

3E2074

Roll No. : _____

Total Printed Pages : **3****3E2074**

B. Tech. (Sem. III) (Main) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Object Oriented Programming)

Time : **3 Hours**][Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.*

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

1 Explain structure as a user defined data type in 'C' with the help of suitable example.

16**OR**

1 (a) Explain followings with their syntax :

- (i) pointer to structure
- (ii) parsing structure to function
- (iii) array of structure.

4+4+4

(b) What is the difference between structured programming and object oriented programming?

4

2 (a) What is constructor? How many types of constructors are in C++? Describe with the help of a suitable example.

10

- (b) Define followings :
- (i) reference variables in C++
 - (ii) static member function
 - (iii) this pointer.

2×3=6

OR

- 2 (a) What is friend function? Write a program to swap private data of two classes.

8

- (b) Differentiate followings :
- (i) objects and classes
 - (ii) data abstraction and encapsulation
 - (iii) inline function and macro
 - (iv) constructor and destructor.

2×4=8

- 3 What is operator overloading? How many arguments are required to overload unary and binary operators, respectively? Define a class string, use overloaded == operator to compare two strings.

2+2+12=16

OR

- 3 (a) What is type conversion in C++? How it is achieved in user defined data types?

8

- (b) What is function overloading? Explain with the help of a suitable example.

8

- 4 What is inheritance? What are the various forms of inheritance? Explain each with the help of examples.

16

OR



4 What is polymorphism? How is it achieved at compile time and runtime? Explain both with the help of example.

16

5 What is generic programming? How is it implemented in C++? Write a program to implement sorting using templates.

16

OR

5 Write short notes on : (any two)

- (a) Exception handling
- (b) Virtual Base class
- (c) Multiple inheritance.

2×8=16



3E2073

Roll No. : _____

Total Printed Pages : **2****3E2073**

B. Tech. (Sem. III) (Main) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Data Structures & Algorithms)

Time : **3 Hours**][Total Marks : **80**[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.*

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

1. _____ Nil _____ 2. _____ Nil _____

UNIT-I

- 1 Define the Computer Algorithm? What are various characteristics of Algorithm? Why it is difficult to estimate the execution time of Algorithm? How execution time is calculated?
- 2 (a) What do you understand by Asymptotic Notations? Explain the notation big 'O', Theta and Omega with suitable example.
(b) Define the Storage Element Array. What are the various operation performed on array? Explain with example.

UNIT-II

- 3 (a) What do you understand by polynomial algorithm? Explain with example.
(b) Write an algorithm multiplication of sparse matrices.
- 4 (a) Write an algorithm for dequeue and circular queue.
(b) How is stack useful in function Call and Return? Write an algorithm for Recursion.



UNIT-III

- 5 What do you mean by searching? Differentiate between sequential search and binary search with suitable example.
- 6 Write an algorithm to implement stack, queue and dequeue by using linked list data structure and also write how insertion and deletion will take place.

UNIT-IV

- 7 (a) What is a threaded and unthreaded binary tree data structure? How they are represented in memory? Explain with example.
(b) What do you mean by AVL tree? Insert the following list of data in an AVL tree :
50, 63, 65, 69, 71, 72, 200, 0, 7, and 63.
- 8 (a) How is B-tree are different from B+ tree? What are their merits and demerits?
(b) Define the tree. What are their characteristics? What are the application of tree?

UNIT-V

- 9 (a) Define minimum spanning tree algorithm? Write Kruskal Algorithm with suitable example and explain.
(b) What do you understand by 'Heap'? Explain with suitable example.
- 10 (a) Define the graph traversal. Which graph Traversal is better? Explain depth first search traversal.
(b) Which is the better sorting method among Radix, Bubble, Quick Insertion and why?



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Total Printed Pages : **4****3E2071**

B.Tech. (Sem. III) (Main) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Mathematics - III)

Time : **3 Hours**[Total Marks : **80**[Min. Passing Marks : **24**

Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.

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

1. _____ **Graph Paper** _____ 2. _____ **Nil** _____

UNIT - I

- 1 (a) Find the maxima and minima of the function

$$u = x^3 + y^3 - 3x - 12y + 25.$$

6

- (b) Solve the following problem using Kuhn-Tucker conditions :

$$\text{Minimize } f(x_1, x_2, x_3) = x_1^2 + x_2^2 + x_3^2$$

$$g_1 = 2x_1 + x_2 - 5 \leq 0$$

$$g_2 = x_1 + x_3 - 2 \leq 0$$

$$g_3 = 1 - x_1 \leq 0$$

$$g_4 = 2 - x_2 \leq 0$$

$$g_5 = -x_3 \leq 0$$

10**OR**

- 1 (a) Find the point on the plane $x + 2y + 3z = 1$ which is nearest to the point $(-1, 0, 1)$ by Lagrange's multipliers method.

8

- (b) A rectangular sheet of metal has four equal square portions removed at the corners and the sides are then turned up so as to form an open rectangular box. Show that when the volume contained in the box is maximum, the depth will be

$$\frac{1}{6} \left[(a+b) - (a^2 - ab + b^2)^{1/2} \right] \text{ where 'a' and 'b' are original dimensions of the rectangle.}$$

8**[Contd...**

UNIT - II

- 2 (a) A firm manufactures two products A and B on which the profit earned per unit is Rs. 3.00 and Rs. 4.00 respectively. Each product is processed on two different machines M_1 and M_2 . Product A requires 1 minute of processing on M_1 and 2 minutes on M_2 , while B requires 1 minute on machine M_1 and 1 minute on machine M_2 . Machine M_1 is available for not more than 7 hours 30 minutes while M_2 is available for 10 hours on any working day. Find the number of units of A and B to be manufactured to have maximum profit. Formulate the problem and solve graphically. 8

- (b) Solve the following LPP by using Simplex method :

$$\text{Max. } Z = 5x_1 + 3x_2$$

$$\text{S.T. } 3x_1 + 5x_2 \leq 15$$

$$5x_1 + 2x_2 \leq 10$$

$$\text{and } x_1, x_2 \geq 0$$

OR

- 2 (a) Find the dual problem of the following LPP :

$$\text{Max. } Z = x_1 + 3x_2$$

$$\text{S.T. } 3x_1 + 2x_2 \leq 6$$

$$3x_1 + x_2 = 4 \quad \text{and } x_1, x_2 \geq 0$$

- (b) Solve the following transportation problem :

	D_1	D_2	D_3	D_4	
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
	20	40	30	10	100

using MODI method.

