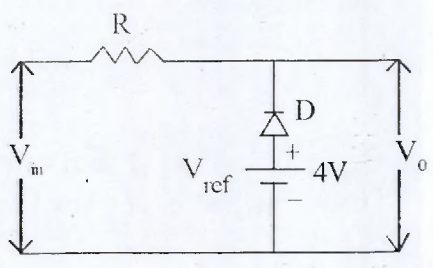
OR

2. Determine the output waveform of following circuits :- **(8+8)**

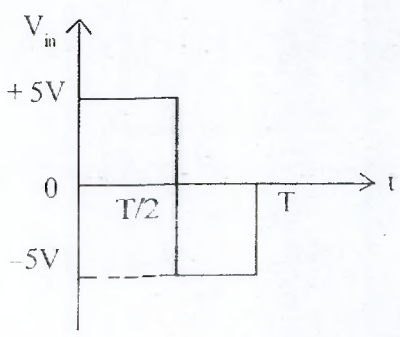
   (Assume diode D to be an ideal Si diode)

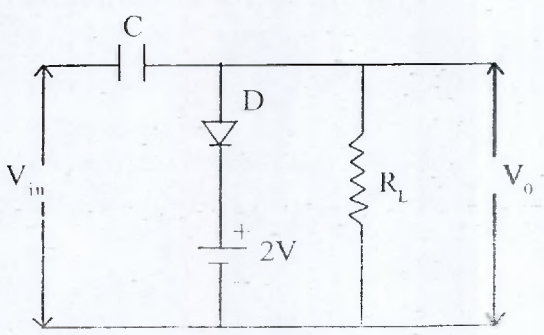
   a)





   b)





Unit - II

3. a) Differentiate between Zener and avalanche break down.

   b) What is thermistor? Give its symbol and typical characteristic. (8+8)

OR

4. a) Distinguish between Junction Field Effect Transistor (FET) and Bipolar Junction Transistor (BJT)?

   b) Describe construction and working of Uni-Junction. Transistor (UJT)? What are main applications of UJT? (8+8)

Unit - III

5. a) Explain the working of FET as Voltage Variable Resistor (VVR) and give its application.

   b) An N-channel JFET has I_{DSS} = 10 mA and Vp = -4V. Determine the minimum value of V_{DS} for Pinch off region and drain current I_D for V_{GS} = -2V in Pinch off region. (8+8)

OR

6. a) Describe the output characteristic of a commonemitter BJT (Bipolar Junction Transistor)?

   b) Explain thermal runaway in BJT and how it can be avoided? (8+8)

Unit - IV

7. a) Draw neat circuit diagram of two stage R-C coupled Amplifier using BJT. Draw the frequency response and explain it briefly.

   b) Explain Differential Amplifiers. (8+8)

OR

8. a) Draw circuit diagram and explain briefly about darlington connection. Also find the expression for Ri (Input resistance) and Av (Voltage gain).

b) The following h-parameters are given for a CE transistor Amplifier :-

$h_{ie} = 1100\Omega$, $h_{fe} = 50$, $h_{oe} = 25\mu A/V$, $h_{re} = 2.5\times10^{-4}$ if $R_L = 1\ K\Omega$, then find the following :-

i) Current gain (A_i)

ii) Input Impedance (Zi) (8+8)

Unit - V

9. a) Explain barkhausen criterian in brief.

b) Draw the R-C phase shift oscillator circuit using BJT and describe its working? (8+8)

OR

10. a) Sketch a Schmitt-trigger circuit and explain its working.

b) Explain the working of transistorised (BJT) Bi-stable multivibrator. (8+8)

3E1463

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3E1463

B. Tech. IIIrd Semester Examination. Feb. - 2011
(Common for Computer Engg. & IT (Old Scheme, Back) & EX (Main & Back))
Data Structures & Algorithms

Time : 3 Hours **Maximum Marks : 80**

Min. Pass'ng Marks : 24

Instructions to Candidates:

*Attempt overall **five** questions, selecting **one** question from **each** unit. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

Unit - I

1. a) Describe the notation of **(3×2)**

i) Complexity of an algorithm

ii) Space-time trade off of algorithm.

b) Compute the following **(2×2)**

i) $\lfloor \log_2 0.01 \rfloor$ ii) $\lceil \log_2 1000 \rceil$

c) $P(n) = a_0 + a_1 n + a_2 n^2 + ----- + a_m n^m$. If degree of $P(n) = m$ them prove that $P(n) = O(n^m)$. **(6)**

2. a) Write advantage and disadvantage of using linked list storage for storing string. **(4)**

b) A and B are two Multidimensional array declared as : **(4×2)**

$A(-2:2, 2:22)$ and $B(1:8, -5:5, -10:5)$

i) Find length of each dimension and number of element in A and B.

ii) Consider the element B[3, 3, 3] in B. Find the effective indices E_1, E_2, E_3 and address of element assuming Base (B) = 400 and W = 4 words per memory location. [Assume B is stored in column - major order]

c) For an integer K, write an algorithm which delete K^{th} element from two-way circular linked list. **(4)**

