

**Code: 4G453**

*III B.Tech. I Semester Supplementary Examinations May 2017*

**Automata and Compiler Design**  
(Information Technology)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70Marks )

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**UNIT-I**

1. Write the procedure for finding a DFA equivalent to a given NFA. Construct DFA equivalent to the following NFA. Show the acceptance of the string 00011 on both the Fas.

	0	1
q0	{q0,q1}	{q0}
q1		{q2}
q2		{q3}
q3 (Final State)		

14M

**OR**

- 2 a) Define a Regular expression. Find regular expressions for the following languages over the alphabet {a, b}.
- i) All strings of odd length 7M
  - ii) All strings that end with either ab or bb
  - iii) All strings that contain even number of a's
- b) Construct a DFA for the recognizing the language of all strings over the alphabet {0, 1} and contain the substring 10. Show the acceptance of the string 001011. 7M

**UNIT-II**

3. a) Explain the role of syntax and semantic analysis phases in a compiler by taking a suitable example(s). 7M
- b) Write the rules/steps to calculate the First and Follow sets of variable in a given CFG. Find First and Follow sets of the variables in the following grammar.
- S → AaBbC                      A → ab / ba / CB /
- B → bb / cc                      C → abc / Bc 7M

**OR**

4. What is a recursive descent parser? Construct recursive descent parser for the following grammar. Show the moves of the parser for the string.
- S → Ab / Ba              A → Ba / BB / ab              B → ab / bb / b 14M

**UNIT-III**

5. a) What is a type expression? Explain about the equivalence of type expression with suitable examples. 7M
- b) What is syntax directed translation? Write syntax directed translation for storing the type of a variable into symbol table. (Assume a suitable grammar for the declaration of variables). 7M

**OR**

6. a) Discuss about polymorphic functions and the type checking of these functions. 7M
- b) Explain about the general model of an LR parser. 7M

**UNIT-IV**

7. a) Write about the advantages of intermediate code? Discuss about three address code with examples. 7M
- b) Explain the process of accessing non local variables information from symbol table in case of nested procedures. 7M

**OR**

8. a) What is the need for dynamic storage allocation? Discuss the methods of dynamic storage allocation strategies. 7M
- b) Generate three address code for the following code segment and write the corresponding triples. 7M
- ```
for (i=1; i<=10;i++) { a[i] = a[i+1] * 2; b[i] = a[i]; }
```

**UNIT-V**

9. a) Explain in detail about peephole optimization. 10M
- b) What is DAG? Explain how DAG is useful in code generation. 4M

**OR**

10. a) What is the use of data flow analysis? Write short notes on data flow analysis of flow graph of basic blocks. 7M
- b) Discuss in brief about register allocation and assignment? 7M

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**R-14**

**Code: 4G151**

*III B.Tech. I Semester Supplementary Examinations May 2017*

**Computer Networks**

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70Marks )

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**UNIT-I**

1. a) Compare the functions of ISO model and TCP/IP protocol architectures. 7M
- b) Distinguish between circuit switching and packet switching networks. 7M

**OR**

2. a) What is computer network? Write about network hardware and software. 7M
- b) Discuss the characteristics of co-axial cable and give its advantages and disadvantages. 7M

**UNIT-II**

3. a) Define checksum. Explain how check sum is used for error detection with example. 7M
- b) Draw the frame format of Ethernet and explain it. 7M

**OR**

4. a) Describe about the working of stop and wait protocol. 7M
- b) Explain CSMA/CD protocol in MAC layer. 7M

**UNIT-III**

5. a) Describe about flooding and shortest path routing algorithm. 7M
- b) What is a subnet? Differentiate between virtual circuits and datagram subnets. 7M

**OR**

6. a) Explain about hierarchical routing algorithm with example. 7M
- b) Define internetworking. Explain about ICMP protocol. 7M

**UNIT-IV**

7. a) Describe the services offered by transport layer. 7M
- b) What is flow control? Explain its role in transport layer. 7M

**OR**

8. a) Briefly explain the elements of transport layer. 7M
- b) Explain about TCP header format. 7M

**UNIT-V**

9. a) How security is maintained in internet. Illustrate it with examples. 7M
- b) Write short notes on FTP and HTTP. 7M

**OR**

10. a) Explain the naming hierarchy in DNS with an example. 7M
- b) Write about WWW and multimedia. 7M

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Code: 4G451

III B.Tech. I Semester Supplementary Examinations May 2017

**Design and Analysis of Algorithms**

(Common to CSE &amp; IT)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70Marks )

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**UNIT-I**

1. Explain in brief about Asymptotic Notations with examples 14M

**OR**

2. a) Explain the method of determining the complexity of procedure by the step count approach. Illustrate with an example. 6M  
b) Compare with an example simple Find and Collapsing Find 8M

**UNIT-II**

3. a) Write and explain the control abstraction for Divide and Conquer. 4M  
b) Find an optimal solution to the knapsack instance  $n=7$  objects and the capacity of knapsack  $m=15$ . The profits and weights of the objects are  $(P_1, P_2, P_3, P_4, P_5, P_6, P_7) = (10, 5, 15, 7, 6, 18, 3)$   
 $(W_1, W_2, W_3, W_4, W_5, W_6, W_7) = (2, 3, 5, 7, 1, 4, 1)$  10M