UNIT - III

- 3 (a) A project consists of a series of tasks labelled A, B, ..., J, with the following relationships $A < D, E$; $B, D < F$; $C < G$, $B < H$; $F, G < I$. Construct the network diagram, find also the minimum time of completion of the project, when the time of completion of each task is as follows :

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Task	A	B	C	D	E	F	G	H	I
Time (days)	23	8	20	16	24	18	19	4	10

8

- (b) A small project is composed of nine activities, whose time estimates are as given below :

Activity (i, j)	Estimated durations (days)		
	Optimistic	Most Likely	Pessimistic
(1, 2)	3	6	15
(1, 6)	2	5	14
(2, 3)	6	12	30
(2, 4)	2	5	8
(3, 5)	2	11	20
(4, 5)	3	6	15
(6, 7)	3	9	27
(5, 8)	1	4	7
(7, 8)	4	19	28

Draw the project network and calculate the length and variance of the critical path. Find the probability for the project to be completed in 41 days.

8

OR

- 3 (a) We have 7 jobs each of which has to go through the machine A and B in the order $A \rightarrow B$. Processing times are given below. Determine a sequence of these jobs that will minimize the total elapsed time :

Jobs	1	2	3	4	5	6	7
A	3	12	15	6	10	11	9
B	8	10	10	6	12	1	3

8

- (b) Use graphical method to minimize the time required to process the following jobs on the machine shown below (ie for each machine find the job which should be done first). Also calculate the total elapsed time :

Job 1	Sequence of Machines	A	B	C	D	E
	Time	3	4	2	6	2
Job 2	Sequence of Machines	C	A	D	E	B
	Time	5	4	3	2	6

8

UNIT - IV

- 4 (a) Find the Laplace transform of $\sin \sqrt{t}$. Hence show that

$$L \left\{ \frac{\cos \sqrt{t}}{\sqrt{t}} \right\} = \left(\frac{\pi}{s} \right)^{1/2} e^{-(1/4)s}$$

8



(b) Use Laplace transform to solve the differential equation

$$y'' + 9y = \cos 2t, \quad y(0) = 1, \quad y\left(\frac{\pi}{2}\right) = -1.$$

OR

4 (a) Find $L^{-1}\left\{\frac{1}{s^3(s^2+1)}\right\}$.

(b) Solve $\frac{\partial u}{\partial t} = 3 \frac{\partial^2 u}{\partial x^2}$.

BC : $u(x, 0) = 30 \cos 5x, \quad u\left(\frac{\pi}{2}, t\right) = 0, \quad \left(\frac{\partial u}{\partial x}\right)_{x=0} = 0.$

UNIT - V

5 (a) Using Lagrange's interpolation formula, find the value of y when $x=10$ from the following data :

x	5	6	9	11
y	12	13	14	16

(b) Use Gauss' backward central interpolation formula to estimate the population in 1936, given that

<i>Year</i>	1901	1911	1921	1931	1941	1951
<i>Population in thousands</i>	12	15	20	27	39	52

OR

5 (a) Use Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule to calculate $\int_0^1 \frac{dx}{1+x^2}$. Hence obtain the approximate value of π in each case.

(b) Use modified Euler's method to solve $\frac{dy}{dx} = x + \sqrt{y}$, with initial conditions, $y=1$ at $x=0$, for $x=0.6$ in steps of 0.2.



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Total Printed Pages : **4**

B.Tech. (Sem. III) (Main) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Electronic Devices & Circuits)

Time : 3 Hours]

[Total Marks : 80
[Min. Passing Marks : 24

Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

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

1. _____ **Semi Log Graphpaper** _____ 2. _____ **Nil** _____

UNIT - I

- 1 (a) Define and explain the following terms :
(i) Mobility
(ii) Conductivity 5+5
- (b) Determine the voltage available at the output of the circuit shown in Fig 1. if the secondary voltage of the transformer is 120 V (rms).

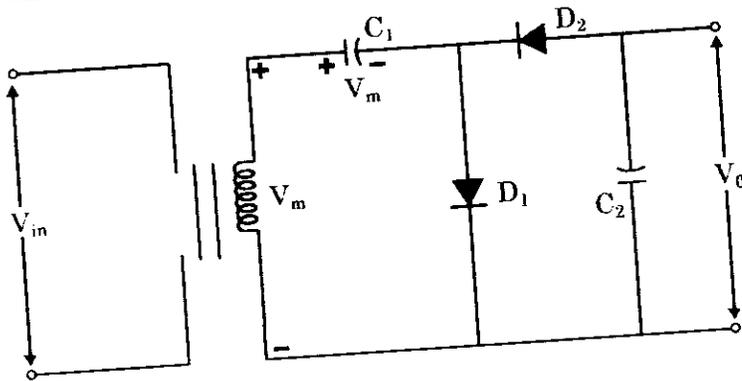


Fig. 1

6

OR

- 1 (a) Derive the continuity equation, explain the physical meaning of each term in the equation. 8
- (b) Determine V_0 for the network shown in Fig. 2.

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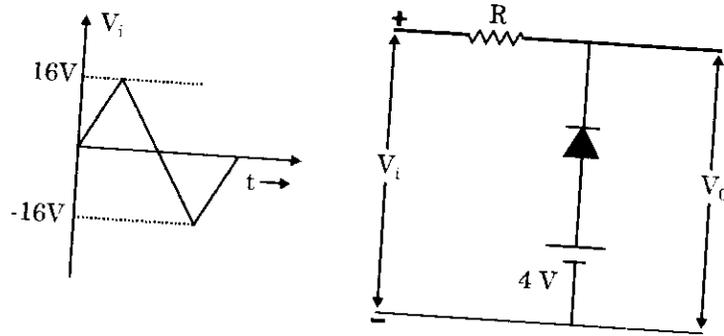


Fig. 2

8

UNIT - II

- 2 (a) Sketch the input and output characteristics for a transistor connected in CB configuration. Obtain the parameters h_{ib} , h_{fb} , h_{rb} , h_{ob} . 12
- (b) Explain the concept of thermal stability in a transistor. 4
- OR
- 2 (a) Show that the thermal runaway cannot take place if the quiescent point is located at $V_{CE} < \frac{1}{2} V_{CC}$. 6
- (b) Determine V_{CEQ} and I_{EQ} for the network shown in Fig. 3.

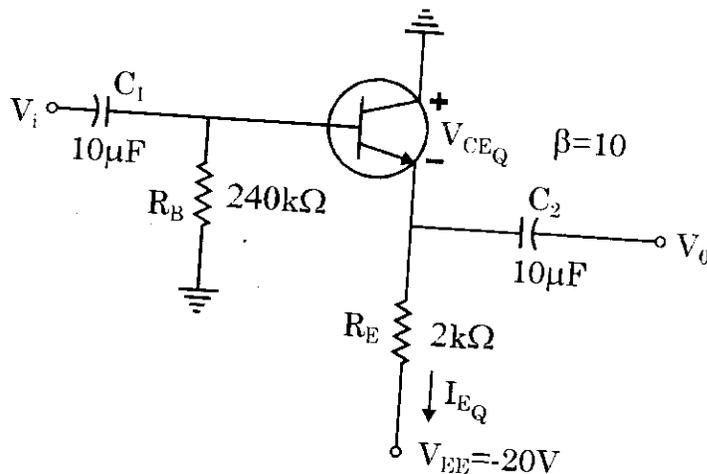


Fig. 3



UNIT - III

3 (a) Derive the following for the emitter follower circuit :

(i) A_v (ii) R_{if} (iii) R_{of}

8

(b) For circuit shown in Fig. 4, following parameters are given :

$$C_G = 0.01 \mu F, C_c = 0.5 \mu F, C_s = 2 \mu F,$$

$$R_{sg} = 10 k \Omega, R_G = 1 M \Omega, R_D = 4.7 k \Omega,$$

$$R_s = 1 k \Omega, R_L = 2.2 k \Omega, I_{DSS} = 8 mA,$$

$$V_p = -4 V, r_d = \infty \Omega, V_{DD} = 20 V.$$

Determine the lower cut off frequency, also plot the frequency response.

