CS54

ifth Semester B E Degree Summer Semester End Examination (SSEE), September 2021

# DATABASE MANAGEMENT SYSTEM

me: 3 Hours ] [ Maximum Marks: 100

**Instructions to students:**

(i) Answer ANY FIVE FULL Questions.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | With a neat block diagram explain the DBMS architecture. Also discuss the various component modules in it. | [10 Marks] | CO1 | L3 |
| | b) | Draw an ER Diagram for Bank database considering at least minimum 5 entities | [10 Marks] | CO1 | L3 |
| 2. | a) | Explain with a neat sketch, the different phases of database design. | [10 Marks] | CO1 | L2 |
| | b) | Draw an ER diagram for hospital database considering at least minimum 5 entities. | [10 Marks] | CO1 | L3 |
| 3. | a) | Discuss various types of JOIN operations in relational algebra with the help of examples for each. | [10 Marks] | CO2 | L2 |
| | b) | Discuss the various types of constraints on relationship types? Explain each with example. | [10 Marks] | CO2 | L2 |
| 4. | a) | Explain any five relational algebra operators along with syntax and purpose. | [10 Marks] | CO2 | L3 |
| | b) | Consider the following schema:<br>Suppliers (sid: integer, sname: string, address: string)<br>Parts (Pid: integer, pid: integer, cost: real)<br>Catalog (sid: integer, pid: integer, cost: real)<br>Write the following queries in relational algeara<br>i. Find the name of suppliers who supply some Red part.<br>ii. Find the SIDS of suppliers who supply some red or green part.<br>iii. Find the SIDS of suppliers who supply some red part or are at 221 packer Ave.<br>iv. Find the SIDS of suppliers who supply some red part and green part | [10 Marks] | CO2 | L3 |
| 5. | a) | Consider the following relation schema:<br>Project (P_No, P_Name, P_Incharge)<br>Employee (E_No, E_Name)<br>Assigned_to (P_No, E_No)<br>Write the SQL queries for the following:<br>i) List details of employees who are working on all the projects.<br>ii) List E_No of employees who are not working on project number 2K.<br>iii) List the names of employees who are working in the same project as employee named 'TOM'. | [10 Marks] | CO3 | L3 |

iv) List the names of employees who are not working in any project.

b) Define views & assertions? Explain how they are created and dropped in SQL with the help of examples. [10 Marks] CO3

6. a) Consider the following company database:
Employee (SSN,Ename, Salary, superssn, Dno)
Department (Dnum, Dname, MgrSSN)
Location (Dnum, Location)
Works (ESSN, Pno, hours)
Project (Pno, Pname)
Dependents (ESSN, Depname, Sex)
Write queries in SQL
i) Retrive names of employee whose salary is greater than all the employee in department number 3.
ii) Retrieve number of dependents for employee named Ravi.
iii) Display employee name and his/her supervisor name.
iv) Retrieve Pname of employee named Ravi.

b) Explain the various methods by which nesting of queries is achieved with the help of suitable examples. [10 Marks] CO3 L3

7. a) Explain informal design guidelines used as a measures to determine the quality of relation schema design. [10 Marks] CO4 L3

b) What is the need for normalization? Explain 2NF and 3NF with examples. [10 Marks] CO4 L3

8. a) Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF? [08 Marks] CO4 L3

b) Define multi valued dependency. Explain 4NF with example. [06 Marks] CO4 L3

c) Define join dependency. Explain 5NF with example [06 Marks] CO4 L3

9. a) Explain time stamp ordering algorithm with example. [08 Marks] CO5 L3

b) Prove that Strict 2PL protocol guarantees strict schedule with example. [08 Marks] CO5 L4

c) Explain how to resolve deadlock and starvation problems. [04 Marks] CO5 L3

10. a) Explain 2PL with examples and along with its advantages. [08 Marks] CO5 L3

b) Explain multi-granularity locking with example and also explain under what circumstances is it used. [08 Marks] CO5 L3

c) Discuss time stamp ordering protocol for concurrency control. [04 Marks] CO5 L2