**OR**

4. a) Explain partition exchange sort algorithm and trace this algorithm for  $n=8$  elements: 24,12, 35, 23,45,34,20,48 7M  
b) Discuss the single – source shortest paths algorithm with suitable example. 7M

**UNIT-III**

5. a) What is principle's of optimality? Explain how travelling sales person problem uses the dynamic programming technique with example. 7M  
b) Give the statement of sum –of subsets problem. Find all sum of subsets for  $n=4$ ,  $(w_1, w_2, w_3, w_4) = (11, 13, 24, 7)$  and  $M=31$ . Draw the portion of the state space tree using fixed – tuple sized approach. 7M

**OR**

6. a) Describe the Dynamic 0/1 Knapsack Problem. Find an optimal solution for the dynamic programming 0/1 knapsack instance for  $n=3$ ,  $m=6$ , profits are  $(p_1, p_2, p_3) = (1, 2, 5)$ , weights are  $(w_1, w_2, w_3) = (2, 3, 4)$ . 8M  
b) Briefly explain Hamiltonian cycles using backtracking. 6M

**UNIT-IV**

7. a) What are connected and bi-connected components? Explain with suitable example. 7M  
b) Write a Program schema for a LIFO branch and bound search for Least-cost answer node. 7M

**OR**

8. a) Write a short note on spanning trees. 5M  
b) Draw the portion of state space tree generated by LCKNAP for the Knapsack instances:  $n=5$ ,  
 $(P_1, P_2, \dots, P_5) = (10, 15, 6, 8, 4)$ ,  $(W_1, W_2, \dots, W_5) = (4, 6, 3, 4, 2)$  and  $M = 12$ . 9M

**UNIT-V**

9. a) How are P and NP problems related? 7M  
b) Explain the differences between decision and optimization problems. 7M

**OR**

10. a) Write the properties of NP-Complete and NP-Hard Problems 7M  
b) State Cook's theorem and explain its importance. 7M

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**R-14**

**Code: 4G357**

*III B.Tech. I Semester Supplementary Examinations May 2017*

**Microprocessors and Interfacing**

( Common to CSE & IT )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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**UNIT-I**

1. a) Distinguish minimum and maximum mode concept in 8086 $\mu$ P. 6M
- b) Explain about maximum mode of operation in 8086  $\mu$ P. 8M

**OR**

2. a) What is the purpose of instruction stream byte queue in 8086? 6M
- b) Discuss about segmentation memory concept in 8086  $\mu$ P. 8M

**UNIT-II**

3. a) Describe 8255 PPI mode2 operation with an example. 8M
- b) Distinguish SRAM & DRAM 6M

**OR**

4. a) Illustrate the block diagram of 8255 PPI and explain its features. 8M
- b) Describe the control word format of 8255 for different modes. 6M

**UNIT-III**

5. a) What is DMA? Explain about Master and Slave mode concept. 9M
- b) Illustrate the block diagram of 8257 DMA controller. 5M

**OR**

6. a) What is meant by interrupt driven I/O? 4M
- b) Describe 8259 PIC architecture. 10M

**UNIT-IV**

7. a) Describe the architectural features of 8251 USART. 8M
- b) Distinguish asynchronous and synchronous data transfer schemes. 6M

**OR**

8. a) Explain how TTL to RS232C and RS232C to TTL conversion is possible? 7M
- b) Distinguish asynchronous and synchronous data transfer schemes. 7M

**UNIT-V**

9. a) List out the salient features of Pentium processors 4M
- b) Distinguish the architectural features of 80286 and 80386  $\mu$ Ps. 10M

**OR**

10. a) Explain the concept of real and protected mode segmentation 10M
- b) Describe the features of paging mechanism. 4M

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**R-14**

**Code: 4G152**

*III B.Tech. I Semester Supplementary Examinations May 2017*

**Operating Systems**  
(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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**UNIT-I**

- 1. a) Explain operating system services and systems calls. 7M
- b) Discuss types of operating systems. 7M

**OR**

- 2. a) Explain states of process with neat sketch and discuss the process state transition with a neat diagram. 7M
- b) Define thread. Differentiate user threads form kernel threads. 7M

**UNIT-II**

- 3. a) Explain Peterson's Solution. 7M
- b) Explain atomic transactions. 7M

**OR**

- 4. a) Explain Deadlock handling methods. 7M
- b) Explain Banker's deadlock-avoidance algorithm with an illustration. 7M

**UNIT-III**

- 5. a) Explain memory management without swapping. 7M
- b) Explain about contiguous memory allocation with neat diagram. 7M

**OR**

- 6. a) Explain the services provided by a kernel I/O subsystem. 7M
- b) Explain FIFO page replacement algorithm. 7M

**UNIT-IV**

- 7. a) Explain the two-level directory and three-level directory structure. 7M
- b) Explain file allocation methods 7M

**OR**

- 8. a) Explain and compare the C-LOOK and C-SCAN disk scheduling algorithms. 7M
- b) Explain Tertiary storage structure. 7M

**UNIT-V**

- 9. a) Explain protection mechanism. 7M
- b) What is meant by Access control. Explain Revocation of Access Rights. 7M

**OR**

- 10. a) Describe firewalling to protect systems and networks. 7M
- b) Explain Computer security classification. 7M

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