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**Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019**  
**Management and Entrepreneurship for IT Industry**

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

**Module-1**

- 1 a. Explain the various roles of a manager. (06 Marks)  
b. Explain the contribution of FW Taylor to the theory of management. (10 Marks)

**OR**

- 2 a. Explain the steps involved in planning, and give the importance and purpose of planning process. (12 Marks)  
b. What are MBO and MBE? Explain. (04 Marks)

**Module-2**

- 3 a. Explain types of leaders or leadership styles. (06 Marks)  
b. Explain steps in controlling. (10 Marks)

**OR**

- 4 a. Explain Maslow's hierarchy theory. (10 Marks)  
b. Explain the following: (i) Cognitive evaluation theory (06 Marks)  
(ii) Herzberg (two factor theory)

**Module-3**

- 5 a. Differentiate between entrepreneur, intrapreneur and manager. (04 Marks)  
b. Explain various stages in entrepreneurial process. (12 Marks)

**OR**

- 6 a. List some of the most commonly attributed reasons for the lack of entrepreneurship in India. (12 Marks)  
b. Write short notes on: (i) Procrastination (ii) Tying your dreams to age (04 Marks)

**Module-4**

- 7 a. Explain the phases of project identification with its sources. (04 Marks)  
b. List out various contents of project report. (12 Marks)

**OR**

- 8 a. Explain various factors to be considered for selection of a project. (06 Marks)  
b. Give the meaning of project appraisal. (10 Marks)

**Module-5**

- 9 a. Explain the following: (i) NSIC (ii) DIC (iii) NIMSMIET (iv) NIESBUD (v) KSFC (10 Marks)  
b. Justify WTO and its impact on Small Scale Industries in India. (06 Marks)

**OR**

- 10 a. What is TECSOK? Explain the services offered by TECSOK. (10 Marks)  
b. Explain the aims and objectives of KIADB. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

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## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Computer Networks

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain HTTP messages. (08 Ma)  
b. Explain web caching with diagram. (08 Ma)

OR

- 2 a. Explain FTP with its commands and replies. (08 Ma)  
b. Explain SMTP. (04 Ma)  
c. Explain DNS resource record. (04 Ma)

### Module-2

- 3 a. Explain Sender's view of sequence numbers and its operation in Goback N protocol. (08 Ma)  
b. Draw TCP segment structure and explain. (08 Ma)

OR

- 4 a. Explain 3 way handshake and closing a TCP connection. (08 Ma)  
b. Explain the causes and costs of congestion. (08 Ma)

### Module-3

- 5 a. With diagram explain router architecture. (08 Ma)  
b. Explain IP fragmentation. (08 Ma)

OR

- 6 a. Explain distance vector algorithm. (08 Ma)  
b. Explain 4 types of hierarchical OSPF routers. (08 Ma)  
c. Compare link state with distance vector algorithm. (08 Ma)

### Module-4

- 7 a. Explain components of a cellular network architecture. (08 Ma)  
b. Explain direct routing of a mobile node. (08 Ma)

OR

- 8 a. Explain steps of handoff a mobile user. (08 Ma)  
b. Explain HLR, VLR, home address, care-of-address. (08 Ma)

### Module-5

- 9 a. With diagram, explain naïve architecture for audio/video streaming. (08 Ma)  
b. Explain audio compression in internet. (08 Ma)

OR

- 10 a. With diagram, explain interaction between client and server using F (08 Ma)  
b. Explain how streaming from streaming server to a media player is (08 Ma)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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15CS53

## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Database Management System

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What are the responsibilities of the DBA and Database Designer? (06 Marks)
- b. With neat diagram, explain "three schema Architecture". (05 Marks)
- c. Discuss the different types of user friendly interfaces and the types of user who typically use each. (05 Marks)

OR

- 2 a. Explain with block diagram the different phases of database design. (08 Marks)
- b. Draw an ER-Diagram of movie database. Assume your own entities (minimum 4) attributes and relationships. (08 Marks)

### Module-2

- 3 a. Discuss the characteristics of relations. (06 Marks)
- b. Outline the steps to convert the basic ER Model to relational Database schema. (06 Marks)
- c. Define the following: (04 Marks)
  - i) Relation state
  - ii) Relation schema
  - iii) Arity
  - iv) Domain.

OR

- 4 a. Discuss the various types of set theory operations with example. (08 Marks)
- b. Consider the two tables, show the results of the following:

T <sub>1</sub>		
A	B	C
10	a	5
15	b	8
25	a	6

T <sub>2</sub>		
P	Q	R
10	b	6
25	c	3
10	b	5

i)  $T_1 \bowtie T_2$   
 $(T_1.A = T_2.Q)$

ii)  $T_1 \bowtie T_2$   
 $(T_1.A = T_2.P)$

iii)  $T_1 \bowtie T_2$   
 $(T_1.A = T_2.P) \text{ AND } (T_1.C = T_2.R)$

iv)  $T_1 - T_2$

(08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-3**

- 5 a. How does SQL implement the entity integrity constraints of the relational data model? Explain with an example. (04 Marks)
- b. Discuss: i) Shared variables ii) Communication variables. (06 Marks)
- c. Explain with examples in SQL:
- Drop command
  - Delete command
  - Update command. (06 Marks)

**OR**

- 6 a. With program segment, explain retrieving of tuples with embedded SQL in C. (06 Marks)
- b. Consider the following tables:  
works (Pname, Cname, Salary)  
lives (Pname, Street, City)  
located-In (Cname, City)  
write the following queries in SQL:
- List the names of the people who work for the company 'Wipro' along with the cities they live in.
  - Find the names of the persons who do not work for 'Infosys'.
  - Find the people whose salaries are more than that of all of the 'oracle' employees.
  - Find the persons who works and lives in the same city. (10 Marks)

**Module-4**

- 7 a. What do you mean by closure of attribute? Write an algorithm to find closure of attribute. (06 Marks)
- b. Explain any two informal Quality measures employed for a relation schema design. (04 Marks)
- c. Given below are two sets of FDs for a relation R (A, B, C, D, E). Are they equivalent?
- $A \rightarrow B$ ,  $AB \rightarrow C$ ,  $D \rightarrow AC$ ,  $D \rightarrow E$
  - $A \rightarrow BC$ ,  $D \rightarrow AE$  (06 Marks)

**OR**

- 8 a. What do you mean by multivalued dependency? Explain the 4NF with example. (06 Marks)
- b. Suggest and explain three different techniques to achieve 4NF using suitable example. (04 Marks)
- c. Consider the following relation for CARSALE (CAR-NO, Date-Sold, Salesman No, Commission, Discount)  
Assume a car can be sold by multiple salesman and hence primary key is {CAR\_NO, Salesman\_No}.  
Additional dependencies are  
 $Date\_Sold \rightarrow Discount$   
 $Salesman\_No \rightarrow Commission$
- Is this relation in 1NF, 2NF or 3NF? Why or why not?
  - How would you normalize this completely? (06 Marks)

**Module-5**

- 9 a. Discuss the ACID properties of a transaction. (04 Marks)
- b. What are the anomalies occur due to interleave execution? Explain them with example. (06 Marks)

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c. Consider the three transactions  $T_1$ ,  $T_2$  and  $T_3$  and schedules  $S_1$  and  $S_2$  given below. Determine whether each schedule is serializable or not? If a schedule is serializable write down the equivalent serial schedule (S).

$T_1 : R_1(x); R_1(z); W_1(x);$

$T_2 : R_2(x); R_2(y); W_2(z); W_2(y);$

$T_3 : R_3(x); R_3(y); W_3(y);$

$S_1 : R_1(x); R_2(z); R_1(z); R_3(x); R_3(y); W_1(x); W_3(y); R_2(y); W_2(z); W_2(y);$

$S_2 : R_1(x); R_2(z); R_3(x); R_1(z); R_2(y); R_3(y); W_1(x); W_2(z); W_3(y); W_2(y);$

(06 Marks)

OR

- 10 a. Describe the problems that occur when concurrent execution uncontrolled. Give examples. (06 Marks)
- b. What is two phase locking? Describe with the help of an example. (04 Marks)
- c. What is Deadlock? Consider the following sequences of actions listed in the order they are submitted to the DBMS.