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CS54

Fifth Semester B E Degree Summer Semester End Examination (SSEE), September 2021

# DATABASE MANAGEMENT SYSTEM

Time: 3 Hours ] [ Maximum Marks: 100

**Instructions to students:**

(i) Answer ANY FIVE FULL Questions.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | With a neat block diagram explain the DBMS architecture. Also discuss the various component modules in it. | [10 Marks] | CO1 | L3 |
| | b) | Draw an ER Diagram for Bank database considering at least minimum 5 entities | [10 Marks] | CO1 | L3 |
| 2. | a) | Explain with a neat sketch, the different phases of database design. | [10 Marks] | CO1 | L2 |
| | b) | Draw an ER diagram for hospital database considering at least minimum 5 entities. | [10 Marks] | CO1 | L3 |
| 3. | a) | Discuss various types of JOIN operations in relational algebra with the help of examples for each. | [10 Marks] | CO2 | L2 |
| | b) | Discuss the various types of constraints on relationship types? Explain each with example. | [10 Marks] | CO2 | L2 |
| 4. | a) | Explain any five relational algebra operators along with syntax and purpose. | [10 Marks] | CO2 | L3 |
| | b) | Consider the following schema:<br>Suppliers (sid: integer, sname: string, address: string)<br>Parts (Pid: integer, pid: integer, cost: real)<br>Catalog (sid: integer, pid: integer, cost: real)<br>Write the following queries in relational algeara<br>i. Find the name of suppliers who supply some Red part.<br>ii. Find the SIDS of suppliers who supply some red or green part.<br>iii. Find the SIDS of suppliers who supply some red part or are at 221 packer Ave.<br>iv. Find the SIDS of suppliers who supply some red part and green part | [10 Marks] | CO2 | L3 |
| 5. | a) | Consider the following relation schema:<br>Project (P_No, P_Name, P_Incharge)<br>Employee (E_No, E_Name)<br>Assigned_to (P_No, E_No)<br>Write the SQL queries for the following:<br>i) List details of employees who are working on all the projects.<br>ii) List E_No of employees who are not working on project number 2K.<br>iii) List the names of employees who are working in the same project as employee named 'TOM'. | [10 Marks] | CO3 | L3 |

iv) List the names of employees who are not working in any project.

b) Define views & assertions? Explain how they are created and dropped in SQL with the help of examples. [10 Marks] C

6. a) Consider the following company database:
Employee (SSN,Ename, Salary, superssn, Dno)
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b) Explain the various methods by which nesting of queries is achieved with the help of suitable examples. [10 Marks] CO3

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b) What is the need for normalization? Explain 2NF and 3NF with examples. [10 Marks] CO4

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b) Define multi valued dependency. Explain 4NF with example. [06 Marks] CO4

c) Define join dependency. Explain 5NF with example [06 Marks] CO4

9. a) Explain time stamp ordering algorithm with example. [08 Marks] CO5

b) Prove that Strict 2PL protocol guarantees strict schedule with example. [08 Marks] CO5

c) Explain how to resolve deadlock and starvation problems. [04 Marks] CO5

10. a) Explain 2PL with examples and along with its advantages. [08 Marks] CO5

b) Explain multi-granularity locking with example and also explain under what circumstances is it used. [08 Marks] CO5

c) Discuss time stamp ordering protocol for concurrency control. [04 Marks] CO5 L2

