14IT 402

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

November, 2016 **Information Technology**

Fourth Semester **Automata Theory and Formal Languages**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

a) Define Finite automata
b) What is a transition table and transition graph?
c) Give the DFA accepting the language over the alphabet 0, 1 that have the set of all strings that either begins or end (or both) with 01.
d) Is it true that the language accepted by any NFA is different from the regular language? Justify your Answer.
e) Define Regular expression. Give an Example.
f) State the pumping lemma for regular languages.
g) Define CFG. Find L (G) where G= ({S}, {0, 1}, {S->0S1, S-> Ɛ}, S).
h) What are the two normal forms of CFG?
i) Define Instantaneous description of a PDA.
j) When we say a problem is decidable? Give an example of undecidable problem?
k) Define Turing Machine and list different types of Turing Machine.
l) Using Pumping lemma show that the language L= $\{a^n b^n c^n \mid n>=1\}$ is not a CFL.

UNIT-I

2. a) Design a DFA which accepts set of all strings containing odd number of 0's and odd number of 1's. [4M]

   b) Construct an equivalent DFA for NDFA M= ({q1, q2, q3}, δ, q1, {q3}) where δ is given by

   δ(q1,0)={q2,q3} δ(q1,1)={q1}

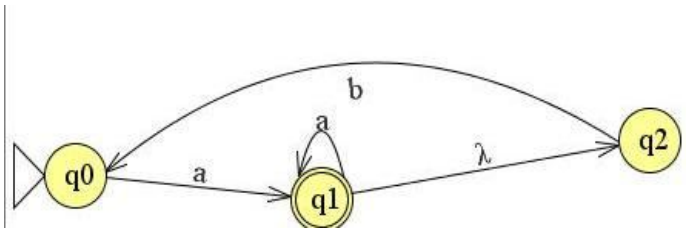
   δ(q2,0)={q1,q2} δ(q2,1)=Φ

   δ(q3,0)={q2} δ(q3,1)={q1,q2} [8M]

(OR)

3. a) Prove that If L is accepted by NFA with Ɛ transitions, then there exist L which is accepted by NFA without Ɛ transitions [6M]

   b) Convert the following NFA- Ɛ to DFA [6M]



UNIT-II

4. a) List the closure properties of regular sets and explain any two of them. [4M]
   b) Construct the NFA with Ɛ moves for the regular expression r= (a(aa)*b+ab*a)* [8M]

(OR)

5. a) Using pumping lemma show that the set (0^n1^n/n>=0} is not regular [6M]
   b) Minimize the finite automata given below and show both given and reduced are equivalent [6M]

State/Σ	0	1
q0	q1	q2
q1	q3	q4
q2	q5	q6
q3	q3	q4
q4	q5	q6
q5	q3	q4
q6	q5	q6

UNIT-III

6. a) State the pumping lemma for CFL's, list out the applications of pumping lemma for CFG.[6M]
   b) Show that E->E+E/ E*E/ (E)/ id is ambiguous. [6M]

(OR)

7. a) Explain different types of acceptance of a PDA. Are they equivalent in sense of language acceptance? Justify your Answer. [4M]
   b) Find the equivalent CNF for the following CFG [8M]

   S->bA/aB
   A->bAA/aS/a
   B->aBB/bS/b

UNIT-IV

8. a) What do you mean by 'decidable' and 'undecidable' problems? Give examples. [6M]
   b) State and explain PCP. [6M]

(OR)

9. a) Briefly explain the properties of recursively enumerable languages. [6M]
   b) Design a Turing machine for set of all strings with equal number of 0's and 1's. [6M]

14 CS IT 404

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

November, 2016 **Common for CSE & IT**

Fourth Semester **Design and Analysis Of Algorithms**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1 Answer all questions (1X12=12 Marks)

a) What are the factors affecting the Algorithm analysis?
b) Define Asymptotic Notation.
c) How Divide & Conquer can be applied to Binary trees?
d) Write the control abstraction of Greedy method.
e) What is a Knapsack Problem?
f) What are the features of Dynamic Programming?
g) Define multistage graph?
h) Define Explicit Constraint?
i) List down the examples of Backtracking?
j) Define E-node?
k) What is meant by least cost search?
l) What is meant by Class NP (non polynomial)?

UNIT I

2	a)	What is an Algorithm? Explain efficiency of an algorithm with examples.	6M
	b)	Write a Pseudo code for Divide and Conquer algorithm for merging two sorted arrays into single Sorted one	6M

(OR)

3	a)	Discuss briefly any two asymptotic notations.	6M
	b)	Write the control abstraction for Divide and Conquer.	6M

UNIT II

4	a)	Difference between Greedy method & Dynamic Programming.	4M
	b)	Explain Travelling Salesman Problem with an example	8M

(OR)

5	a)	Explain Krushkals Algorithm for finding Minimum Spanning Tree?	6M
	b)	Discuss the steps in developing dynamic programming Problem.	6M

UNIT III

6	a)	Explain Breadth First Search Technique with suitable example?	6M
	b)	Explain 8-Queens problem with an Algorithm?	6M