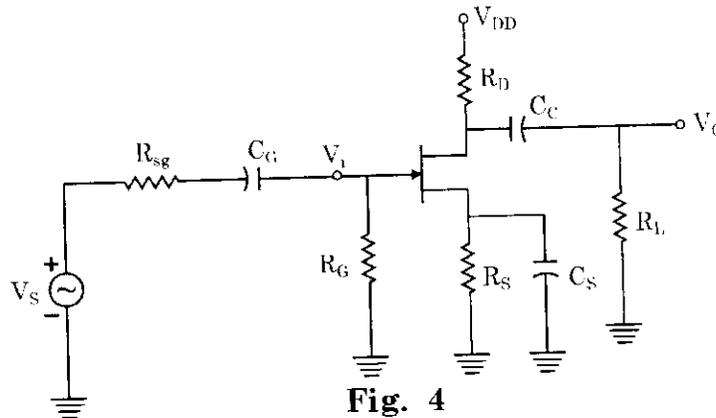


Fig. 4

8

OR

3 (a) For the amplifier shown in Fig 5, find R_i , R_i' , A_v , A_{v_s} and A_l . The transistor parameters for CE are :

$$h_{ie} = 1.1 k \Omega, h_{re} = 2.5 \times 10^{-4}$$

$$h_{fe} = 50, h_{oe} = 24 \mu A/s$$

$$\frac{1}{h_{oe}} = 40 k \Omega$$

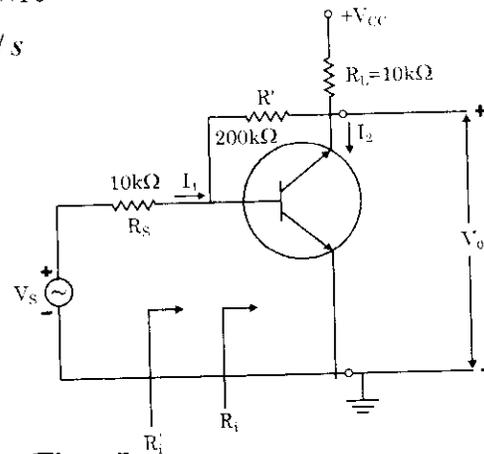


Fig. 5

10



- (b) State and explain Miller's theorem.

6

UNIT - IV

- 4 (a) Derive the voltage gain of the circuit with voltage shunt feedback amplifiers.

8

- (b) An amplifier with a $1k\Omega$ input resistance and a $50k\Omega$ output resistance has a voltage gain of 40. The amplifier is now modified to provide a 10% negative voltage feedback in series with input. Calculate :

- (i) The voltage gain with feedback
 (ii) The input resistance with feedback
 (iii) The output resistance with feedback.

8

OR

- 4 (a) In the circuit shown in Fig. 6 which represents the BJT amplifier with current series feedback, calculate the voltage gain of the circuit.

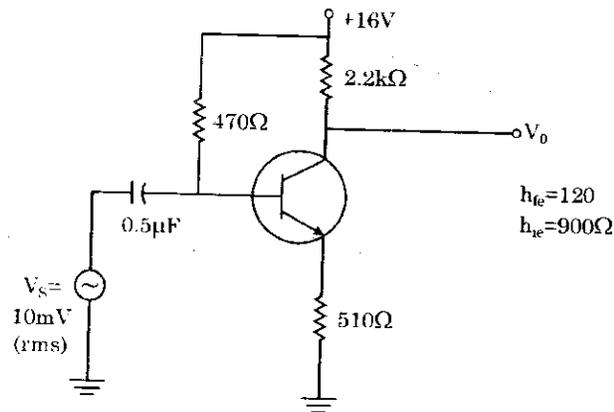


Fig. 6

- (b) Describe briefly how different feedback amplifiers are classified. Also explain the characteristics of negative feedback amplifiers.

8

8

UNIT - V

- 5 (a) Clearly distinguish between astable, monostable and bistable multivibrators on the basis of their operation and working principle.

- (b) What-are the different characteristic of a crystal oscillators? Explain.

10

6

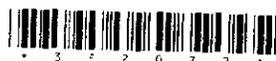
OR

- 5 (a) Explain the operation and working of a wien bridge oscillator, also derive the necessary equation for oscillation.

- (b) State and explain the frequency stability criterion for sinusoidal oscillator.

10

6



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Roll No. : _____

Total Printed Pages : **4**

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B.Tech. (Sem. III) (Main) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Fundamental of Linux & Shell Programming)

Time : 3 Hours]

[Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.*

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

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

- 1 (a) Answer the following questions using shell command only :
- How can you only see the first 14 lines of a file ?
 - What is the command to list ALL (hidden also) files of current directory and its sub directories ?
 - Which two commands can you use to delete directories ?
 - What command you execute to display the last five commands you have entered ?
 - How can you uncompress the file named 'xyz.bz2' ?
 - How can you count the number of words in a file named 'f1' ?
 - Which command is used to count the number of user logged in ?
 - Which command is used to over write the contents of a file named 'f1' ?
- 8
- (b) What are the various methods to get help in Linux ?
- 3
- (c) Explain Input/Output redirection and Piping in detail.
- 5

OR

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1

[Contd...

- 1 (a) Explain the term 'Open Source Technology'. Also list the criteria associated with open source softwares. 4
- (b) Explain Linux file system tree architecture with the help of diagram. Describe how linux is more secured than other operating systems. 6
- (c) List the various permissions used for files and directories in Linux ? How can you change the permissions using chmod, chgrp, chown commands ? 6

UNIT - II

- 2 (a) Explain vi editor and its modes with the help of diagram. Also explain its features. 8
- (b) Explain advanced vi tools, tricks, and techniques in detail. 8

OR

- 2 (a) Explain the yank, put and delete commands used in vi editor. 6
- (b) How can you search a specified pattern in a vi editor ? 4
- (c) Explain the following : 6
- (i) Features of vi editor
- (ii) Cursor movement in vi editor.