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CS54

Fifth Semester B E Degree Summer Semester End Examination (SSEE), September 2021

# DATABASE MANAGEMENT SYSTEM

Time: 3 Hours ] [ Maximum Marks: 100

**Instructions to students:**

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| 1. | a) | With a neat block diagram explain the DBMS architecture. Also discuss the various component modules in it. | [10 Marks] | CO1 | L3 |
| | b) | Draw an ER Diagram for Bank database considering at least minimum 5 entities | [10 Marks] | CO1 | L3 |
| 2. | a) | Explain with a neat sketch, the different phases of database design. | [10 Marks] | CO1 | L2 |
| | b) | Draw an ER diagram for hospital database considering at least minimum 5 entities. | [10 Marks] | CO1 | L3 |
| 3. | a) | Discuss various types of JOIN operations in relational algebra with the help of examples for each. | [10 Marks] | CO2 | L2 |
| | b) | Discuss the various types of constraints on relationship types? Explain each with example. | [10 Marks] | CO2 | L2 |
| 4. | a) | Explain any five relational algebra operators along with syntax and purpose. | [10 Marks] | CO2 | L3 |
| | b) | Consider the following schema:<br>Suppliers (sid: integer, sname: string, address: string)<br>Parts (Pid: integer, pid: integer, cost: real)<br>Catalog (sid: integer, pid: integer, cost: real)<br>Write the following queries in relational algeara<br>i. Find the name of suppliers who supply some Red part.<br>ii. Find the SIDS of suppliers who supply some red or green part.<br>iii. Find the SIDS of suppliers who supply some red part or are at 221 packer Ave.<br>iv. Find the SIDS of suppliers who supply some red part and green part | [10 Marks] | CO2 | L3 |
| 5. | a) | Consider the following relation schema:<br>Project (P_No, P_Name, P_Incharge)<br>Employee (E_No, E_Name)<br>Assigned_to (P_No, E_No)<br>Write the SQL queries for the following:<br>i) List details of employees who are working on all the projects.<br>ii) List E_No of employees who are not working on project number 2K.<br>iii) List the names of employees who are working in the same project as employee named 'TOM'. | [10 Marks] | CO3 | L3 |

iv) List the names of employees who are not working in any project.

b) Define views & assertions? Explain how they are created and dropped in SQL with the help of examples. [10 Marks] CO3

6. a) Consider the following company database:
Employee (SSN,Ename, Salary, superssn, Dno)
Department (Dnum, Dname, MgrSSN)
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   iv) Retrieve Pname of employee named Ravi.

b) Explain the various methods by which nesting of queries is achieved with the help of suitable examples. [10 Marks] CO3

7. a) Explain informal design guidelines used as a measures to determine the quality of relation schema design. [10 Marks] CO4

b) What is the need for normalization? Explain 2NF and 3NF with examples. [10 Marks] CO4

8. a) Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF? [08 Marks] CO4

b) Define multi valued dependency. Explain 4NF with example. [06 Marks] CO4

c) Define join dependency. Explain 5NF with example [06 Marks] CO4

9. a) Explain time stamp ordering algorithm with example. [08 Marks] CO5

b) Prove that Strict 2PL protocol guarantees strict schedule with example. [08 Marks] CO5

c) Explain how to resolve deadlock and starvation problems. [04 Marks] CO5

10. a) Explain 2PL with examples and along with its advantages. [08 Marks] CO5

b) Explain multi-granularity locking with example and also explain under what circumstances is it used. [08 Marks] CO5

c) Discuss time stamp ordering protocol for concurrency control. [04 Marks] CO5

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CS52

FIFTH Semester B E Degree Summer Semester End Examination (SSEE), September-2021

# JAVA AND J2EE

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer ANY FIVE FULL Questions.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| | a) | Explain the process of compiling and running the JAVA application, with the help of "HELLO WORLD" Program. | [05 Marks] | CO1 | L2 |
| | b) | List out the difference between Runtime and Compile time polymorphism with a example program. | [08 Marks] | CO1 | L1,L2 |
| | c) | Define Applet. Explain different stages in life cycle of applet .Write a JAVA applet that sets the background color red and foreground color black and output the message "WELCOME" to the status window. | [07 Marks] | CO1 | L1,L2 |
| 2. | a) | Explain the following keywords with an example program: i) this ii) super iii ) extends iv) implements | [08 Marks] | CO1 | L2 |
| | b) | Explain with a program Inner Class. | [04 Marks] | CO1 | L2 |
| | c) | List out the differences between the throw and throws with an example program. | [08 Marks] | CO1 | L1 |
| 3. | a) | Define threads. Explain the different ways of creating threads with an example program. | [06 Marks] | CO2 | L1,L2 |
| | b) | Define Synchronization. Demonstrate a program using synchronized method and block. | [10 Marks] | CO2 | L1,L2 |
| | c) | Explain with an example program Adapter Class. | [04 Marks] | CO2 | L2 |
| 4. | a) | Define Socket. Explain briefly with a code snippet for Client and Server Socket Connection. | [10 Marks] | CO2 | L1,L2 |
| | b) | Demonstrate an JAVA Applet program to handle KeyMouse Event. | [06 Marks] | CO 2 | L2 |
| | c) | Explain the following functions with an example program : i)isAlive( ) ii)join( ) | [04 Marks] | CO2 | L2 |
| 5. | a) | Explain origin of Swings. List out the difference between AWT and Swings. | [06 Marks] | CO3 | L1,L2 |
| | b) | Write a sort notes on. i) Components ii) Containers | [06 Marks] | CO3 | L1 |

