Hall Ticket Number :										

R-14

Code: 4G143

II B.Tech. II Semester Regular Examinations May 2016

Formal Languages and Automata Theory

(Computer Science & Engineering)

Max. Marks: 70 Time: 3 Hours

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

****

UNIT–I

1. a) Define automaton. Explain the difference between NFA and DFA with the suitable example 7M

   b) Design a DFA that accepts the language of all strings with even number of a's and number of b's divisible by 3 over the alphabet ∑ ={a,b} 7M

OR

2. a) Explain the procedure to convert NFA with € moves to NFA without € moves with suitable example 7M

   b) Construct the melay machine that generates 2's complement of the given input over ∑ ={0,1}and convert the same to moore machine 7M

UNIT–II

3. a) List any 6 Identity rules of the regular expression and write the closure properties of the regular sets. 7M

   b) Construct a NFA for regular expression (a+b)*abb and draw its equivalent DFA. 7M

OR

4. a) Construct DFA equivalent to the Regular expression $(0+1)^*(00+11)(0+1)^*$ 7M

   b) Find the regular expression accepted by the following DFA

State/∑	A	b
→A	A	B
B	A	C
Ⓒ	C	B

Where A is the initial state and C is the final state 7M

UNIT–III

5. a) Constuct the CFG for the following languages defined over {a,b}
   i) L={ $a^n b^m c^m d^n$/ n,m>=1}
   ii) L is a language that accepts all the strings that start and end with same symbol 7M
   b) State and Explain the Pumping lemma for the context free languages 7M

OR

6. a) Reduce the following CFG G={{S,A,B,E,C},{a,b,c},P,S}
   P contains,
   S→ AB
   A→a
   B→b
   B→C
   E→c|€ 4M
   b) Convert the following CFG to GNF G={{E,T,F},{a},P,E} P contains
   E→E+T | T
   T → T*F | F
   F → (E) | a 10M

UNIT–IV

7 a) Design a PDA for the language L={ $a^n b^m c^{m+n}$ / n, m >=1} 5M
   b) Explain the process of constructing PDA from the given grammar and Construct PDA that accepts the CFG g={{S,A,B,C},{a,b,c},P,S} p is defined as,
   S → aA
   A → aABC | bB | a
   B → b
   C → c 9M

OR

8 a) Design a PDA for L={WW^R / W= {a,b}* } where W^R represents reverse string 7M
   b) Explain the process of converting PDA to CFG with suitable example 7M

UNIT–V

9 a) Explain church's hypothesis. 7M
   b) Design a Turing machine for the language L={$a^n b^n c^n$/n>=1} 7M

OR

10 a) Construct a Turing machine to accept the following language and give its state transition table and diagram. Check the machine by tracing a suitable string or instance. L={$a^n b^n a^n b^n$/n>=1} 7M
   b) Discuss different languages and their corresponding machines 7M

***

Hall Ticket Number :										

Code: 4GC43

R-14

II B.Tech. II Semester Regular Examinations May 2016

Environmental Science

(Common to CE, ME and CSE)

Max. Marks: 70 Time: 3 Hours

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

****

UNIT–I

1. a) Enumerate four conceptual spheres in the earth's environment.
   b) Explain briefly the importance of Environmental studies and need for public awareness?

OR

2. a) Define and explain scope of environmental studies?
   b) Explain role of an individual in promoting environmentalism?

UNIT–II

3. a) Explain the importance of forests in maintaining ecological balance and in providing economical and commercial services?
   b) Explain the food problems of India and World

OR

4. a) Write a note on possible conflicts over water, giving examples of Indian and Global context.
   b) Explain role of an individual in conservation of natural resources

UNIT–III

5. a) What are the three different types of ecological Pyramids? Explain
   b) Define and explain "River" ecosystem?

OR

6. a) Explain the concept of "food chain" and "food web"?
   b) Comment on Indian biodiversity with special reference as a mega diversity nation?

UNIT–IV

7. a) Explain the major water pollutants and their effect on the Environment?
   b) Briefly describe sources, effects and control of Noise pollution?

OR

8. a) Discuss briefly any two Global effects of Air Pollution.
   b) Describe various effects and control measures of Thermal pollution?

UNIT–V

9. a) Enumerate and Explain rainwater harvesting methods
   b) Explain the evolution of family welfare programs in India?

OR

10. a) Explain environmental consequences of unethical behavior of human population?
    b) Discuss objectives and elements of value education?