UNIT - III

- 3 (a) What do you understand by the term 'X' in X-windows ? Explain the components of X-windows system. 8
- (b) Explain the yum and rpm commands used for installation, deletion, updation of packages. 6
- (c) How can you run X-client on a remote machine ? 2

OR



- 3 (a) Explain the concept of virtual desktop windows manager in X-windows system. Also explain its features. 8
- (b) Explain the following :
(i) X-Display
(ii) X-Authority. 8

UNIT - IV

- 4 (a) What is the purpose of shell ? Explain different types of shell. 8
- (b) Explain the following :
(i) Command line editing
(ii) File name completion 8

OR

- 4 (a) Explain the special characters used for searching files and path name. 7
- (b) Explain the following :
(i) Features of bash
(ii) Process of debugging a bash script
(iii) Variables used in bash. 9

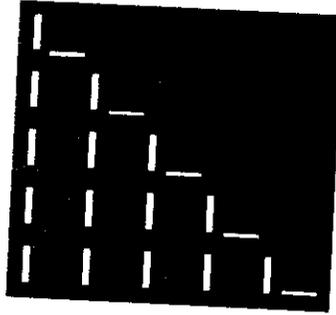
UNIT - V

- 5 (a) Write Shell Script to find out biggest number from given three numbers. Numbers are supplied as command line argument. Print error if sufficient arguments are not supplied. 7
- (b) Explain the following :
(i) File name substitution
(ii) Job controlling
(iii) Awk utility. 9

OR



- 5 (a) Write shell script using for loop to print the following pattern on screen :



- (b) Explain the role of CVS. Also explain the organizational features of CVS. 6
- (c) Explain all the decision making statements with syntax. 5
- 5



3E1461

Roll No. : _____

Total Printed Pages : **3**

3E1461

B.Tech. (Sem. III) (Back) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Digital Electronics)

Time : 3 Hours]

[Total Marks : 80
[Min. Passing Marks : 24

Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

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

1. _____ Nil _____

2. _____ Nil _____

- 1 (a) (i) Convert decimal 65535 to hexadecimal and binary.
(ii) Convert decimal 29 to an excess-3 number.
(iii) Convert octal 34.562 to binary.
(iv) Convert decimal 2479 to hexadecimal.
(b) Add and multiply $(1230)_4$ and $(23)_4$.

OR

- 1 (a) Find the decimal equivalent of each of the following numbers assuming to be in 2's complement format :

- (i) 10010
(ii) 1000
(iii) 0110
(iv) 00110111

- (b) (i) Convert binary $(10110)_2$ to Gray code
(ii) Perform subtraction using 10's complement 4250-76532
(iii) Perform subtraction using 2's complement 11101-1100
(iv) Perform addition $6B3+A9C$

- 2 (a) Determine the minimum set of prime implicants of the function

$$F(w, x, y, z) = \sum 1, 4, 6, 7, 8, 9, 10, 11, 15$$

[Contd...

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(b) Simplify $(A+B) \left[\overline{A+(B+C)} \right] + \overline{A}B + \overline{A}C$.

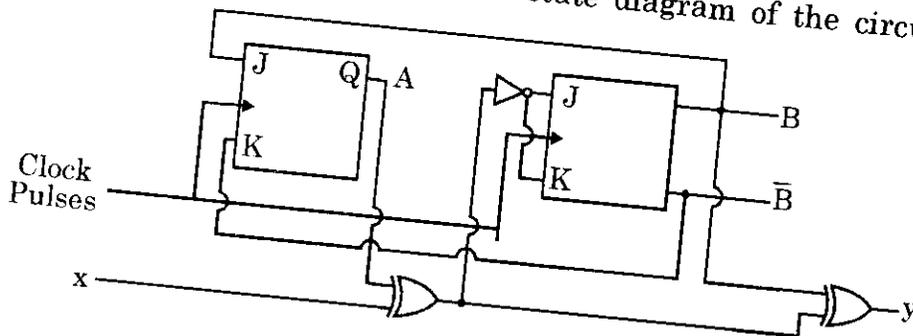
OR

- 2 (a) Minimize the following functions using K-map and realize using minimum number of gates

$$f = \sum m(0, 3, 5, 6, 9, 10, 12, 15)$$

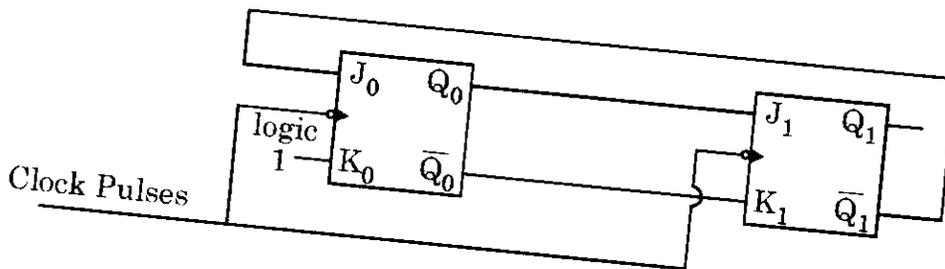
- (b) Design a full-adder using two half-adder.

- 3 (a) What is race-around condition? How does it get eliminated?
 (b) A sequential circuit has two JK flip-flops, one input x and one output y . The logic diagram of circuit is shown below. Derive the state table and state diagram of the circuit.



OR

- 3 (a) A mod-3 counter using two JK flip-flops is shown below :
 Assume $R_0 = R_1 = 0$ initially. Sketch the waveform.



- (b) Implement the following function using 16:1 multiplexer

$$F(A, B, C, D, E) = \sum m(0, 2, 3, 4, 7, 8, 9, 15, 16, 19, 20, 23, 25, 27, 31)$$

- 4 (a) Explain the working principle of tristate NAND gate. Also explain open collector TTL.



(b) Explain the following characteristics / properties of digital logic ICs

- (i) Figure of merit
- (ii) Noise immunity
- (iii) Fan-in and Fan-out
- (iv) Saturation delay time

OR

- 4 (a) Compare the characteristic of TTL, ECL and CMOS logic. Describe interfacing of CMOS and TTL Logic families.
- (b) Explain the working principle of CMOS inverter.

- 5 (a) Design a 3-bit synchronous counter using T flip-flop.
- (b) What is the difference between decoder and demultiplexer? Construct a 5×32 decoder using four 3×8 decoder with enable and one 2×4 decoder. Draw a block diagram.

OR

- 5 (a) Perform the following operations after conversion to BCD
- (i) $5 + (-3)$
 - (ii) $24 + (-17)$
- (b) (i) Convert RS flip flop into JK flip-flop.
- (ii) Reduce to its minimum sum of products form. Then implement it in logic circuit

$$X = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C\bar{D} + A\bar{B}\bar{C}\bar{D} + \bar{A}CD + A\bar{B}C\bar{D}$$





3E1462

Roll No. : _____

Total Printed Pages : 3

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B.Tech.(Sem.III) (Back) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Electronic Devices & Circuits)

Time : 3 Hours]

[Total Marks : 80
[Min. Passing Marks : 24

Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

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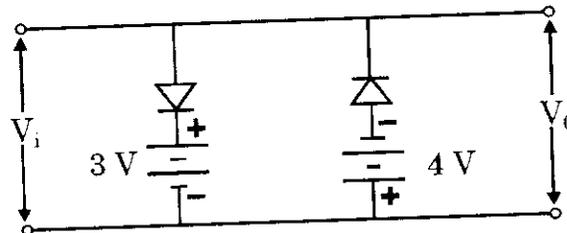
1. _____ Nil _____ 2. _____ Nil _____

- 1 (a) What is a clamper circuit ? Explain the working of positive clamper circuit and draw its output waveform.
(b) Explain working principle of a voltage quadrupler with neat diagram.