Sequence  $S_1: R_1(A); W_2(B); R_1(B); R_3(C); W_2(C); W_4(B); W_3(A)$

Draw waits-for graph in case of Deadlock situation. (06 Marks)

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15CS54

## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Automata Theory and Computability

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

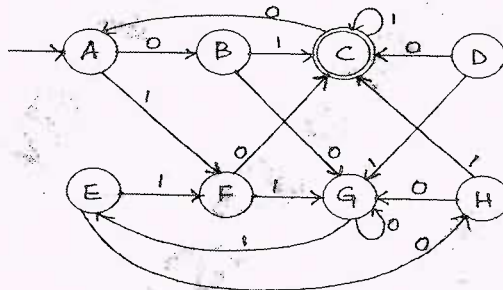
- 1 a. Define the following with example :  
 i) String    ii) Language    iii) Alphabet    iv) DFSM. (08 Marks)
- b. Design a DFSM to accept each of the following languages :  
 i)  $L = \{W \in \{0, 1\}^* : W \text{ has } 001 \text{ as a substring}\}$   
 ii)  $L = \{W \in \{a, b\}^* : W \text{ has even number of a's and even number of b's}\}$ . (08 Marks)

**OR**

- 2 a. Define NDFSM. Convert the following NDFSM to its equivalent DFSM. (08 Marks)

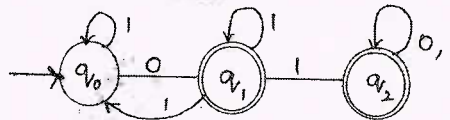


- b. Minimize the following DFSM. (08 Marks)



### Module-2

- 3 a. Define Regular expression and write Regular expression for the following language.  
 i)  $L = \{a^{2n} b^{2m} \mid n \geq 0, m \geq 0\}$  (08 Marks)  
 ii)  $L = \{a^n b^m \mid m \geq 1, n \geq 1, nm \geq 3\}$ .
- b. Obtain the Regular expression for the following FSM. (08 Marks)



**OR**

- 4 a. Define a Regular grammar. Design regular grammars for the following languages.  
 i) Strings of a's and b's with at least one a.  
 ii) Strings of a's and b's having strings without ending with ab.  
 iii) Strings of 0's and 1's with three consecutive 0's. (08 Marks)
- b. State and prove pumping theorem for regular languages. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-3**

- 5 a. Define context free grammar. Design a context free grammar for the languages. (08 Marks)
- i)  $L = \{0^m 1^m 2^n \mid m \geq 0, n \geq 0\}$       ii)  $L = \{a^i b^j \mid i \neq j, i \geq 0, j \geq 0\}$
- iii)  $L = \{a^n b^{n-3} \mid n \geq 3\}$ .
- b. Consider the grammar G with production.
- $S \rightarrow AbB$
- $A \rightarrow aA \mid \epsilon$  (08 Marks)
- $B \rightarrow aB \mid bB \mid \epsilon$
- Obtain leftmost derivation, rightmost derivation and parse tree for the string aaabab.

**OR**

- 6 a. Define a PDA. Obtain a PDA to accept  $L = \{a^n b^n \mid n \in \{a, b\}^*\}$ . Draw the transition diagram. (08 Marks)
- b. Convert the following grammar into equivalent PDA.
- $S \rightarrow aABC$
- $A \rightarrow aB \mid a$  (08 Marks)
- $B \rightarrow bA \mid b$
- $C \rightarrow a$ .

**Module-4**

- 7 a. State and prove pumping lemma for context free languages. Show that  $L = \{a^n b^n c^n \mid n \geq 0\}$  is not context free. (10 Marks)
- b. Explain Turing machine model. (06 Marks)

**OR**

- 8 a. Design a Turing machine to accept the language  $L = \{0^n 1^n 2^n \mid n \geq 1\}$ . (08 Marks)
- b. Design a Turing machine to accept strings of a's and b's ending with ab or ba. (08 Marks)

**Module-5**

- 9 a. Explain the following :
- i) Non deterministic Turing machine      ii) Multi-tape Turing machine. (06 Marks)
- b. Define the following :
- i) Recursively enumerable language      ii) Decidable language. (06 Marks)
- c. What is Post correspondence problem? (04 Marks)

**OR**

- 10 a. What is Halting problem of Turing machine? (06 Marks)
- b. Define the following : i) Quantum computer      ii) Class NP. (06 Marks)
- c. Explain Church Turing Thesis. (04 Marks)

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15CS552

## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Introduction to Software Testing

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain about software quality with respect to quality attributes and reliability. (08 Marks)  
b. Explain the classification of test metrics used in software testing. (08 Marks)

OR

- 2 a. Explain about the Error and Fault Taxonomies in a perspective testing with respect to types and instances. (08 Marks)  
b. Explain the levels of abstraction and testing in the waterfall model in a levels of testing. (08 Marks)

### Module-2

- 3 a. Discuss the triangle problem with respect to problem statement, traditional implementation and structured implementation. (08 Marks)  
b. Explain the difference between Robustness Testing and Worst Case Testing. (08 Marks)

OR

- 4 a. Explain the following equivalence class testing with respect to:  
i) Weak Normal ii) Strong Normal  
iii) Weak Robust iv) Strong Robust (08 Marks)  
b. Explain the Decision Table – Based Testing with any one suitable examples. (08 Marks)

### Module-3

- 5 a. Explain the Fault-Based Testing Terminologies with respect to assumptions. (08 Marks)  
b. Difference between statement testing and condition testing with respect to structural testing. (08 Marks)

OR

- 6 a. Explain the following with respect to path testing:  
i) DD – Paths  
ii) McCabe's Basis Path Method. (08 Marks)  
b. Explain about slice based testing with suitable examples with respect to data flow testing. (08 Marks)

### Module-4

- 7 a. Explain the following with respect to Test Execution:  
i) Scaffolding  
ii) Test Oracles (08 Marks)  
b. Explain the six basic principles that characterize various approaches and techniques for analysis and testing. (08 Marks)

**OR**

- 8 a. Explain the difference between Risk Planning and the Quality Team with respect to planning and monitoring the process. (08 Marks)
- b. Explain about the quality and Process with respect to planning and monitoring the process. (08 Marks)

**Module-5**

- 9 a. Explain some of the possible manifestations of incomplete specifications and faulty implementation with reference to Integration and Component based Software Testing. (08 Marks)
- b. Explain the following in brief notes on:
- i) System Testing
  - ii) Acceptance Testing
  - iii) Regression Testing
- (08 Marks)

**OR**

- 10 a. Draw the context diagram of the simple Automatic Teller Machine (SATM) system with SATM Terminal and 15 Screens for the SATM system. (08 Marks)
- b. Explain the following Decomposition Based Integration Testing with respect to:
- i) Top-Down Integration
  - ii) Bottom-up Integration
  - iii) Sandwich Integration
- (08 Marks)

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15CS553

## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Advanced JAVA and J2EE

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What is auto-boxing? Write a program to demonstrate autoboxing/unboxing. (05 Marks)  
b. What do you mean by type wrapper? Explain numeric type wrapper with an example program in JAVA. (05 Marks)  
c. Explain the following methods of java.lang.Enum with an example:  
i) ordinal( ) ii) compareTo( ) iii) equals( ) (06 Marks)

OR

- 2 a. Demonstrate single annotation with an example. (04 Marks)  
b. Explain following built-in annotations with a program in Java:  
i) @Override ii) @Inherited iii) @Retention (06 Marks)  
c. Explain different retention policies for annotations in Java. (06 Marks)

### Module-2

- 3 a. Explain ArrayList. Write a program to demonstrate how ArrayList can be used to insert and remover string. (08 Marks)  
b. Explain Queue interface. Explain different methods defined by Queue. (08 Marks)