| | | | | | |
|---|---|---|---|---|---|
| | c) | Write a JAVA Swing Applet program that has a two Buttons named alpha and beta, when either of buttons is pressed it should display "alpha button pressed" respectively. | [08 Marks] | CO3 | L1 |
| 6. | a) | Demonstrate a Swing Application Program using Applet to implement a JComboBox. | [10 Marks] | CO3 | L2 |
| | b) | Demonstrate an Swing Application Program using Applet to implement an JTree. | [10 Marks] | CO3 | L2 |
| 7. | a) | With a neat Diagram explain the different types of Drivers available in JDBC. | [10 Marks] | CO4 | L1,L2 |
| | b) | Explain Transaction Processing. Demonstrate a program to achieve database transaction. | [10 Marks] | CO4 | L2 |
| 8. | a) | List out the steps for JDBC connectivity using Oracle/MySQl with syntax. Design and implement a simple JDBC application program for creating student database. | [10 Marks] | CO4 | L1,L6 |
| | b) | Explain J2EE architecture. | [10 Marks] | CO4 | L2 |
| 9. | a) | Define Servlet. Explain the Life cycle of Servlet. | [05 Marks] | CO4 | L1,L2 |
| | b) | Explain the following with an example Program:<br>i)Cookies ii)Session | [10 Marks] | CO4 | L2 |
| | c) | Explain Javax servlet package. | [05 Marks] | CO4 | L2 |
| 10. | a) | Define RMI. Demonstrate with code snippet RMI at server side. | [10 Marks] | CO3 | L1,L2 |
| | b) | Define JSP. Explain the life cycle of JSP. List out the different types of tags available in JSP with syntax and example program for each. | [10 Marks] | CO4 | L1,L2 |

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CS52

**FIFTH Semester B E Degree Summer Semester End Examination (SSEE), September-2021**

# JAVA AND J2EE

**[Time: 3 Hours]** **[Maximum Marks: 100]**

**Instructions to students:**

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| | b) | List out the difference between Runtime and Compile time polymorphism with a example program. | [08 Marks] | CO1 | L1,L2 |
| | c) | Define Applet. Explain different stages in life cycle of applet .Write a JAVA applet that sets the background color red and foreground color black and output the message "WELCOME" to the status window. | [07 Marks] | CO1 | L1,L2 |
| 2. | a) | Explain the following keywords with an example program: i) this ii) super iii ) extends iv) implements | [08 Marks] | CO1 | L2 |
| | b) | Explain with a program Inner Class. | [04 Marks] | CO1 | L2 |
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| 3. | a) | Define threads. Explain the different ways of creating threads with an example program. | [06 Marks] | CO2 | L1,L2 |
| | b) | Define Synchronization. Demonstrate a program using synchronized method and block. | [10 Marks] | CO2 | L1,L2 |
| | c) | Explain with an example program Adapter Class. | [04 Marks] | CO2 | L2 |
| 4. | a) | Define Socket. Explain briefly with a code snippet for Client and Server Socket Connection. | [10 Marks] | CO2 | L1,L2 |
| | b) | Demonstrate an JAVA Applet program to handle KeyMouse Event. | [06 Marks] | CO 2 | L2 |
| | c) | Explain the following functions with an example program : i)isAlive( ) ii)join( ) | [04 Marks] | CO2 | L2 |
| 5. | a) | Explain origin of Swings. List out the difference between AWT and Swings. | [06 Marks] | CO3 | L1,L2 |
| | b) | Write a sort notes on. i) Components ii) Containers | [06 Marks] | CO3 | L1 |