8+8

OR

- 1 (a) Determine the output waveform for circuit given in Fig. 1, when the input voltage V_i is $5 \sin 200 \pi t$.



- (b) Draw V-I characteristics of a P-N junction diode and mention the following within the characteristics :

- (i) Static and dynamic resistance
(ii) I_0 and cut in voltage.

8+8



- 2 (a) Explain the working of JFET (N-channel) with diagram. What do you understand by pinch-off phenomenon ? Also justify the reason behind non-uniform penetration of depletion region at drain end with respect to the source end within channel.
- (b) Describe the difference between enhancement and depletion mode of MOSFET.

8+8

OR

- 2 (a) Describe the construction and working of photo voltaic cell. Give V-I characteristics of the same.
- (b) Explain construction, working principle and V-I characteristics of thermistor.

8+8

- 3 Explain the need for biasing a transistor. Design a self bias circuit for a common emitter (CE) amplifier which is having $\beta = 99$, $S = 5$, $V_{CE} = 6$ volts, $V_{CC} = 15$ volts, $V_{RE} = 5.5$ volts, $R_C = 2.5 R \Omega$ and $V_{BE} = 0.3$ volts.

10

OR

- 3 Deduce expression for A_V , A_I , R_i and R_o in a common emitter BJT amplifier in term of h -parameters.

16

- 4 (a) Draw R-C coupled amplifier circuit and calculate gain for low, medium and high frequency regions and also draw frequency response.
- (b) Draw the circuit of Book-strapped Darlington circuit and explain its working.

8+8

OR

- 4 (a) Draw the small-signal equivalent circuit of an FET amplifier in common source (CS) mode and derive the expression for voltage gain.

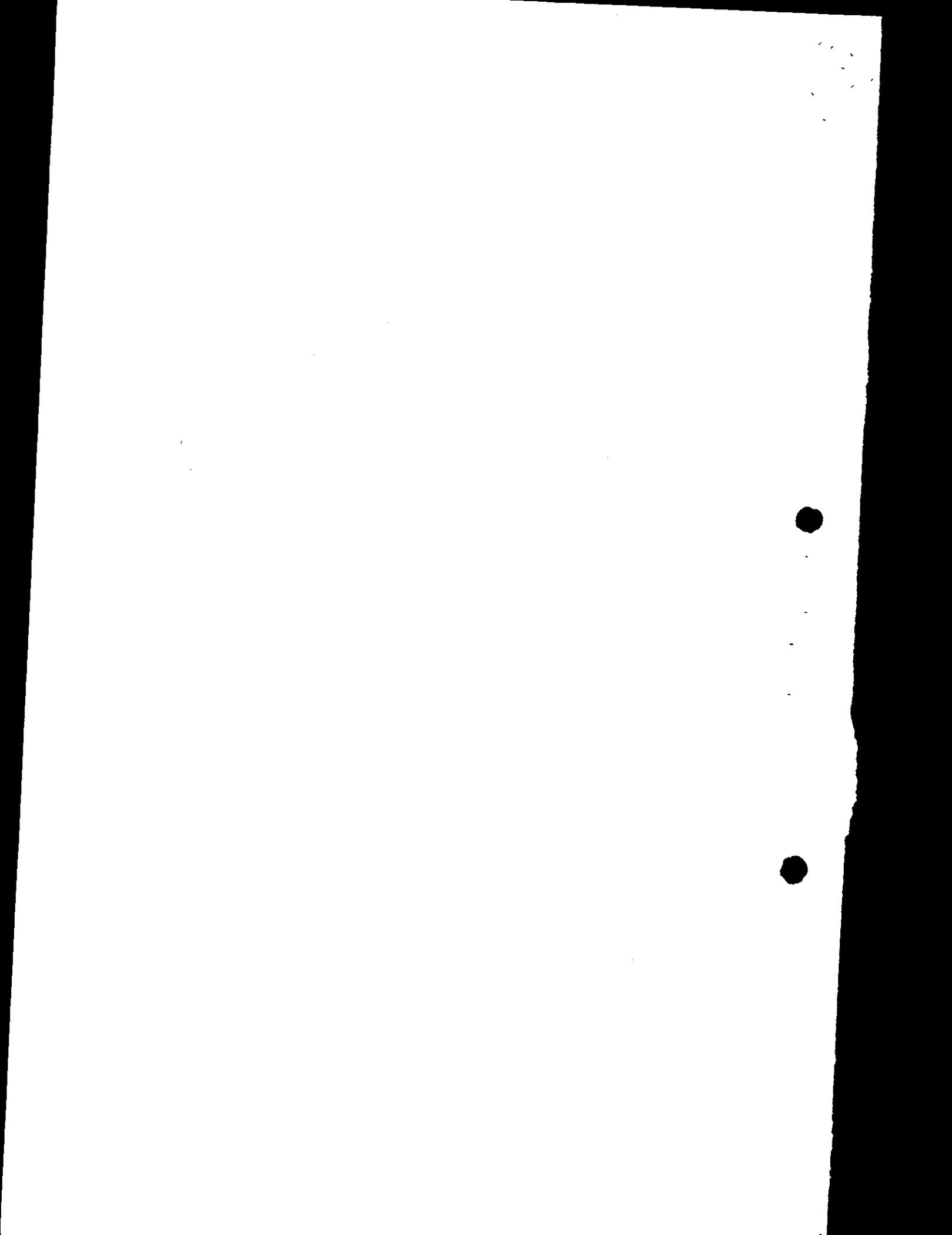


- (b) Explain FET as a source follower. 12+4
- 5 (a) Explain the Barkhausen criterion for sustained oscillations. Draw the R-C phase shift oscillator circuit and explain its working.
- (b) Draw the circuit of BJT Wein bridge oscillator and explain its working. 10+6

OR

- 5 (a) Explain working of BJT astable multivibrator with suitable circuit diagrams.
- (b) Draw the schematic and wave diagrams of a bistable multivibrator and explain its triggering. 8+8





3E1463

Roll No. : _____

Total Printed Pages : **4****3E1463**

B.Tech.(Sem. III) (Back) Examination, February - 2010
(Common for Comp. & IT(Back), EX(Main/Back)
(Data Structures & Algorithms)

Time : **3 Hours**][Total Marks : **80**[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