***

Hall Ticket Number :										

R-14

Code: 4G141

II B.Tech. II Semester Regular Examinations May 2016

Computer Organization

(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)

****

UNIT–I

1. a) Simplify the Boolean function f(w,x,y,z) = ∑(0,5,11,14) and give the circuit realization of this function using logic gates. 7M

   b) Explain the function of a 3 to 8 line decoder using its associated signals and truth table. 7M

OR

2. a) List the techniques used to represent negative numbers in binary. Compare and contrast among them in terms of the range of numbers, considering N bits are used to represent a number. 7M

   b) State the limitations of using parity bit to detect errors. Explain the features of Hamming codes to locate the presence of errors. 7M

UNIT–II

3. a) What is a three-state buffer? Design a decoder and three-state buffer logic to implement multiplexing the least significant bit of 6 registers of a CPU onto a common bus line. 7M

   b) The 8-bit registers AR and BR, respectively are initialized with 10011001 and 00011110. Determine the values of each registers after executing the following sequence of micro-operations:

   AR ← AR ⊕ BR

   BR ← AR ⊕ BR

   AR ← AR ⊕ BR 7M

OR

4. a) State and explain the phases of an instruction cycle of basic computer architecture. 10M

   b) Differentiate between an interrupt cycle and instruction cycle. 4M

UNIT–III

5. a) Explain the functional units of a microprogrammed control unit. 7M

   b) Discuss in detail the various fields of a microinstruction format and specify the control memory size. 7M

OR

6. a) State the pros and cons of microprogrammed control unit over hardwired control unit. 4M

   b) Describe the organization and functions of a microprogram sequencer for control memory. 10M

UNIT–IV

7. a) Bring out the features of Booth's algorithm for multiplication. Explain the data flow among the functional units of a hardware implementation of Booth's algorithm. 10M

   b) Explain the terms 'mantissa' and 'exponent' with suitable examples. State the advantage of using biased exponent. 4M

OR

8. a) Explain the hierarchy of memory subsystem of a computer organization. 4M

   b) What is the use of 'tag' and 'index' fields in a cache memory organization? Assume a cache memory of size 1K words is to be mapped with 1 MB of physical address space. Determine the number of bits required for address the main memory and hence the number of bits for tag and index fields. 10M

UNIT–V

9. a) State the advantages and disadvantages of isolated I/O mapping when compared to memory mapped I/O. 4M

   b) List and describe the features of data transfer schemes between I/O and CPU. 10M

OR

10. a) State the advantages of instruction pipelining. Describe the difficulties that may arise due pipelining and cite the techniques to handle the same. 7M

    b) Explain the organization of SIMD array processor. 7M

***

Hall Ticket Number :										

Code: 4G142 **R-14**

II B.Tech. II Semester Regular Examinations May 2016

Software Engineering

(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)

****

UNIT–II

1 a) For the scenario described below, which life cycle model would you choose? Give the reason why you would choose this model. You are interacting with the MIS department of a very large pharmaceutical company with multiple departments. The have a complex legacy system. Migrating the data from this legacy system is not an easy task and would take a considerable time. The pharmaceutical company is very particular about processes, acceptance criteria and legal contracts. 10M

b) List out any five benefits of software engineering 5M

OR

2. a) A Coffee Vending Machine dispenses coffee to customers. Customers order coffee by selecting a recipe from a set of recipes. Customers pay for the coffee using coins. Change is given back, if any, to the customers. The 'Service Assistant' loads ingredients (coffee. powder, milk, sugar, water, chocolate) into the coffee machine.

The 'Service Assistant' adds a recipe by indicating the name of the coffee, the units of coffee powder, milk, sugar, water and chocolate to be added as well as the cost of the coffee. The Service Assistant can also edit and delete a recipe. Develop the use case diagram for the specification above. 6M

a) For any two scenarios draw an activity diagram and sequence diagram. 8M

UNIT–II

3. a) What are the components of the standard structure for the software requirements document? Explain in detail. 9M

b) Write the software requirement specification of a distributed airline reservation system. 5M

OR

4. a) Differentiate verification and validation. Give an example. 8M

b) Name the metrics for specifying Non-functional requirements. 6M

UNIT–III

5. a) Explain clearly the concepts of pattern based software design. 9M

b) Distinguish between class based and conventional components design 5M

OR

6. a) Explain Structured Analysis Design Tool (SADT) 7M

b) Design a SADT 7M

UNIT–IV

7. Write short notes on
   a) Architecture design. 7M
   b) Data acquisition system. 7M

OR

8. a) With a neat sketch draw the architecture model for an integration framework for CASE tool and explain them. 9M
   b) Design a black box testing for an Under Water submarine 5M