OR

- 4 a. Create a class STUDENT with two private-string members: USN, Name using LinkedList class in Java, write a program to add atleast 3 objects of above STUDENT class. Also display the data in neat format. (08 Marks)  
b. Explain ArrayList class and explain following methods:  
i) binarySearch ii) copyOf iii) equals iv) fill (08 Marks)

### Module-3

- 5 a. Explain following StringBuffer methods with an example:  
i) insert ii) append iii) replace iv) substring (08 Marks)  
b. Differentiate String and StringBuffer class. Write a program to demonstrate different construction of String class. (08 Marks)

OR

- 6 a. Write a program to remove duplicate characters from a given string and display the resultant string. (06 Marks)  
b. Differentiate between equals( ) and == with respect to string with a program. (06 Marks)  
c. Explain following character extraction method: i) charAt( ) ii) toCharArray( ) (04 Marks)

### Module-4

- 7 a. What is the role of Tomcat server? Explain different steps involved in configuring for development of servlet program execution. (08 Marks)  
b. Write a Java servlet program to accept two parameter from webpage, find the sum of them. display the result in web page. Also give necessary html script to create web page. (08 Marks)

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OR

- 8 a. Explain different JSP tags with a program to demonstrate all tags. (08 Marks)  
b. What are cookies? How cookies are handled in JSP? Write a program to create with name "Username" and cookie value "xyz". Also display stored cookie in webpage. (08 Marks)

**Module-5**

- 9 a. What are database drivers? Explain different JDBC driver types. (08 Marks)  
b. List and explain various statement objects in JDBC. (08 Marks)

OR

- 10 a. Explain different steps involved in JDBC process, with a code snippet. Also give exception handling block. (08 Marks)  
b. Write a program to connect to database with following information:  
Drive: JDBC/ODBC bridge  
URL: "jdbc:odbc:Ex"  
Username: "xyz"  
Password: "123"  
Retrieve all rows with marks > 60 using prepared statement object. Assume following table:  
Table Name : STUDENT  
Fields : USN-Varchar (20)  
Marks-int  
Name-Varchar (25)

(08 Marks)

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## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Dot Net Frame Work for Application Development

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Explain Namespaces and Assemblies in brief. (04 Marks)
- b. Explain concept of named arguments with programming example. (06 Marks)
- c. Write a C # program to find factorial of a given number. (06 Marks)

OR

- 2 a. Explain how to use while, for, and do statements to execute code repeatedly while some Boolean condition is true with an example. (08 Marks)
- b. Define Exception. Explain how to catch and handle exceptions by using the try and catch constructs with programming example. (08 Marks)

### Module-2

- 3 a. Explain Anonymous classes, with an example. (04 Marks)
- b. Explain Boxing and Unboxing, with an example. (06 Marks)
- c. Explain how arguments are passed as method parameters by using 'ref' and 'out' keywords. (06 Marks)

OR

- 4 a. Define Constructor. Explain constructor overloading with a programming example. (08 Marks)
- b. Write a C # program to compute row sum and column sum of rectangular array. (08 Marks)

### Module-3

- 5 a. Explain the concept of params array with programming example. (06 Marks)
- b. Define Inheritance. Explain how to create a derived class that inherits features from a base class, with an example program. (06 Marks)
- c. Explain Abstract class and Abstract method, with an example. (04 Marks)

OR

- 6 a. Explain how to manage system resources by using Garbage collector. (06 Marks)
- b. Explain how to implement interface in a class with programming example. (06 Marks)
- c. Explain Sealed classes and Sealed methods in brief. (04 Marks)

### Module-4

- 7 a. Explain read – only and write – only properties with an example. (04 Marks)
- b. Compare indexers and arrays with an example. (04 Marks)
- c. Explain Binary tree Algorithm, with an example. (08 Marks)

OR

- 8 a. What is an Indexer? List and explain set of operators provided by C # that you can use to access and manipulate the individual bits in an int. (08 Marks)
- b. Explain Linked list < T > collection class with programming example. (08 Marks)

**Module-5**

- 9 a. Explain how to implement an enumerator manually with an example. (06 Marks)
- b. Define Delegate. Explain how to declare delegate with an example. (05 Marks)
- c. Explain how to handle and event by using a delegate, with an example. (05 Marks)

OR

- 10 a. What is LINQ? Explain LINQ to selecting and ordering data, with an example. (08 Marks)
- b. Explain Operator overloading and their constraints with a programming example. (08 Marks)

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## Fifth Semester B.E. Degree Examination, June/July 2019 Computer Networks

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Describe in detail the services offered by DNS and explain the DNS message format. (08 Marks)
- b. Illustrate the basic operation of SMTP and FTP. (08 Marks)

OR

- 2 a. Explain the persistent and non-persistent connection of HTTP. (08 Marks)
- b. Define a socket. Describe the socket programming using TCP. (08 Marks)

### Module-2

- 3 a. Draw and explain the FSM for sender and receiver side of rdt 2.1 protocol. (08 Marks)
- b. Elaborate the three-way handshaking procedure used in TCP. (04 Marks)
- c. Suppose that 2 measured sample RTT values are 106 ms and 120 ms. Compute
  - (i) Estimated RTT after each of these sample RTT value is obtained, Assume  $\alpha = 0.125$  and estimated RTT is 100 ms just before first of the sample obtained.
  - (ii) Compute DevRTT, Assume  $\beta = 0.25$  and DevRTT was 5 msec before first of these samples are obtained. (04 Marks)

OR

- 4 a. With an FSM, explain the three phases of congestion control. (08 Marks)
- b. Write the TCP segment structure and explain its fields. (04 Marks)
- c. Elaborate the working of Go-Back N protocol. (04 Marks)

### Module-3

- 5 a. Give the format of IPV6 datagram and explain the fields. (06 Marks)
- b. What are the message types used in IGMP? (03 Marks)
- c. Write the link state routing algorithm and apply it to the following graph with source node [Refer Fig.Q5(c)] is 'u'. (07 Marks)

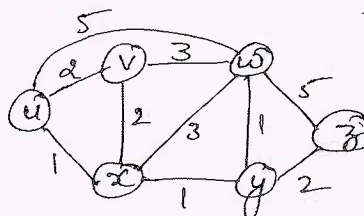


Fig.Q5(c)

OR

- 6 a. What is routing? Write the structure of a router. (07 Marks)
- b. List the broadcast routing algorithms? Explain any one of them. (04 Marks)
- c. Describe the intra-AS routing protocols in detail (05 Marks)

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**Module-4**

- 7 a. Illustrate the two different approaches for routing to a mobile node. (08 Marks)  
b. With a neat diagram, bring out the steps for mobile node registration to home agent. (08 Marks)

**OR**

- 8 a. Bring out the components of 3G Cellular Network architecture. (08 Marks)  
b. State handoff? What are the steps involved in accomplishing handoff. (05 Marks)  
c. Explain the three phases of mobile IP. (03 Marks)

**Module-5**

- 9 a. Bring out the leaky bucket mechanism for traffic policing. (07 Marks)  
b. Classify the multimedia network applications. (03 Marks)  
c. Describe the link scheduling mechanisms. (06 Marks)

**OR**

- 10 a. List the categories of streaming stored video. Explain any one of them. (08 Marks)  
b. Explain the working of CDN. (08 Marks)

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## Fifth Semester B.E. Degree Examination, June/July 2019 Database Management System

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define DBMS. Discuss the advantages of DBMS over the traditional file system. (08 Marks)  
 b. Explain the component modulus of DBMS and their interaction, with the help of a diagram. (08 Marks)

**OR**

- 2 a. Define the following with an example :  
 i) Weak entity type                      ii) Participation constraints  
 ii) Cardinality ratio                      iv) Recursive relationship. (08 Marks)  
 b. Draw an ER diagram of Banking system taking into account atleast five entities, indicate all keys, constraints and assumptions that are made. (08 Marks)