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

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

- 1 (a) What do you understand by abstract data type ? Explain with example. 4
- (b) Explain unrolled linked lists with their concept. 4
- (c) Perform polynomial addition on the given polynomials using linked lists :

$$P_1 = 4x^3 + 5x^2 + 2x$$

$$P_2 = 5x^4 + 4x^2 + 5$$

8

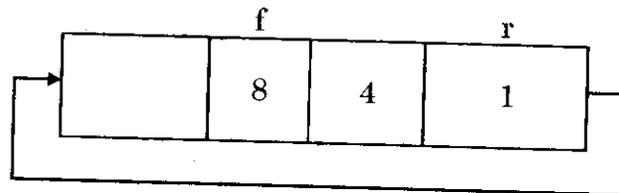
OR

- 1 (a) How can you calculate address for 3-D array when array is represented as row major order and column major order ? 4
- (b) Write an algorithm for deletion of intermediate element in a double linked list with explanation. 8
- (c) What do you understand by sparse matrix ? Show how you can convert Sparse matrix into 3-column form. 4



UNIT - II

- 2 (a) Do you need to check stack overflow and underflow when stack is implemented using linked list ? Explain. 3
- (b) Evaluate given prefix expression into infix using stack
/* $P+QRS$. 5
- (c) Explain enqueue operation on given circular queue with algorithms.



OR

- 2 (a) How you can check end of a circular queue using : 8
- (i) Array representation
- (ii) Linked list representation.
- Write an algorithm to delete N^{th} element from front of circular queue.

- (b) What is recursion ? What will be output of following program and explain why ? Answer with the help of stack. 8

(Ignore Syntax Errors)

```
main ( )  
{  
    static int i ;  
    if (i<=100)  
    { i++;  
      printf ("%d", i);  
      main ( );  
    }  
}
```

8



UNIT - III

- 3 (a) What do you understand by almost complete binary tree and binary search tree ? Explain with example. 8
- (b) Consider the inorder and postorder for a binary tree :
(i) Inorder : 4, 3, 11, 5, 1, 8, 2, 17, 10, 9
(ii) Postorder : 4, 11, 5, 3, 8, 17, 10, 9, 2, 1
find the binary tree. 4
- (c) Differentiate between tree and dictionary. 4

OR

- 3 (a) Explain AVL tree. Insert following elements in AVL, tree :
50, 52, 61, 55, 51, 48, 65, 54, 49, 53, 60 4
- (b) What do you understand by :
(i) Threaded binary tree
(ii) B⁺ tree
(iii) B tree. 12

UNIT - IV

- 4 (a) Explain adjacency matrix representation and linked representation of graph. 8
- (b) What is use of Prim's algorithm ? Write algorithm for it. 8

OR

- 4 (a) How BFS is different from DFS ? 8
- (b) Explain Warshall's algorithm by taking example. 8



UNIT - V

- 5 (a) Sort following numbers using radix sort :
1, 5, 236, 874, 243, 900, 24 8
- (b) What is hashing ? How is it different from linear and binary search ? 8

OR

- 5 (a) Write any sorting algorithm whose best case, worst case and average case time complexity for an input of N numbers is same. 5
- (b) Explain how collision is resolved in hashing. 8
- (c) Construct a heap from following set of characters, use alphabetic comparison :
'D', 'V', 'J', 'M', 'E', 'T', 'F', 'C', 'Q' 3



3E1464

Roll No. : _____

3E1464

Total Printed Pages : **4**

B. Tech. (Sem. III) (Back) Examination, February - 2010
Computer Engineering
(3CP4 Discrete Mathematics Structures)

Time : **3 Hours**]

[Total Marks : **80**
[Min. Passing Marks : **24**

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

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

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

- 1 (a) Show that the propositional formula $(p \wedge q) \wedge (r \wedge s) \rightarrow p$ for any propositions p, q, r, s is a tautology. 8
- (b) Show that $\sim\{p \vee (\sim p \wedge q)\}$ and $\sim p \wedge \sim q$ are logically equivalents. 8

- 2 (a) Show that the following argument is valid :

$$\begin{array}{l}
 p \\
 p \rightarrow q \\
 q \rightarrow r \\
 \hline
 r
 \end{array}$$

- (b) Express the following formulas in principal disjunctive normal form : $p \rightarrow q$ and $p \vee q$. 8



UNIT - II

- 3 (a) Prove $\sim(p \wedge q) \rightarrow \sim p \vee (\sim p \vee q) = \sim p \vee q.$ 4
- (b) Prove $(p \vee q) \wedge \{\sim p \wedge (\sim p \vee q)\} = \sim p \wedge q.$ 4
- (c) Prove $\sim p \rightarrow (q \rightarrow r), \sim p, q \vdash r.$ 4
- (d) Using principle of mathematical induction prove that 4
- $$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \dots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}.$$
- 4 Solve the following recurrence relations : 4
- (a) $a_n = 3a_{n-1} - 2a_{n-2}; n > 2$
with initial condition $a_1 = 5$ and $a_2 = 3.$
- (b) $y_{n+2} - 2 \cos \alpha y_{n+1} + y_n = \cos n \alpha.$ 8
- 8

UNIT - III

- 5 (a) Prove that a connected graph $G = (V, E)$ can have a closed circuit passing through every edge of G exactly once if and only if all its vertices be of even degree. 8
- (b) Define edge connectivity and vertex connectivity of a graph G . Prove that for any graph G .
Vertex connectivity \leq Edge connectivity. 8
- 6 (a) Prove that a tree with n vertices has $n-1$ edges. 8
- (b) In how many distinct ways can we 4-color the vertices of a regular hexagon that is free to move in space. 8



UNIT - IV

- 7 (a) Suppose 100 of the 120 students of mathematics at a college take at least one of the language Hindi, English and German. Also suppose 65 study Hindi, 45 study English and 42 German. If 20 study Hindi and English, 25 study English and German and 15 study Hindi and German. Find the number of students who study all the three languages. 8

- (b) Define equivalence relation. A relation R on the set of complex numbers is defined by

$z_1 R z_2$ iff $\frac{z_1 - z_2}{z_1 + z_2}$ is real. Show that R is an equivalence relation. 8

- 8 (a) Find the discrete Fourier transform for the function :

$$\begin{array}{cccccc} x_0 = 0.25 & x_1 = 0.50 & x_2 = 0.75 & x_3 = 1.00 & x_4 = 1.25 \\ f(x_0) = 1 & f(x_1) = 2 & f(x_2) = 3 & f(x_3) = 4 & f(x_4) = 4 \end{array}$$

8

- (b) Find the inverse-discrete Fourier transform of the sequence

$$\langle D_j \rangle = \langle D_0, D_1, D_2 \rangle = \langle 0, 1-w^2, 1-w \rangle.$$

8

UNIT - V

- 9 (a) Show that the set $\{1, w, w^2\}$ of the three cube roots of unity is a cyclic group for multiplication. 8

- (b) Show that the non empty set S , with binary operation on $a, b \in S$, defined by $a \circ b = a$ is only a semigroup and not a monoid. 8

- 10 (a) If G be a finite group and H be a subgroup of G . show that order of the sub group H divides the order of G . 8

8



- (b) Determine the group code (3, 6) using the parity check matrix H given by

$$H = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

8



3E1465

Roll No. : _____

Total Printed Pages : 4**3E1465**

B.Tech. (Sem. III) (Back) Examination, February - 2010
(Common for Comp. Engg. & IT)
(Mathematics - III)

Time : 3 Hours]

 [Total Marks : 80
 [Min. Passing Marks : 24

Attempt overall five questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. All questions carry equal marks. Attempt five questions in all selecting one question from each unit.