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| | c) | Write a JAVA Swing Applet program that has a two Buttons named alpha and beta, when either of buttons is pressed it should display "alpha button pressed" respectively. | [08 Marks] | CO3 | L1 |
| 6. | a) | Demonstrate a Swing Application Program using Applet to implement a JComboBox. | [10 Marks] | CO3 | L2 |
| | b) | Demonstrate an Swing Application Program using Applet to implement an JTree. | [10 Marks] | CO3 | L2 |
| 7. | a) | With a neat Diagram explain the different types of Drivers available in JDBC. | [10 Marks] | CO4 | L1,L2 |
| | b) | Explain Transaction Processing. Demonstrate a program to achieve database transaction. | [10 Marks] | CO4 | L2 |
| 8. | a) | List out the steps for JDBC connectivity using Oracle/MySQl with syntax. Design and implement a simple JDBC application program for creating student database. | [10 Marks] | CO4 | L1,L6 |
| | b) | Explain J2EE architecture. | [10 Marks] | CO4 | L2 |
| 9. | a) | Define Servlet. Explain the Life cycle of Servlet. | [05 Marks] | CO4 | L1,L2 |
| | b) | Explain the following with an example Program:<br>i)Cookies ii)Session | [10 Marks] | CO4 | L2 |
| | c) | Explain Javax servlet package. | [05 Marks] | CO4 | L2 |
| 10. | a) | Define RMI. Demonstrate with code snippet RMI at server side. | [10 Marks] | CO3 | L1,L2 |
| | b) | Define JSP. Explain the life cycle of JSP. List out the different types of tags available in JSP with syntax and example program for each. | [10 Marks] | CO4 | L1,L2 |

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FIFTH Semester B E Degree Summer Semester End Examination (SSEE), September-2021

# JAVA AND J2EE

[Time: 3 Hours] [Maximum Marks: 100]

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|---|---|---|---|---|---|
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| | b) | List out the difference between Runtime and Compile time polymorphism with a example program. | [08 Marks] | CO1 | L1,L2 |
| | c) | Define Applet. Explain different stages in life cycle of applet .Write a JAVA applet that sets the background color red and foreground color black and output the message "WELCOME" to the status window. | [07 Marks] | CO1 | L1,L2 |
| 2. | a) | Explain the following keywords with an example program: i) this ii) super iii ) extends iv) implements | [08 Marks] | CO1 | L2 |
| | b) | Explain with a program Inner Class. | [04 Marks] | CO1 | L2 |
| | c) | List out the differences between the throw and throws with an example program. | [08 Marks] | CO1 | L1 |
| 3. | a) | Define threads. Explain the different ways of creating threads with an example program. | [06 Marks] | CO2 | L1,L2 |
| | b) | Define Synchronization. Demonstrate a program using synchronized method and block. | [10 Marks] | CO2 | L1,L2 |
| | c) | Explain with an example program Adapter Class. | [04 Marks] | CO2 | L2 |
| 4. | a) | Define Socket. Explain briefly with a code snippet for Client and Server Socket Connection. | [10 Marks] | CO2 | L1,L2 |
| | b) | Demonstrate an JAVA Applet program to handle KeyMouse Event. | [06 Marks] | CO 2 | L2 |
| | c) | Explain the following functions with an example program : i)isAlive( ) ii)join( ) | [04 Marks] | CO2 | L2 |
| 5. | a) | Explain origin of Swings. List out the difference between AWT and Swings. | [06 Marks] | CO3 | L1,L2 |
| | b) | Write a sort notes on. i) Components ii) Containers | [06 Marks] | CO3 | L1 |