### Module-2

- 3 a. What is meant by Integrity Constraint? Explain the importance of referential integrity constraint. How referential integrity constraint is implemented in SQL? (08 Marks)  
 b. Consider the following Movie database ;  
 Movie (Title , director , Myear , Rating)  
 Actors (Actor , Aage)  
 Acts (Actor , title)  
 Directors (Director , dage)  
 Write the following queries in relational algebra on the database given ;  
 i) Find movies made by "Hanson" after 1997.  
 ii) Find all actors and directors.  
 iii) Find "Coen's" movie with "Mc Dormand".  
 iv) Find (director , actor) pairs where the director is younger than the actor. (08 Marks)

**OR**

- 4 a. Discuss insulation , deletion and modification anomalies. Why are they considered bad? Illustrate with an example. (08 Marks)  
 b. Write the SQL queries for the following relational schema ;  
 Sailors (Sid , Sname , Rating, Age)  
 Boats (Bid , Bname , color)  
 Reserve (Sid , Bid , Day)  
 i) Retrieve the Sailor's name who have reserved red and green boat.  
 ii) Retrieve the no : of boats which are not reserved.  
 iii) Retrieve the Sailors name who have reserved boat number 103.  
 iv) Retrieve the Sailors name who have reserved all boats. (08 Marks)

### Module-3

- 5 a. How are triggers and assertions defined in SQL? Explain. (08 Marks)  
 b. How are views created and dropped? Explain how the views are implemented and updated. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the Single-tier and Client-server architecture, with a neat diagram. (08 Marks)  
 b. Explain the following :  
 i) Embedded SQL      ii) Database stored procedure. (08 Marks)

Module-4

- 7 a. Which Normal form is based on the concept of transitive functional dependency? Explain the same with an example. (08 Marks)  
 b. What is the need for normalization? Consider the relation :  
 Emp-proj = {SSn, Pnumber, Hours, Ename, Pname, Plocation}.  
 Assume {SSn, Pnumber} as primary key.  
 The dependencies are ;  
 $\{SSn, Pnumber\} \rightarrow Hours$   
 $SSn \rightarrow Ename$   
 $Pnumber \rightarrow \{Pname, Plocation\}$   
 Normalize the above relation to 3NF. (08 Marks)

OR

- 8 a. What is Functional Dependency? Find the minimal cover using the minimal cover algorithm for the following functional dependency.  
 $F = \{AB \rightarrow D, B \rightarrow C, AE \rightarrow B, A \rightarrow D, D \rightarrow EF\}$ . (08 Marks)  
 b. Consider two sets of functional dependency.  
 $F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$  and  $G = \{A \rightarrow CD, E \rightarrow AH\}$ .  
 Are they equivalent? (08 Marks)

Module-5

- 9 a. Discuss the ACID properties of a database transaction. (04 Marks)  
 b. Why Concurrency control is needed? Demonstrate with an example. (12 Marks)

OR

- 10 a. Discuss the UNDO and REDO operations and the recovery techniques that use each. (06 Marks)  
 b. Discuss the time-stamp ordering protocol for concurrency control. (05 Marks)  
 c. Explain how shadow paging helps to recover from transaction failure. (05 Marks)

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15CS/IS54

## Fifth Semester B.E. Degree Examination, June/July 2019 Automata Theory and Computability

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Define the following : i) string ii) alphabet iii) language. (06 Marks)
- b. Design a deterministic finite state machine for the following language over  $\Sigma = \{a, b\}$ .
  - i)  $L = \{W \mid |W| \bmod 3 > |W| \bmod 2\}$
  - ii)  $L = \{w \mid W \text{ ends either with } ab \text{ or } ba\}$ . (10 Marks)

OR

- 2 a. Write a note on finite state transducers. (07 Marks)
- b. Define DFSM? Minimize the following FSM. [Refer Fig.Q2(b)]

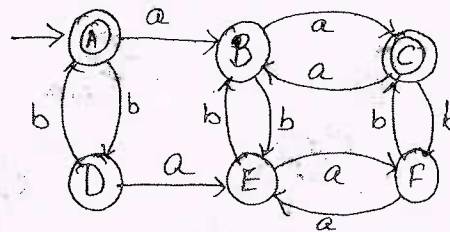


Fig.Q2(b)

(09 Marks)

### Module-2

- 3 a. Write the equivalent Regular Expression for the given Finite state machine. [Refer Fig.Q3(a)] (08 Marks)

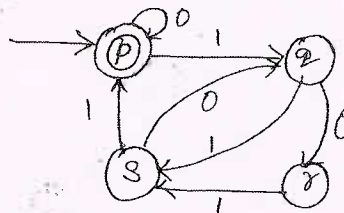


Fig Q3(a)

- b. Write the Regular Expression for the following language.
  - i)  $\{w \in \{a, b\}^* \text{ with atmost one } a\}$
  - ii)  $\{w \in \{a, b\}^* \text{ does not end with } ba\}$
  - iii)  $\{w \in \{0, 1\}^* \text{ has substring } 001\}$
  - iv)  $\{w \in \{0, 1\}^* \mid |W| \text{ is even}\}$ . (08 Marks)

OR

- 4 a. State and prove the pumping theorem for regular language. (08 Marks)
- b. Show that the language  $L = \{a^n b^n \mid n \geq 0\}$  is not regular. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-3**

- 5 a. Define grammar. Write the CFG for the following language.
- i)  $L = \{w \in \{a, b\}^* \mid n_a(w) = n_b(w)\}$
- ii)  $L = \{a^i b^j \mid i = j+1\}$ . (08 Marks)
- b. What is inherent ambiguity? Show that the language given is inherently ambiguous?
- $L = \{a^n b^n c^m \mid n, m \geq 0\} \cup \{a^n b^m c^n \mid n, m \geq 0\}$ . (08 Marks)

**OR**

- 6 a. Define PDA? Design PDA for the language  $L = \{a^n b^m a^n \mid n, m \geq 0\}$ . (06 Marks)
- b. Convert the following language from CFG to PDA  $L = \{ww^R \mid w \in \{0, 1\}^*\}$ . (06 Marks)
- c. Convert the following CFG to CNF  $E \rightarrow E + E \mid E * E \mid (E) \mid id$ . (04 Marks)

**Module-4**

- 7 a. Prove that the language  $L = \{a^n b^n c^n \mid n \geq 0\}$  is not context free. (08 Marks)
- b. Prove that CFL are not closed under intersection, complement or difference? (08 Marks)

**OR**

- 8 a. Design a Turing machine to accept  $L = \{a^n b^n c^n \mid n \geq 0\}$ . (08 Marks)
- b. Define a turning machine. Explain the working of a turning machine. (05 Marks)
- c. Write a note on multitape machine. (03 Marks)

**Module-5**

- 9 Write a short notes on :
- a. Growth rate of function (05 Marks)
- b. Church-turning thesis (06 Marks)
- c. Linear bounded automata. (05 Marks)

**OR**

- 10 Write a short notes on :
- a. Post correspondence problem (05 Marks)
- b. Halting problem in turning machine (05 Marks)
- c. Various types of turning machine. (06 Marks)

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15CS546

## Fifth Semester B.E. Degree Examination, June/July 2019 Dot Net Framework for Application Development

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing  
ONE full question from each module.*

### Module-1

- 1 a. What is a console application? Explain the steps to create a console application in visual studio 2015. (07 Marks)
- b. Explain the purpose of namespaces and assemblies. (04 Marks)
- c. Explain the steps to create a graphical application and create a user interface to print the greeting message. (05 Marks)

OR

- 2 a. Define local scope and class scope. (02 Marks)
- b. Create a method that calculates all arithmetic operations (+, -, \*, /, %(mod)) and explain the procedure to generate a method stub wizard that help you to write methods. Explain the use of visual studio 2015 debugger to step in and step out of method call as they run. (10 Marks)
- c. Explain the exception handling using try and catch statements. (04 Marks)