Unit - II

3. a) What do you mean by stack and queue? Explain with the help of example. Write an algorithm for implementation of recursion. **(4+4)**

b) Let a and b denote positive number. A function Q is defined Recursively as follow

$$Q(a,b)=\begin{cases}O & \text{if } a<b\\ Q(a-b,\,b)+1 & \text{if } b\le a\end{cases}$$

i) Find the value of Q (2, 3) and Q (14, 3).

ii) What this function do? Find Q (5861,7) (4+4)

4. a) Write a program which gives the solution to the Towers of Hanoi problem for 4 disk. Also define it's generalized solution for n disk. (4+4)

b) What do you mean by Queues and Deques? Describe the linked representation of queues. (4+4)

Unit - III

5. a) Define the different type of Binary tree. Explain the Representation of Binary tree in Memory. (4+4)

b) What is Heap sort? Explain the Algorithm for Insertion and deleation of element in Heap tree . (2+6)

6. a) What do you understand by AVL tree? Insert the element in AVL tree. 64, 1, 44, 26, 13, 110, 98, 85. (3+5)

b) Write an algorithm which print the nodes of T in

i) Preorder ii) Inorder iii) Postorder (8)

Unit -IV

7. a) Explain the shortest-path Algorithm. Describe the Breadth-first search and depth-first search with the help of suitable example. (4+4+4)

b) What is Adjacency matrix and Adjacency lists? (4)

8. Which minimum spanning tree algorithm is better and why? Write Prime and Dijkstra's algorithm. (4+6+6)

Unit - V

9. Which is better among Bubble, Selection, Quick and Merge sort and why? Also write complexity of above algorithm in worst and average case. (16)

10. What do you mean by Hush function? Explain the Division method, Mid square method and folding method with suitable example. (4+12)

3E1464

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3E1464

B.Tech. IIIrd Semester (Back, Old Scheme) Examination, Feb. - 2011

Computer Engineering

3CP4 Discrete Mathematical Structure

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Prove that the following implications are tautologies : **(8)**

   i) $p \wedge q \rightarrow p \vee q$

   ii) $\sim p \rightarrow (p \rightarrow q)$

   b) Prove the following equivalences : **(8)**

   i) $(p \rightarrow q) \wedge (p \rightarrow r) = p \rightarrow (q \wedge r)$

   ii) $(p \rightarrow r) \wedge (q \rightarrow r) = (p \vee q) \rightarrow r$

2. a) Prove $\sim \sim p$

$$\begin{array}{l} p \wedge q \rightarrow r \wedge s \\ \underline{q} \\ \therefore s \end{array}$$ **(8)**

   b) Test the validity of the following argument :

   "If 5 is a prime number, then it will not be divisible by 5". **(8)**

Unit - II

3. a) Prove that if n be an integer then if n^2 is odd then n is also odd, by indirect method. **(8)**

   b) Use mathematical induction to prove that $n^3 - n$ is divisible by 3, whenever n is a positive integer. **(8)**

4. a) Solve the recurrence relation $a_n + a_{n-1} - 6\,a_{n-2} = 0$; given that $a_0 = 1, a_1 = 2$; $n-2 \geq 0$. (8)

b) Solve the recurrence relation

$$u_{n+2} + u_{n+1} + u_n = n^2 + n + 1$$ (8)

Unit - III

5. a) Prove that the number of odd degree vertices in a graph G is always even. (8)

b) Find the number of ways in which 11 persons may sit at a round table so that every person has different neighbours in those arrangements. (8)

6. Consider 3 coloring of the configurations of the vertices of a square. If the three colors are red, white and blue, how many non-equivalent configurations have exactly two blue vertices? (16)

Unit - IV

7. a) In a Survey of 60 people it was found that 25 read News Week, 26 read Time and 26 read the magazine Fortune. Also, 9 read both News Week and Fortune, 11 read News Week and Time. and 8 read Time and Fortune. If 8 read none of the three magazines, determine the number of people who read exactly one of the three magazines. (8)

b) Find the Discrete Fourier Transform of the sequence $< d_k > = \{1, 2, 3, 4\}$. (8)

8. a) Show that the mapping $f : A \to A$, defined by $f(x) = 2x+1$ is a bijection, find f^{-1}. (8)

b) Find the Discrete Fourier Transform of $< d_k > = \{1, -1, 0\}$; $k = 0, 1, 2$. (8)

Unit - V

9. a) Define the following : (8)

i) Monoid ii) Cyclic group

iii) Subgroup iv) Normal Subgroup

b) Show that intersection of two subgroups H and K of group G is also a subgroup of G. (8)

10. a) Let N be a normal subgroup of a group G, and iet R be following relation on G : $a\,R\,b$ iff $a^{-1} b \in N$, then prove R is a congruence relation on G. (8)

b) Write down a short note on Parity check equations. (8)