| | | | | | |
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| | c) | Write a JAVA Swing Applet program that has a two Buttons named alpha and beta, when either of buttons is pressed it should display "alpha button pressed" respectively. | [08 Marks] | CO3 | |
| 6. | a) | Demonstrate a Swing Application Program using Applet to implement a JComboBox. | [10 Marks] | CO3 | |
| | b) | Demonstrate an Swing Application Program using Applet to implement an JTree. | [10 Marks] | CO3 | |
| 7. | a) | With a neat Diagram explain the different types of Drivers available in JDBC. | [10 Marks] | CO4 | L1,L2 |
| | b) | Explain Transaction Processing. Demonstrate a program to achieve database transaction. | [10 Marks] | CO4 | L2 |
| 8. | a) | List out the steps for JDBC connectivity using Oracle/MySQl with syntax. Design and implement a simple JDBC application program for creating student database. | [10 Marks] | CO4 | L1,L6 |
| | b) | Explain J2EE architecture. | [10 Marks] | CO4 | L2 |
| 9. | a) | Define Servlet. Explain the Life cycle of Servlet. | [05 Marks] | CO4 | L1,L2 |
| | b) | Explain the following with an example Program: i)Cookies ii)Session | [10 Marks] | CO4 | L2 |
| | c) | Explain Javax servlet package. | [05 Marks] | CO4 | L2 |
| 10. | a) | Define RMI. Demonstrate with code snippet RMI at server side. | [10 Marks] | CO3 | L1,L2 |
| | b) | Define JSP. Explain the life cycle of JSP. List out the different types of tags available in JSP with syntax and example program for each. | [10 Marks] | CO4 | L1,L2 |

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18CS54

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# COMPUTER NETWORKS AND INTERNET PROTOCOL

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

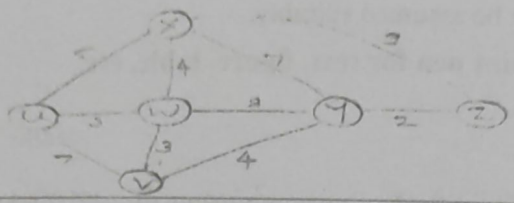
(i) Answer FIVE FULL Questions as per choice.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | What is Data Communication? Identify the five components of a data communications system. Discuss each component. | [05 Marks] | CO1 | L1 |
| | b) | Discuss in detail about the layers in OSI model with a neat diagram. | [10 Marks] | CO1 | L2 |
| | c) | Four levels of addresses are used in an internet employing the TCP/IP protocols. Explain each type of addressing. | [05 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | Define Network. With a neat diagram explain the four basic topologies. | [05 Marks] | CO1 | L3 |
| | b) | Distinguish between LAN, WAN and MAN. Assume that you have two computers connected by an Ethernet hub at home. Is this a LAN, a MAN, or a WAN? Explain your reason. | [10 Marks] | CO1 | L3 |
| | c) | What is Network Simulation? List the different types of Network Simulators/Network simulation tools are open source and commercial. | [05 Marks] | CO1 | L4 |
| 3. | a) | What is framing? Explain different types of framing protocols with their format. | [05 Marks] | CO2 | L2 |
| | b) | Identify the four protocols that have been defined for the data-link layer to deal with flow and error control mechanism with suitable diagrams. | [10 Marks] | CO2 | L2 |
| | c) | A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces?<br>i. 1000 frames per second?<br>ii. 500 frames per second?<br>iii. 250 frames per second? | [05 Marks] | CO2 | L3 |
| | | OR | | | |
| 4. | a) | If there is no dedicated link present then multiple stations can access the channel Simultaneously. Hence multiple access protocols are required to decrease collision and avoid crosstalk. What is Channelization. List and explain the MAC Protocol and Channelization Protocol with a neat diagram. | [10 Marks] | CO2 | L2 |

b) Classify the differences between Slotted ALOHA and ALOHA. [10 Marks] CO1

5. a) A packet-switched network can use two different approaches to route the packets. [10 Marks] CO3
Explain datagram approach and the virtual circuit approach with relevant diagrams.

b) Consider the network diagram [10 Marks] CO3



Write and use Bellman ford algorithm to find the shortest path from the source node to the destination node and also draw the shortest path tree. Note: Choose U as Source and Z as destination.