### Module-2

- 3 a. Explain the propose of encapsulation and define a class and control the accessibility of members in a class, illustrate with an example? (07 Marks)
- b. What is a constructor? Explain the object creation that invoke the constructor, write and call your own constructor by explaining with an example. (05 Marks)
- c. Explain in detail anonymous classes with an example. (04 Marks)

OR

- 4 a. Explain ref and out parameters with an example. (06 Marks)
- b. Give the differences between a structure and class. (04 Marks)
- c. Write a method that can accept any number of arguments of any type by using the params keyword. (06 Marks)

### Module-3

- 5 a. What is inheritance? Discuss about method hiding and overriding by using the new, virtual and override keywords. (08 Marks)
- b. Define an interface by specifying the signatures and return type of methods and implement an interface in a structure and class. (08 Marks)

OR

- 6 a. Explain in detail how garbage collection works. (08 Marks)
- b. Given the purpose dispose method and explain the calling of dispose method from destructor. (08 Marks)

**Module-4**

- 7 a. Explain the use of get and set assessors. (06 Marks)  
b. Describe an interface containing properties by using structure and classes. (04 Marks)  
c. What is an indexer? Differentiate between indexers and arrays. (06 Marks)

**OR**

- 8 a. Explain in detail about generics. (02 Marks)  
b. Explain the functionality provided in the different collection classes available within the •NET frame work. (14 Marks)

**Module-5**

- 9 a. Define an enumerator that can be used to iterate over the elements in a collection. (04 Marks)  
b. Explain the use of delegates and given examples of delegates in the •NET framework class library. (12 Marks)

**OR**

- 10 a. Declare an event. Explain in detail about raising an event and handling an event by using a delegate. (06 Marks)  
b. Define Language-Interred Query (LINQ) queries to examine the contents of enumerable collections. (10 Marks)

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15CS61

## Sixth Semester B.E. Degree Examination, June/July 2019 Cryptography, Network Security and Cyber Law

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Describe the types of Vulnerabilities to domain of security. (04 Marks)  
 b. List the guiding principles of security. (04 Marks)  
 c. Write the extended Euclidean algorithm, with an example. (08 Marks)

OR

- 2 a. Calculate the value of x using Chinese remainder theorem by given below data :  
 $N = 210$  ,  $n_1 = 5$  ,  $n_2 = 6$  ,  $n_3 = 7$  ,  $x_1 = 3$  ,  $x_2 = 5$  ,  $x_3 = 2$ . (05 Marks)  
 b. Explain the Vigenere Cipher and the Hill Cipher techniques with illustration. (06 Marks)  
 c. With neat diagram, explain Fiestel structure. (05 Marks)

### Module-2

- 3 a. Illustrate the RSA algorithm for encryption and decryption. (08 Marks)  
 b. Briefly explain the practical issues of RSA algorithm. (04 Marks)  
 c. List the properties of the cryptographic hash. (04 Marks)

OR

- 4 a. Discuss the case study : SHA – I. (08 Marks)  
 b. Explain the Man – In – the Middle attack on Diffie – Hellman key exchange. with neat diagram. (08 Marks)

### Module-3

- 5 a. Explain the different Public Key Infrastructure (PKI) architectures. (08 Marks)  
 b. Describe the Mutual authentication using a shared secret. (08 Marks)

OR

- 6 a. Explain the Kerberos message sequence with diagram. (06 Marks)  
 b. Describe the IP Sec protocols Authentication Header and Encapsulating Security Pay load in transport mode. (05 Marks)  
 c. Explain Secure Sockets Layer (SSL) hand shake protocol. (05 Marks)

### Module-4

- 7 a. Explain the Authentication and Master Session Key exchange in 802.11i. (05 Marks)  
 b. List and explain the worm characteristics. (05 Marks)  
 c. Explain Firewall functionality and Proxy fire wall. (06 Marks)

OR

- 8 a. Write a note on Intrusion Detection System (IDS). (05 Marks)  
 b. Explain the types of Intrusion Detection System. (05 Marks)  
 c. Briefly explain the Technologies for Web Services. (06 Marks)

### Module-5

- 9 a. Explain Digital Signature Certificates. (10 Marks)  
 b. Describe the duties of Subscribers. (06 Marks)

OR

- 10 a. List any eight functions of the Controller. (08 Marks)  
 b. Briefly explain Penalties and Adjudication in IT Act. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



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15CS62

## Sixth Semester B.E. Degree Examination, June/July 2019 Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Compare random scan display with raster scan display and list the applications of computer graphics. (04 Marks)
- b. What is OpenGL? With the help of block diagram explain Library organization of OpenGL program and give the general structure of OpenGL program. (04 Marks)
- c. What is DDA? With the help of a suitable example demonstrate the working principle of Bresenham's Line drawing algorithm for different slopes of a line. (08 Marks)

**OR**

- 2 a. Define the following terms with respect to computer graphics.  
i) Bitmap ii) Pixmap iii) aspect ratio iv) Frame buffer (04 Marks)
- b. List and explain various OpenGL primitive and its attribute functions. Develop an OpenGL program to create human face like structure using suitable OpenGL primitive functions. (06 Marks)
- c. With the help of a suitable example demonstrate Bresenham's circle drawing algorithm. (06 Marks)

### Module-2

- 3 a. Explain scan line polygon fill algorithm. Determine the content of the active edge table to fill the polygon with vertices A(2, 4), B(4, 6) and C(4, 1) for  $y = 1$  to  $y = 6$ . (06 Marks)
- b. Develop composite homogeneous transformation matrix to rotate an object with respect to a Pivot point. For the triangle A(3, 2) B(6,2), C(6, 6) rotate it in anticlockwise direction by 90 degree keeping A(3, 2) fixed, draw the new polygon. (06 Marks)
- c. With the help of a diagram explain shearing and reflection transformation technique. (04 Marks)

**OR**

- 4 a. Explain the data structures used by scan line polygon fill algorithm. Determine the content of active edge table to fill the polygon with vertices A(2, 4), B(2, 7), C(4, 9) and D(4, 6). (06 Marks)
- b. Give the reason to convert transformation matrix to homogeneous co-ordinate representation and show the process of conversion. Shear the polygon A(1, 1), B(3, 1), C(3, 3) D(2, 4), E(1, 3) along x-axis with a shearing factor of 0.2. (06 Marks)
- c. i) Prove that two successive 2D rotation are additive (04 Marks)  
ii) Prove that successive scaling are multiplicative.

### Module-3

- 5 a. Design a transformation matrix for window to viewport transformation. And explain how reshape function (glutReshapeFunc) works in OpenGL programming. (05 Marks)
- b. With the help of a suitable diagram explain basic 3D Geometric transformation techniques and give the transformation matrix. Explain the meaning of affine transformation. (05 Marks)
- c. With the help of OpenGL statements and diagram explain illumination and shading models. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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OR

- 6 a. What is Clipping? With the help of a suitable example explain Cohen-Sutherland line clipping algorithm. (06 Marks)
- b. Design transformation matrix to rotate a 3D object about an axis that is parallel to one of the co-ordinate axes. (06 Marks)
- c. With the help of a suitable diagram, explain basic illumination, RGB and CMY colour models. (04 Marks)

Module-4

- 7 a. What is 3D viewing? With the help of a block diagram, explain 3D viewing pipeline architecture. (04 Marks)
- b. Design the transformation matrix for orthogonal and perspective projections. (06 Marks)
- c. Explain Depth buffer method and give the OpenGL visibility detection functions. (06 Marks)

OR

- 8 a. Explain the steps for transformation from world to viewing coordinate system. (04 Marks)
- b. Design the transformation matrix for perspective projection and give OpenGL 3D viewing functions. (06 Marks)
- c. Give the general classification of visible detection algorithm and explain any one algorithm in detail. (06 Marks)

Module-5

- 9 a. With the help of a suitable programming construct explain event driven input menu picking and Building interactive models. (08 Marks)
- b. Write a short notes on (any two)
- i) Curve and Quadric surfaces
  - ii) OpenGL curve and surface functions
  - iii) Bezier curve and surfaces. (08 Marks)