UNIT–V

9. a) Elaborate on Software Configuration Management 7M
   b) Write short notes on COCOMO estimation criteria. 7M

OR

10. a) Write a software review for a product. 8M
    b) Write a note on the ISO 9000 quality standards. 6M

***

Hall Ticket Number :										

Code: 4G144

R-14

II B.Tech. II Semester Regular Examinations May 2016

Object Oriented Programming Through JAVA

(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)

****

UNIT–I

1. a) What is byte code in Java? Explain. 4M
   b) Explain the working of JVM. 5M
   c) What are the advantages of Object Oriented Programming? 5M

OR

2. a) Write a Java program to reverse the given long integer. 7M
   b) Write a Java program to demonstrate constructor overloading. 7M

UNIT–II

3. a) Explain the uses of super keyword with suitable examples 7M
   b) Write a Java program that creates an abstract class called Dimension with area() method. Create two subclasses Rectangle and Triangle. Include appropriate methods for both the subclasses that calculate and display the area of rectangle and triangle. 7M

OR

4. a) What is a Java package? What is a CLASSPATH? Explain how to create and access java Package with an example. 7M
   b) Explain in detail the various forms of implementing interfaces. 7M

UNIT–III

5. a) What is an exception? How is an exception handled in Java? Explain the different types of exceptions in Java. 7M
   b) Compare the keyword *throw* and *throws*. Write a Java program to demonstrate *throw* and *throws* 7M

OR

6. a) What is a thread? What are daemon threads? Explain in detail the thread synchronization in Java. 7M
   b) Write a Java program that creates two threads. First thread prints numbers from 1 to 50 and the other thread prints the numbers from 100 to 50. 7M

UNIT–IV

7. a) What is a socket? What are the two important TCP sockets classes? Explain. 7M
   b) Write a Java program at server side that will receive a connection from client, send a string to the client and closes the connection. Explain the program. 7M

OR

8. a) What is a Java applet? What are the different stages in life cycle of an applet? Explain. 7M
   b) Write a Java program to pass the parameters to an applet. 7M

UNIT–V

9. a) What is an event handling? Name and explain any four event classes available in *java.awt.event* package. 7M
   b) Write a Java program to draw a circle inside a rectangle. 7M

OR

10. a) What is a swing? What are the differences between AWT and Swing? Describe in detail about various components in Swing. 7M
    b) Explain in detail the swing controls *TabbedPanes* and *ScrollPanes* with suitable Java code examples. 7M

***

Hall Ticket Number :										

Code: 4G441

R-14

II B.Tech. II Semester Regular Examinations May 2016

Database Management 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)

****

UNIT–I

1. a) Compare and contrast file systems with database systems. 8M
   b) Define instances and schemas of database? 6M

OR

2. a) Explain about types of database languages with syntax and example? 7M
   b) Explain different types of database users and write the functions of DBA? 7M

UNIT–II

3. a) Distinguish strong entity set with weak entity set? Draw an ER diagram to illustrate weak entity set? 7M
   b) Discuss about the concept design with the ER Model? 7M

OR

4. a) Discuss about the logical database design? 7M
   b) Explain about different types of integrity constraints? 7M

UNIT–III

5. a) Explain about union and intersect operator
      i. Write a query to find the names of sailors who have reserved boat 103 and color is green.
      ii. Write a query to find the names of sailors who have reserved a red or a green boat. 7M
   b) Explain briefly about joins and its types with examples? 7M

OR

6. a) Discuss different types of aggregate operators with examples in SQL? 7M
   b) Discuss about active databases and write an example for trigger? 7M

UNIT–IV

7. a) Illustrate redundancy and the problems that it can cause? 7M
   b) Explain about properties of decomposition? 7M

OR

8. a) Explain about schema refinement in database design? 6M
   b) Compare and contrast BCNF with 3NF? 8M

UNIT–V

9. a) Explain ACID properties and Illustrate them through examples? 7M
   b) Illustrate concurrent execution of transaction with examples? 7M

OR

10. a) Compare I/O costs for all file organizations? 6M
    b) Explain B+ trees? Discuss about this dynamic index structure? 8M

***