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

1. _____ Graphpaper - 1 _____ 2. _____ Nil _____

UNIT - I

1 (a) What is optimization ? Give five applications of optimization in engineering disciplines. 8

(b) Find the extreme point of the function

$$f(x_1, x_2, x_3) = -x_1^2 - x_2^2 - x_3^2 + x_2x_3 + x_1 + 2x_3$$

8**OR**

1 (a) Use Kuhn-Tucker conditions to solve

$$\text{Min } f(x_1, x_2, x_3) = x_1^2 + x_2^2 + x_3^2 + 20x_1 + 10x_2$$

$$\text{Subject to } x_1 \geq 40$$

$$x_1 + x_2 \geq 80$$

$$x_1 + x_2 + x_3 \geq 120$$

8

(b) Find the maximum or minimum point of the

$$f(x_1, x_2) = x_1 + 2x_2 + x_1x_2 - x_1^2 - x_2^2.$$

8**UNIT - II**

2 (a) Solve the LPP by Simplex method

$$\text{Max. } Z = 5x_1 + 3x_2$$



Subject to $3x_1 + 5x_2 \leq 15$

$5x_1 + 2x_2 \leq 10$

and $x_1, x_2 \geq 0$

(b) Solve the LPP by graphical method 8

Max $Z = 3x_1 + 2x_2$

s.t. $x_1 - x_2 \leq 1$

$x_1 + x_2 \geq 3$

and $x_1, x_2 \geq 0$

OR

2 (a) Write the dual of LPP 8

Min $Z = 2x_1 + 2x_2 + 4x_3$

Subject to $2x_1 + 3x_2 + 5x_3 \geq 2$

$3x_1 + x_2 + 7x_3 \leq 3$

$x_1 + 4x_2 + 6x_3 \leq 5$

and $x_1, x_2, x_3 \geq 0$

(b) Solve the transportation problem by Vogel's approximation method 8

		Destination			Supply
		D ₁	D ₂	D ₃	
Origin	O ₁	2	7	4	5
	O ₂	3	3	1	8
	O ₃	5	4	7	7
	O ₄	1	6	2	14
Demand		7	9	18	34

UNIT - III

3 (a) Write short notes on the following :

(i) PERT (ii) CPM 4+4

(b) The following data are available for a project :

Activity	Duration (days)	Preceding Activity
A	5	--
B	6	A
C	5	B
D	4	A
E	3	D
F	4	C, E



Prepare the network diagram for the project. Find EST, LST, EFT, LFT for each activity and floats. Describe the critical path and find the total period of completion of the project. 8

OR

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

Jobs	J_1	J_2	J_3	J_4	J_5	J_6
Machines M_1	5	9	4	7	8	6
M_2	7	4	8	3	9	5

8

- (b) Five jobs must go through machines M_1, M_2 and M_3 in the order M_1, M_2, M_3 . Find the sequence that will minimize the total elapsed time :

Jobs	J_1	J_2	J_3	J_4	J_5
Machines M_1	5	7	6	9	5
M_2	2	1	4	5	3
M_3	3	7	5	6	7

8

UNIT - IV

- 4 (a) State second shifting theorem. Find the Laplace transform

$$\text{of } F(t) = \begin{cases} \cos\left(t - \frac{2\pi}{3}\right), & t > \frac{2\pi}{3} \\ 0, & t < \frac{2\pi}{3} \end{cases}$$

4+4

- (b) Find the inverse Laplace transform of

$$f(s) = \frac{s^2}{(s^2 + a^2)(s^2 + b^2)} \text{ by convolution theorem.}$$

8

OR

- 4 (a) Find the Fourier sine transform of $f(x) = \begin{cases} x, & 0 < x < 1 \\ 2-x, & 1 < x < 2 \\ 0, & x > 2 \end{cases}$.

8



(b) Solve $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $x > 0$, $t > 0$

Subject to

(i) $u_x(0, t) = 0$

(ii) $u(x, 0) = \begin{cases} x, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$

(iii) $u(x, t)$ is bounded.

8

UNIT - V

5 (a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using :

(i) Simpson's $\frac{1}{3}$ rule

(ii) Simpson's $\frac{3}{8}$ rule

(b) The ordinates of the normal curve are given by the following table : 4+4

x	0.0	0.2	0.4	0.6	0.8
y	0.3989	0.3910	0.3683	0.3332	0.2897

Find :

(i) $y(0.25)$ (ii) $y(0.62)$ (iii) $y(0.43)$

8

OR

5 (a) Use Runge-Kutta Fourth order method to solve

$$\frac{dy}{dx} = -2xy^2, \quad y(0) = 1, \quad \text{for } x = 0.2 \text{ with } h = 0.2.$$

(b) Solve the difference equation 8

$$u_{n+2} + u_{n+1} + u_n = n^2 + n + 1$$

8



3E1468

Roll No. : _____

Total Printed Pages : **2****3E1468****B.Tech. (Sem. III) (Back) Examination, February - 2010**
Computer Engineering
(3CP6.3 E-Commerce)Time : **3 Hours**][Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.*

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

1. _____ Nil _____ 2. _____ Nil _____

- 1 (a) Explain applications of E-commerce in our daily life. 8
- (b) Explain Porter's value chain and interorganizational value chains. 8

OR

- 1 (a) Explain Porter's Model with example. 8
- (b) What are competitive advantages using e-commerce in business? 8
- 2 (a) What is trade cycle? Explain each step by trade cycle. 8
- (b) Explain advantages and disadvantages of electronic market. 8

OR

3E1468]



1

[Contd...

2 Explain electronic market with its Pros and Cons. Also explain usage of electronic market.

16

3 (a) Define EDI and explain its benefits.

8

(b) Explain EDI trading patterns and transactions.

8

OR

3 Explain EDI technology with the reference of its standards, communications, implementation, agreements and securities.

16

4 How to create a shopping basket? Explain each step in detail.

16

OR

4 Explain connecting to the database, accessing and versioning the database in detail.

16

5 Define enterprise. Explain enterprise objects, component model and information technology in the enterprise.

16

OR

5 Explain J2EE Model features with its components-container architecture.

16



UNIT-II

- 2 (a) What is Intranet? Explain Intranet vs LAN. 8
- (b) Explain different components of LAN. 8

OR

- 2 (a) Define following terms :
- (i) Components of Intranet workstation
 - (ii) Client software
 - (iii) Network card
 - (iv) Network operating system.