OR

- 10 a. What are display lists? Explain the steps to develop interactive models and animating interactive programs. (08 Marks)
- b. Write a short note on (any two)
- i) Logic operations (graphics)
  - ii) Input devices or clients and servers
  - iii) Bezier spline curve and OpenGL curve functions. (08 Marks)

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15CS63

## Sixth Semester B.E. Degree Examination, June/July 2019 System Software and Compiler Design

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain SIC/XE architecture. (08 Marks)  
 b. Generate the complete object program for the following SIC/XE assembly program.

```

    WRREC  START  405D
           CLEAR  X
           LDT   LENGTH
    WLOOP  TD     OUTPUT
           JEQ   WLOOP
           LDCH  BUFFER, X
           WD   OUTPUT
           TIXR T
           JLT  WLOOP
           RSUB
    OUTPUT BYTE  X'05'
           END

    Address of BUFFER      4033
    Address of LENGTH     4036
    
```

Op Codes :

CLEAR – B4 ;    JEQ – 30;    WD – DC;    JLT – 38;  
 LDT – 74;    LDCH – 50;    TIXR – B8;    RSUB – 4C. (08 Marks)

### OR

- 2 a. List all assembler independent and dependant features and explain program relocation. (05 Marks)  
 b. Explain the data structures used in macro processor with example. (03 Marks)  
 c. Explain the following macroprocessor independent features.  
     i) Generation of unique lables (08 Marks)  
     ii) Keyword macro parameter.

### Module-2

- 3 a. What is loader? What are the basic functions the loader has to perform? (04 marks)  
 b. Develop an algorithm for bootstrap loader. (07 marks)  
 c. Explain dynamic linking with suitable diagram. (05 Marks)

### OR

- 4 a. Differentiate between a linking loader and linkage editor, with the help of suitable diagram. (08 marks)  
 b. Explain different loader option commands with examples. (04 marks)  
 c. Illustrate MS – DOS object module with its record types. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-3**

- 5 a. With the help of a diagram, explain the various phases of compiler. (08 Marks)  
 b. Explain the concept of input buffering in the lexical analysis. (04 Marks)  
 c. What design objectives, compiler optimizations must meet. (04 Marks)

**OR**

- 6 a. Write a LEX program for the tokens given below : (08 Marks)

LEXEMES	TOKEN NAME	ATTRIBUTE VALUE
Any WS	---	---
if	if	---
then	then	---
else	else	---
Any id	id	ptr to table entry
Any number	number	ptr to table entry
<	reloop	LT
<=	reloop	LE
=	reloop	EQ
< >	reloop	NE
>	reloop	GT
>=	reloop	GE

- b. Write regular definitions for unsigned numbers and draw the transition diagram for the same. (08 Marks)

**Module-4**

- 7 a. Define left recursion grammer, eliminate left recursion from the following grammer :  
 $S \rightarrow aB \mid ac \mid sd \mid se$   
 $B \rightarrow bBc \mid f$   
 $C \rightarrow g$ . (03 Marks)
- b. Consider the following context free grammer  $S \rightarrow SS + \mid SS * \mid a$  and the input string  $aa + a^*$   
 i) Give LMD and RMD  
 ii) Parse tree  
 iii) Is the grammer ambiguous? Why  
 iv) Describe the language generated by the grammer  
 v) Left factor the grammer. (05 Marks)
- c. Consider the following grammer with terminals ( , [ , ) , ]  
 $S \rightarrow TS \mid [S] S \mid )S \mid \in$   
 $T \rightarrow (x)$   
 $X \rightarrow TX \mid [X] X \mid \in$   
 i) Construct first and follow sets  
 ii) Construct its LL(1) parsing table  
 iii) Is this grammer LL(1)? (08 marks)

OR

- 8 a. The following is ambiguous grammar

$$S \rightarrow AS \mid b$$

$$A \rightarrow SA \mid a$$

Construct for this grammar its collection of sets of LR(0) items. If we try to build an LR -- parsing table for the grammar, there are certain conflicting actions what are they? Suppose we tried to use the parsing table by non deterministically choosing a possible action whenever there is a conflict, show all the possible sequences of actions on input abab\$.

(10 Marks)

- b. What are the actions of a shift -- reduce parser. Design shift -- reduce parser for the following grammar on the input 10201  $S \rightarrow 0 S 0 \mid 1 S 1 \mid 2$ .

(06 Marks)

**Module-5**

- 9 a. Consider the context free grammar given below :

$$S \rightarrow EN$$

$$E \rightarrow E + T \mid E - T \mid T$$

$$T \rightarrow T * F \mid T / F \mid F$$

$$F \rightarrow (E) \mid \text{digit}$$

$$N \rightarrow ;$$

- i) Obtain the SDD for the above grammar  
 ii) Construct annotated parse tree for the input string  $5 * 6 + 7$ . (08 Marks)
- b. Obtain the DAG for the expression, show the steps  $a + a * (b - c) + (b - c) * d$ . (04 Marks)
- c. Translate the assignment  $a = b * - c + b * - c$  into  
 i) Three address code  
 ii) Quadruples. (04 Marks)

OR

- 10 a. Explain the issues in the design of a code generator. (11 marks)
- b. Write the machine instructions for the following three address instructions :
- $b = a[i]$
  - $a[j] = c$
  - $x = *p$
  - $*p = y$
  - if  $x < y$  got L. (05 Marks)

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## Sixth Semester B.E. Degree Examination, June/July 2019 Operating Systems

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the role of operating system from different viewpoints. Explain the dual mode of operation of an operating system. (07 Marks)
- b. Demonstrate the concept of virtual machine with an example. (05 Marks)
- c. Explain the types of multiprocessing system and the types of clustering. (04 Marks)

OR

- 2 a. Describe the implementation of interprocess communication using shared memory and message passing. (06 Marks)
- b. Demonstrate the operations of process creation and process termination in UNIX. (06 Marks)
- c. Explain the different states of a process, with a neat diagram. (04 Marks)

### Module-2

- 3 a. Discuss the threading issues that come with multithreaded program. (08 Marks)
- b. Illustrate how Reader's-Writer's problem can be solved by using semaphores. (08 Marks)

OR

- 4 a. Calculate the average waiting time by drawing Gantt chart using FCFS (First Come First Serve), SRTF (Shortest Remaining Time First), RR (Round Robin) [ $q = 2$  ms] algorithms.

Process	Arrival time	Burst time
P <sub>1</sub>	0	9
P <sub>2</sub>	1	4
P <sub>3</sub>	2	9
P <sub>4</sub>	3	5

- b. Explain the Dining-Philosopher's problem using monitors. (08 Marks)

### Module-3

- 5 a. Determine whether the following system is in safe state by using Banker's algorithm.

Process	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P <sub>0</sub>	0	1	0	7	5	3	3	3	2
P <sub>1</sub>	2	0	0	3	2	2			
P <sub>2</sub>	3	0	2	9	0	2			
P <sub>3</sub>	2	1	1	2	2	2			
P <sub>4</sub>	0	0	0	4	3	3			

- b. If a request for P<sub>1</sub> arrives for (1 0 2), can the request be granted immediately? (09 Marks)
- c. Discuss the various approaches used for deadlock recovery. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**OR**

- 6 a. Illustrate with example, the internal and external fragmentation problem encountered in continuous memory allocation. (07 Marks)  
b. Explain the structure of page table. (09 Marks)

**Module-4**

- 7 a. Illustrate how demand paging affects systems performance. (08 Marks)  
b. Describe the steps in handling a page fault. (08 Marks)

**OR**

- 8 a. Explain the various types of directory structures. (08 Marks)  
b. Describe various file allocation methods. (08 Marks)

**Module-5**

- 9 a. Explain the access matrix model of implementing protection in operating system. (07 Marks)  
b. Explain the following disk scheduling algorithm in brief with examples:  
i) FCFS scheduling  
ii) SSTF scheduling  
iii) SCAN scheduling  
iv) LOOK scheduling (09 Marks)