**OR**

6. a) What is congestion network? Explain how TCP handles congestion. [05 Marks] CO3 L2

b) In a network nodes receive and save the most recent distance from each of its neighbors to calculate shortest distance from every node to all other nodes in the network. With neat sketch explain distance vector routing algorithm. [10 Marks] CO3 L2

c) Explain the token and leaky bucket policy. [05 Marks] CO3 L2

7. a) Define IP. With a diagram, Explain header format indicating each field in the IPV4-addressing. [10 Marks] CO3 L2

b) Suppose a router receives an IP packet containing 4020 bytes and to be forwarded to an outgoing link with MTU (Maximum transmission unit) of 1550 bytes. Assume the IP header is 20 bytes. Show the fragment the router creates and specify relevant values for each fragment (ID, offset and flag) and bytes in each. [10 Marks] CO3 L3

**OR**

8. a) What is meant by fragmentation? Discuss & Write short notes on: [10 Marks] CO4 L2
(i) Tunneling.
(ii) Internetwork routing.
(iii) Subnet addressing.

b) Enlist the differences between IPV4 and IPV6 addressing. [10 Marks] CO4 L2

| | | | | | |
|---|---|---|---|---|---|
| 9. | a) | Define TCP and UDP. Describe the connection establishment of TCP and process of connection termination with suitable diagrams. | [10 Marks] | CO4 | L2 |
| | b) | Open Shortest Path First (OSPF) is also an intra-domain routing protocol which means that the specification is a public document. Explain the operations of OSPF with neat diagrams at different stages. | [10 Marks] | CO4 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | Define DNS. Explain Recursive and Iterative resolution with relevant diagrams. | [10 Marks] | CO4 | L2 |
| | b) | What is WWW? Explain the basic functions of email system? | [05 Marks] | CO4 | L2 |
| | c) | List and explain the different categories of Web relevant documents. | [05 Marks] | CO4 | L2 |

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**CS55**

**FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022**

# DATA COMMUNICATION NETWORKS

**[Time: 3 Hours]** **[Maximum Marks: 100]**

**Instructions to students:**

**(i) Answer FIVE FULL Questions as per the choice.**
**(ii) Any Missing Data can be assumed suitably.**
**(iii)Use BLACK ball point pen for text, figure, table, etc.**

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Explain the four fundamental characteristics of data communication. | [05 Marks] | CO1 | L2 |
| | b) | Explain different forms of data representation. | [05 Marks] | CO1 | L2 |
| | c) | What is network? Explain briefly three important criteria that a network must meet. | [05 Marks] | CO1 | L2 |
| | d) | Explain the functions of Transport layer. Indicate the process to-process delivery with a supporting diagram. | [05 Marks] | CO1 | L3 |
| | | **OR** | | | |
| 2. | a) | Distinguish simplex, half duplex and full duplex forms of communication. | [05 Marks] | CO1 | L2 |
| | b) | List the basic network topologies and explain any two in detail with supporting diagrams. | [05 Marks] | CO1 | L3 |
| | c) | Explain TCP/IP reference model with the help of neat diagram. | [10 Marks] | CO1 | L3 |
| 3. | a) | What is meant by channelization? Explain in detail CDMA. | [10 Marks] | CO2 | L2 |
| | b) | Explain the structure of hamming code with relevant diagram. | [10 Marks] | CO2 | L4 |
| | | **OR** | | | |
| 4. | a) | Find the codeword, using CRC given data word "1001" and generator is"1011". | [10 Marks] | CO2 | L3 |
| | b) | Explain in detail CSMA /CA ii) CSMA/CD | [10 Marks] | CO2 | L2 |
| 5. | a) | Explain and derive delays in datagram packet switching. | [10 Marks] | CO3 | L4 |
| | b) | Explain the FIFO and priority queue scheduling for managing traffic at packet level. | [10 Marks] | CO3 | L2 |
| | | **OR** | | | |
| 6. | a) | What are datagram and virtual circuits? Distinguish between them. | [10 Marks] | CO3 | L3 |
| | b) | Consider the network in the Fig. 6(b). Use the Dijkstra's Algorithm to find the set of shortest path from node 1 to other nodes. Draw the shortest path tree. | [10 Marks] | CO3 | L4 |