(OR)

7	a)	Explain Depth First Search Technique with suitable example?	6M
	b)	Explain the sum of subsets problem in detail using back tracking.	6M

UNIT IV

8	a)	Explain the concept of Travelling Salesman problem with Brach & Bound technique with suitable example.	8M
	b)	What is P & NP Problem? Give at least 5 problems that can be classified as NP Problem	4M

(OR)

9	a)	Discuss the solution for Knapsack Problem using Branch & Bound Technique	6M
	b)	Explain the need for approximation algorithms & how they can be used for NP Hard Problems	6M

CS IT222

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

November, 2016 **Common for CSE & IT**

Fourth Semester **Electronic Devices & Circuits**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer the following (1X12=12 Marks)

a) Calculate static resistance R_D of a diode having I_D = 30 mA and V_D = 0.75 V.
b) What is the peak factor of a full wave rectifier.
c) Mention the factors which affects the Q-point of a BJT.
d) Draw the symbol of depletion type n-channel MOSFET.
e) Draw the equivalent circuit of UJT.
f) Give an expression for voltage gain of JFET in fixed bias configuration.
g) What is Barkhausencriteria.
h) Write an expression for input impedance with feedback for a voltage series feedback amplifier.
i) What is the affect of feedback on distortion
j) What is the closed loop gain for the non-inverting configuration.
k) Define input bias current of an Op-Amp.
l) Give an expression for CMRR of an Op-Amp.

UNIT I

2. a) Draw and explain the working of negative clamping circuit. (5M)
b) A half wave rectifier is coupled to a 230V, 50 Hz source through a transformer of turns ratio 10:1. The rectifier circuit is connected to a 500 Ω/ 1watt resistor and diode forward resistance is 100 Ω. (7M)

(OR)

3. a) Design a fixed bias circuit with emitter resistor for the following specifications. V_{CC}=12V, V_{BE}=0.7V, I_C=4 mA, h_{fe}=250. (6M)
b) Draw and explain the h-parameter model of a BJT in CB configuration. (6M)

UNIT II

4. a) Explain the transfer characteristics of Enhancement type MOSFET. (6M)
b) A common source amplifier uses a MOSFET having following parameters g_m=1.5mA/V, r_d=40KΩ, C_{gs}=3pF, C_{gd}=3.2 pF. The drain resistance R_d=200KΩ. Compute
i) Voltage gain ii) Input Impedance iii) Output admittance (6M)

(OR)

5. a) Draw the small signal model of E-MOSFET and derive the expression for output impedance and voltage gain. (6M)
b) Explain the construction and working of UJT. (6M)

UNIT III

6. a) Name the different sampling networks used in any feedback system and discuss briefly. (6M)
b) Calculate the gain, Z_{in} and Z_o of a voltage series feedback amplifier having an open loop gain A=300, R_i=1.5 KΩ, R_o=50 KΩ and β=-1/20. (6M)

(OR)

7. a) Derive the expression for frequency of Oscillations of a Colpitts Oscillator with necessary diagram. (8M)
b) What are the factors affecting the frequency stability in an Oscillator. Discuss each term. (4M)

UNIT IV

8. a) Draw the circuit diagram of summing amplifier using Op-Amp and explain its operation. (6M)
   b) Design an adder circuit using Op-Amp to get the output expression as
   $V_o=-(0.1V_1+V_2+5V_3)$, where V_1,$V_2$and V_3 are inputs. (6M)

(OR)

9.a) Draw the functional block diagram of IC555 using Op-Amp and explain its function. (8M)
   b) Mention the specifications of an Op-Amp. (4M)

CS/IT 224

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

November, 2016 **Common for CSE & IT**

Fourth Semester **GUI Programming**

Time: Three Hours **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

a) Define method
b) What is meant by scope?
c) What is an event?
d) What is the use of finally keyword?
e) What is a thread and a process?
f) What is meant by abstract base class?
g) What is AWT?
h) What is multithreaded programming?
i) How do you define a tree in Java?
j) How does Swing components different from AWT components?
k) What is an Exception?
l) What is the abbreviation of URL and TCP/IP ?

UNIT I

2. a) What is the use of garbage collections in java with an example (6M)
   b) Explain the concept of method overloading with an example (6M)

(OR)

3. a) Explain the concept of packages with an example (6M)
   b) Explain briefly about type conversion and casting with an example (6M)

UNIT II

4. a) Write the usage of try and catch block with an example. (6M)
   b) What is daemon thread? Explain inter thread communication. (6M)

(OR)

5. a) Explain types of I/O streams with an example (6M)
   b) Explain creating and passing parameters to applets with an example (6M)

UNIT III

6. a)Explain about Event handling with an example (6M)
   b) Explain about AWT components (6M)

(OR)

7. a) Discuss briefly about event listener class (6M)
   b) Write briefly about JFrame and JComponent (6M)

UNIT IV

8. Describe JDBC principles. What are the methods used to access database? Write a program to illustrate the use of such methods. (12M)

(OR)

9. a) Explain URL connection class in java. (6M)
   b) Explain scroll panes in swings (6M)