**OR**

- 10 a. Explain the components of LINUX system with a neat diagram. (08 Marks)  
b. Explain the way process is managed in LINUX platform. (08 Marks)

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15CS651

## Sixth Semester B.E. Degree Examination, June/July 2019 Data Mining and Data Warehousing

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Describe a 3 – tier data warehousing architecture. (06 Marks)
- b. Compare OLTP and OLAP Systems. (06 Marks)
- c. What is a Data warehouse and what are its four key features? (04 Marks)

**OR**

- 2 a. Explain with suitable examples the various OLAP operations in a multidimensional data model. (07 Marks)
- b. Explain the following terms with examples : i) Snowflake schema ii) Fact constellation schema iii) Star schema (09 Marks)

### Module-2

- 3 a. Describe ROLAP . MOLAP , HOLAP. (06 Marks)
- b. What is Data Mining? With a neat diagram, explain the KDD process in data mining. (06 Marks)
- c. For the following vectors X and Y, calculate the cosine similarity, where  $X = \{3 \ 2 \ 0 \ 5 \ 0 \ 0 \ 0 \ 2 \ 0 \ 0\}$  ,  $Y = \{1 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 1 \ 0 \ 2\}$ . (04 Marks)

**OR**

- 4 a. Describe the various types of attributes and data sets. (08 Marks)
- b. Define Data preprocessing. Mention the steps involved in it. Explain any 2 steps in detail. (08 Marks)

### Module-3

- 5 a. Briefly explain the Apriori Algorithm for frequent itemset generation. (05 Marks)
- b. Explain the following terms with example : (06 Marks)
- i) Rule – generation ii) Computational complexity.
- c. Generate frequent itemset for the given data with support = 50%. (05 Marks)

TID	100	200	300	40
Items	{1, 3, 4}	{2, 3, 5}	{1, 2, 3, 5}	{2, 5}

**OR**

- 6 a. Consider the following transaction data set : (09 Marks)
- i) Construct an FP tree ii) Generate the list of frequent itemset.  
Ordered by their corresponding suffixes.

TID	1	2	3	4	5	6	7
Items	{a, b}	{b, c, d}	{a, c, d, e}	{a, d, e}	{a, b, c}	{a, b, c, d}	{a}

8	9	10
{a, b, c}	{a, b, d}	{b, c, e}

- b. Briefly explain the candidate generation procedure using  $F_{k-1} \times F_{k-1}$  Merging strategy. (07 Marks)

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**Module-4**

- 7 a. Explain how decision tree induction algorithm works. Give example. (08 Marks)  
b. List and explain the different characteristics of decision tree induction. (08 Marks)

**OR**

- 8 a. Describe the nearest neighbour classification technique. (09 Marks)  
b. Write a note on Bayesian classifier. (07 Marks)

**Module-5**

- 9 a. What is Cluster analysis? Describe the different types of clustering techniques with example. (08 Marks)  
b. Explain the following terms :  
i) K – means clustering      ii) Graph based clustering. (08 Marks)

**OR**

- 10 a. What are the basic approaches used for generating a agglomerative hierarchical clustering? (08 Marks)  
b. Explain D B Scan algorithm, with example. (08 Marks)

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15CS664

## Sixth Semester B.E. Degree Examination, June/July 2019 Python Application Programming

Time: 3 hrs.

Max. Marks: 80

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. List the features of Python Programming Language (at least FIVE). (05 Marks)
- b. What is the role of a programmer? List two skills required to be a programmer. (05 Marks)
- c. Explain the chained and nested conditional execution statements along with syntax and flow chart. (06 Marks)

OR

- 2 a. What are Python words and sentences? Explain with an example for each. (04 Marks)
- b. Differentiate compiler and interpreter. (04 Marks)
- c. Write python programs to i) Find largest of three numbers (08 Marks)  
ii) Check whether the given year is leap year or not with functions.

### Module-2

- 3 a. With syntax, explain the finite and infinite looping constructs in python. What is the need for break and continue statements. (08 Marks)
- b. Write a Python program to generate and print prime numbers between 2 to 50. (04 Marks)
- c. What are String slices? Explain the slicing operator in Python with examples. (04 Marks)

OR

- 4 a. Write a Python program to count the number of occurrences of a given word in a file. (06 Marks)
- b. Write a Python function that takes decimal number as input and convert that to binary equivalent and return the same. (04 Marks)
- c. List any six methods associated with strings and explain each of them with an example. (06 Marks)

### Module-3

- 5 a. What are the ways of traversing a list? Explain with an example for each. (04 Marks)
- b. Differentiate Pop and Remove methods on lists. How to delete more than one element from a list. (06 Marks)
- c. Write a Python program that accepts a sentences and build dictionary with LETTERS, DIGITS , UPPER CASE , LOWER CASE as key values and their count in the sentences as values. Ex : Sentence = "VTU@123.e-Learning"  
d = {"LETTERS" : 12, "DIGITS" : 3, "UPPER CASE" : 4 , "LOWER CASE" : 8}. (06 Marks)

OR

- 6 a. Compare and contrast lists and tuples. (04 Marks)
- b. Write a program to check the validity of a password read by users. The following criteria should be used to check the validity. Password should have atleast  
i) One lower case letter ii) One digit iii) One upper case letter  
iv) One special character from [\$ # @ ! ] v) Six character.  
Your program should accept a Password and check the validity using above criteria and print "valid" or "invalid" as the case may be. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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- c. Demonstrate i) how a dictionary items can be represented as a list of tuples.  
ii) How tuples can be used as keys in dictionaries? (04 Marks)

#### Module-4

- 7 a. What is a Class? How to define a class in Python? How to instantiate a class and how the class members are accessed? (04 Marks)  
b. Differentiate class variables and instance variables. (02 Marks)  
c. Write a Python program that uses datetime module within a class, takes a birthday as input and prints the age and the number of days , hours, minutes and seconds until the next birthday. (10 Marks)

#### OR

- 8 a. Write a program that has a class Point with attributes as X and Y co-ordinates. Create two objects of this class and find the midpoint of both the points. Add a method reflex\_x to class point, which returns a new point. Which is the reflection of the point about the x – axis.  
Ex : point (5, 10) ⇒ reflex\_x returns point (5, -10). (06 Marks)  
b. Differentiate between simple, multiple and multi –level inheritance. (06 Marks)  
c. Write a program that has a class Person , Inherit a class Student from Person which also has a class MarksAttendance. Assume the attributes for Person class as : USN, Name, dob, gender. Attributes for Student class as : Class , branch , year , MA.  
Attributes for MarksAttendance : Marks, Attendance.  
Create a student S = Student (“1AB16CS005”, “XYZ”, “18-1-90”, “M”, 85 , 98) and display the details of the student. (04 Marks)

#### Module-5

- 9 a. Demonstrate with the help of Python construct i) how to retrieve an image over HTTP.  
ii) how to retrieve web pages with urllib. (08 Marks)  
b. Compare and contrast the JavaScript object Notation (JSON) and XML. (04 Marks)  
c. What is Service –Oriented Architecture? List the advantages of the same. (04 Marks)

#### OR

- 10 a. Write a Python program that retrieve an user's Twitter friends , Parse the returned JSON and extract some of the information about the friends. (08 Marks)  
b. Create a simple spidering program that will go through Twitter accounts and build a database of them. (08 Marks)

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15CS61

## Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Cryptography, Network Security and Cyber Law

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing one full question from each module.**

### Module-1

- 1 a. Define cyber security? Explain the motives of cyber attack. (05 Marks)
- b. Use extended Euclidean algorithm to find inverse of 12 modulo 79? (05 Marks)
- c. Apply Chinese remainder theorem to find square roots of 3 modulo 143 and list all square roots of -3 modulo 143. (06 Marks)

**OR**

- 2 a. Explain DES construction in detail. (05 Marks)
- b. Explain confusion and Diffusion with example. (05 Marks)
- Explain three sounds SPN Network. (06 Marks)

### Module-2

- 3 a. Explain RSA operation in detail. (06 Marks)
- b. Explain Public Key Cryptography Standards (PKCS) (10 Marks)
- c. Explain Deffie Helman key exchange.