4×4=16

UNIT- III

- 3 Explain following terms :
- (i) Mail protocol
 - (ii) INBOX
 - (iii) E-mail Attachment
 - (iv) Address Book

4×4=16

OR

- 3 (a) Explain the concepts and features of E-mail technology. 8
- (b) Define mail server and Message headers. 8

UNIT-IV

- 4 What is Video Conferencing? Explain the hardware and software required for video conferencing on Internet. 16

OR



- 4 What is digital telephony as ISPN application? Explain following :
- (i) H.323 protocol
 - (ii) Multi-point conferencing
- 16

UNIT-V

- 5 Explain following terms :
- (i) Web Server
 - (ii) Hyperlink
 - (iii) Search Engine
 - (iv) URL
- 4×4=16

OR

- 5 (a) Explain the steps for creating a web page. 8
- (b) How is web traffic analysed on internet? Explain it. 8
-



100



3E1511

Roll No. : _____

Total Printed Pages : **4****3E1511****B.Tech. (Sem. III) (Back) Examination, February - 2010**
Information Technology
(3IT4 Telecommunication Fundamentals)Time : **3 Hours**][Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt overall **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

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

1. _____ **Nil** _____2. _____ **Nil** _____**UNIT - I**

- 1 (a) Why earthing of the outer conductors is necessary in a co-axial cable ? – Explain. 4
- (b) What is meant by multipath in wireless transmission systems ? What are the reasons for the phenomena ? Discuss its effect on the quality of reception. 2+3+3=8
- (c) Take an example and show the effect of bandwidth of transmission media on the quality of transmitted digital data. Draw wave forms of the transmitted and received signal. 4

OR

- 1 (a) Given an amplifier with an effective noise temperature of 10000°K and a 10 MHz bandwidth, what thermal noise level may we expect at its output ? 3
- (b) What is the thermal noise level of a channel with a bandwidth of 10 kHz carrying 1 kW of power operating at 50° C ? 3
- (c) List two major functions performed at each layer of TCP/IP model. What are the major differences in the services at data-link layer and transport layer ? 4



- (d) In TCP/IP, IP is a connectionless unreliable protocol. What changes in the upper/lower layers you foresee had IP been a connection oriented reliable protocol ?

6

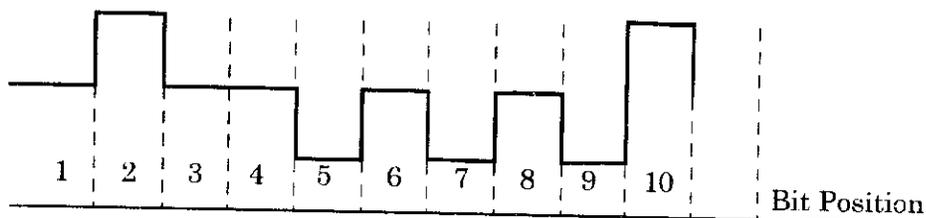
UNIT - II

- 2 (a) Ten signals each of 3600 Hz are multiplexed on to a single channel using RDM. If the guard bands are 400 Hz :
- What is the total bandwidth required ?
 - What percentage of bandwidth is wasted due to multiplexing ?
 - If the signals are now digitized and represented using 8 bits for each sample. What minimum bandwidth is required for the output link ? Assume lossless link.
- 2+2+2=6
- (b) 5 signals each of 3600 Hz and 5 signals each of 4000 Hz are to be multiplexed to a common TDM channel. Compute the data rate of the multiplexed data. Assume 8-bits are used for each sample.
- 4
- (c) Derive the expression for ratio of signal energy per bit (E_b) to noise power density per Hertz (N_0). For $E_b / N_0 = 8.4 \text{ dB}$ on a 2400 bps channel at 290°K, what received signal is required? Assumed that value of Boltzman constant = 228.5 dBW.

6

OR

- 2 (a) Draw the waveforms for encoding 0100101011 using
- NRZ-L
 - Polar pseudoternary
 - Manchester encoding.
- 1+2+3=6
- (b) The waveform below represents the bit sequence 0100101011 and contains one bit in error. Identify the (i) coding (ii) the bit position with error. Justify your answer and draw the correct waveform.



1+1+2+2=6



- (c) Write short note on Ethernet. (Not more than 75 words).

4

UNIT - III

- 3 (a) Derive the expression for expected number of transmissions per carriage return typed for a slotted ALOHA system.

6

- (b) In an infinite population slotted ALOHA system, the mean number of slots a station waits between a collision and its retransmission is 4. Plot the delay u/s through put curve for this system.

8

- (c) Explain the effect of propagation delay on the performance of Carrier Sense Multiple Access (CSMA) protocols. If the propagation delay is zero, will there be collisions in a CSMA protocol ? Justify your answer.

2+2=4

OR

- 3 (a) Explain bit map protocol for medium access. Why it is used and what are its disadvantages ?

3+2=5

- (b) How long does a station, S, have to wait in the worst case before it can start transmitting its frame over a CAN that uses the basic bit map protocol ?

5

- (c) A large population of ALOHA users manages to generate 50 requests/sec, including originals and retransmissions. Time is slotted in units of 40 msec. Compute the probability of success on (i) first attempt (ii) exactly nine collisions before success and (iii) expected number of transmission attempts needed.

2+2+2=6

UNIT - IV

- 4 (a) Explain the operation of ADSL using Discrete Multi Tone (DMT). Draw block diagram of DMT transmitter.

2+3=5



- (b) Draw neat sketch for a 3-stage space division switching network consisting of 10 pairs of subscribers to be divided in 4 groups of 5 subscribers each. Using minimum ports on each switch. How many pairs can simultaneously talk in the configuration.

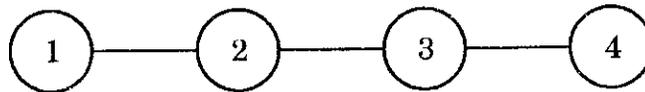
$$4 \times 2 = 6$$

- (c) Suppose we want that all the 10 pairs can communicate, how many interfaces will be required? Justify your answer.

$$2 \times 3 = 5$$

OR

- 4 Consider the figure below where each



circle represents a communication node and line represents a communication link. Assume that the propagation delay on each link equals 10 msec, processing time at each node equals 2 msec. Transmission time for control packets and acknowledgements = one ms and for data packets = 2 msec.

Compute the total time for completion of communication on an error free carrier if (i) circuit switched (ii) virtual circuit packet switched and (iii) datagram packet switching is used to transmit 3 packets. Draw event diagram for all the three cases. Comment on the results.

$$2 \times 3 + 2 \times 3 + 4 = 16$$

UNIT - V

- 5 Write short notes on any four : (not more than 75 words)

- Applications and working of bridge
- Differences in switches and bridge
- Purpose and working of proxy server
- Purpose and architectures for application server
- Bluetooth
- Firewall
- Remote Access Server
- Web Server.

$$4 \times 4 = 16$$