**OR**

- 4 a. If the RSA public key is (31, 3599) what is the corresponding private key. (05 Marks)
- b. Explain Basic properties of hash function. (05 Marks)
- c. Explain Birthday attack. (06 Marks)

### Module-3

- 5 a. Explain identity based encryption. (05 Marks)
- b. Explain Needham Schroeder protocol version – 1. (05 Marks)
- c. Explain Kerberos with message sequence. (06 Marks)

**OR**

- 6 a. Explain password based one way authentication. (05 Marks)
- b. Explain Needham – Schroeder protocol version – 2. (05 Marks)
- c. Explain SSL Handshake protocol. (06 Marks)

### Module-4

- 7 a. Explain authentication and master session key exchange in 802.11i? (05 Marks)
- b. Explain worm features. (05 Marks)
- c. Explain Function of Firewall. (06 Marks)

**OR**

- 8 a. Explain 802.11i four way handshanke with neat diagram. (05 Marks)
- b. List and explain practice issues of Firewall. (05 Marks)
- c. Explain DDOS attack prevention and detection. (06 Marks)

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**Module-5**

- 9 a. Discuss OFFENES defined as per IC Act 2000 (any Four) (08 Marks)  
b. Explain briefly certifying authority, suspensions, and revocations of digital signature. (08 Marks)

**OR**

- 10 a. What is information technology act? Discuss scope and objectives. (08 Marks)  
b. Discuss the provisions of the IT act as regards to the following :  
i) Legal Recognition of Electronic records  
ii) Authentication of electronic records. (08 Marks)

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15CS62

## Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing one full question from each module.*

### Module-1

- 1 a. What is Computer Graphics? Explain the applications of computer graphics. (05 Marks)
- b. Illustrate the sequence of coordinate transformations from modeling coordinates to device-coordinates. (05 Marks)
- c. Explain DDA line drawing algorithm with procedure. (06 Marks)

**OR**

- 2 a. Explain the basic operation of CRT with its primary components with neat diagram. (08 Marks)
- b. Digitize the line by using Bresenham's line drawing algorithm with end-points (20, 10) and (30, 18), having slope 0.8. (08 Marks)

### Module-2

- 3 a. How do you classify the polygon? Explain OpenGL polygon fill primitives. (07 Marks)
- b. Explain translation, scaling, rotation in 2D homogeneous coordinate system with matrix representations. (09 Marks)

**OR**

- 4 a. Explain general scan-line polygon-fill algorithm in detail. (10 Marks)
- b. What are the entities required to perform a rotation? Show that two successive rotations are additive. (06 Marks)

### Module-3

- 5 a. Define clipping. Briefly explain Co-hen Sutherland line clipping without code. Discuss four cases. (10 Marks)
- b. Describe phong lighting model. (06 Marks)

**OR**

- 6 a. Clip the polygon given in Fig.Q.6(a), using Sutherland Hodgman polygon clipping algorithm with neat sketches. (06 Marks)

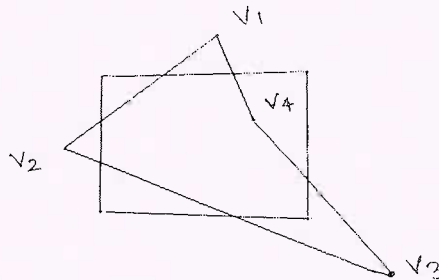


Fig.Q.6(a)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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- b. Explain the different types of light sources supported by OpenGL. (06 Marks)  
c. Explain the RGB and CMY color models. (04 Marks)

**Module-4**

- 7 a. Explain the perspective projections with reference point and vanishing point with neat diagrams. (10 Marks)  
b. Discuss depth-buffer method with algorithm. (06 Marks)

**OR**

- 8 a. Demonstrate how transformation from world coordinates to viewing coordinates with matrix representation. (06 Marks)  
b. Explain orthogonal projections in detail. (10 Marks)

**Module-5**

- 9 a. Explain the major characteristics that describe the logical behaviour of an input device. Explain how OpenGL provides the functionality of each of the classed of logical input devices. (08 Marks)  
b. Describe the logical input operation of picking in selection mode. (04 Marks)  
c. What is DisplayList? Write OpenGL code-segment that generate a blue colored square using display list. (04 Marks)

**OR**

- 10 a. Explain Bezier spline curves with equations and demonstrate the appearance of Bezier curves for various selection of control points. (08 Marks)  
b. What is double buffering? How it is implemented in OpenGL. (04 Marks)  
c. Differentiate event mode with request mode. (04 Marks)

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15CS64

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019

## Operating Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Distinguish between the following terms :
  - i) Multiprogramming and multitasking
  - ii) Multiprocessor systems and clustered systems. (04 Marks)
- b. Analyze modular kernel approach with layered approach with a neat sketch. (06 Marks)
- c. List and explain the services provided by OS for the user and efficient operation of system. (06 Marks)

OR

- 2 a. Illustrate with a neat sketch, the process states and process control block. (08 Marks)
- b. Discuss the methods to implement message passing IPC in detail. (08 Marks)

### Module-2

- 3 a. Discuss the benefits of multithreaded programming. (04 Marks)
- b. Consider the following set of processes with CPU burst time (in ms).

Process	Arrival time	Burst time
P1	0	6
P2	1	3
P3	2	1
P4	3	4

Compute the waiting time and average turnaround time for the above process using FCFS, SRT and RR (time quantum = 2ms) scheduling algorithm. (12 Marks)

OR

- 4 a. Illustrate with examples the Peterson's solution for critical section problem and prove that the mutual exclusion property is preserved. (08 Marks)
- b. Show how semaphore provides solution to reader writers problem. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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Module-3

- 5 a. Define deadlock. Write short notes on 4 necessary conditions that arise deadlocks. (06 Marks)  
 b. Assume that there are 5 processes P<sub>0</sub> through P<sub>4</sub> and 4 types of resources. At time T<sub>0</sub> we have the following state :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	0	0	1	2	0	0	1	2	1	5	2	0
P <sub>1</sub>	1	0	0	0	1	7	5	0				
P <sub>2</sub>	1	3	5	4	2	3	5	6				
P <sub>3</sub>	0	6	3	2	0	6	5	2				
P <sub>4</sub>	0	0	1	4	0	6	5	6				

Apply Banker's algorithm to answer the following :

- i) What is the content of need matrix?  
 ii) Is the system in a safe state?  
 iii) If a request from a process P<sub>1</sub>(0, 4, 2, 0) arrives, can it be granted? (10 Marks)

**OR**

- 6 a. Write short notes on :  
 i) External and internal fragmentation  
 ii) Dynamic loading and linking. (04 Marks)  
 b. Analyze the problem in simple paging technique and show how TLB is used to solve the problem. (08 Marks)  
 c. Given the memory partitions of 200k, 700k 500k, 300k, 100k, 400k. Apply first fit and best fit to place 315k, 427k, 250k, 550k. (04 Marks)

Module-4

- 7 a. For the following page reference string 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5. Calculate the page faults using FIFO and LRU for memory with 3 and 4 frames. (08 Marks)  
 b. Explain demand paging in detail. (08 Marks)

**OR**

- 8 a. What do you mean by free space list? With suitable example, explain any 3 methods of free space list implementation. (08 Marks)  
 b. Write short notes on linked and indexed allocation method with a neat diagram. (08 Marks)

Module-5

- 9 a. Given the following sequences 95, 180, 34, 119, 11, 123, 62, 64 with the head initially at track 50 and ending at track 199. What is the total disk traveled by the disk arm to satisfy the request using FCFS, SSTF, LOOK and CLOOK algorithm. (12 Marks)  
 b. Write short notes on access matrix and its implementations. (04 Marks)

**OR**

- 10 a. Explain the components of Linux system with a neat diagram. (08 Marks)  
 b. Describe briefly on Linux Kernel modules. (08 Marks)

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