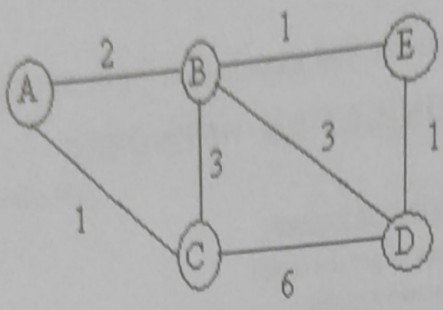


Fig. 6(b)

| | | | | | |
|---|---|---|---|---|---|
| 7. | a) | Change the following IPv4 addresses from binary notation to dotted-decimal notation.<br>a. 10000001 00001011 00001011 11101111<br>b. 11000001 10000011 00011011 11111111 | [04 Marks] | CO4 | L4 |
| | b) | Elaborate the fragmentation and reassembly in IPV4 with a supporting diagram. | [10 Marks] | CO4 | L4 |
| | c) | Explain the following fields in the IPV6 packet header.<br>i) Flow label ii) Hop Count iii) Next Header. | [06 Marks] | CO4 | L3 |

OR

| | | | | | |
|---|---|---|---|---|---|
| 8. | a) | Explain formats of classful IP addressing with neat diagram. | [06 Marks] | CO4 | L3 |
| | b) | Expand the address 0:15::1:12:1213 to its original. | [04 Marks] | CO4 | L3 |
| | c) | Write a short note on IPV6 addressing with examples. | [10 Marks] | CO4 | L2 |
| 9. | a) | Distinguish between TCP and UDP. Describe TCP connection establishment and connection termination process with neat diagram. | [10 Marks] | CO5 | L2 |
| | b) | Discuss in detail, the Routing information protocol, with the header format. | [10 Marks] | CO5 | L3 |

OR

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | Explain two types of DNS messages with its header format. | [06 Marks] | CO5 | L2 |
| | b) | With relevant diagrams Explain local and remote log-in process. | [06 Marks] | CO5 | L2 |
| | c) | Write a note on Electronic mail transfer. | [08 Marks] | CO5 | L3 |

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18CS54

FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022

# COMPUTER NETWORK AND INTERNET PROTOCOLS

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer FIVE FULL Questions as per the choice.
(ii) Any Missing Data can be assumed suitably.
(iii)Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Define data communication. Explain the fundamental characteristics and components of a data communication system. | [08 Marks] | CO1 | L2 |
| | b) | Distinguish between Local Area Networks , Wide Area Networks and Metropolitan area networks | [06 Marks] | CO1 | L3 |
| | c) | List the criteria that a network needs to meet. Explain each one in detail. | [06 Marks] | CO1 | L1, L2 |
| | | **OR** | | | |
| 2. | a) | Describe the functions of OSI layer with a neat diagram. | [10 Marks] | CO1 | L2 |
| | b) | Discuss TCP/IP protocol suite and its functions with neat diagram. | [10 Marks] | CO1 | L2 |
| 3. | a) | Discuss the concepts of bit stuffing and byte stuffing along with unstuffing. | [08 Marks] | CO2 | L2 |
| | b) | Differentiate between ALOHA and Slotted ALOHA | [06 Marks] | CO2 | L3 |
| | c) | Write short notes on i) CSMA /CD ii) CSMA/CA | [06 Marks] | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | What is Channelization. Illustrate different protocols of Channelization with relevant diagrams. | [10 Marks] | CO2 | L2 |
| | b) | Explain stop-and-wait ARQ protocol with its Design and write sender site algorithm. | [10 Marks] | CO2 | L2 |
| 5. | a) | Consider the network in the Fig 5a. Use the Dijkstra's Algorithm to find the set of shortest paths from node 1 to other nodes. Draw the shortest path tree. | [10 Marks] | CO3 | L4 |

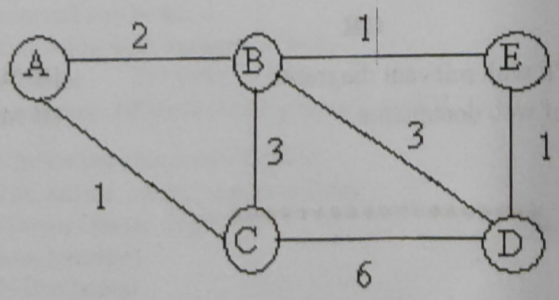
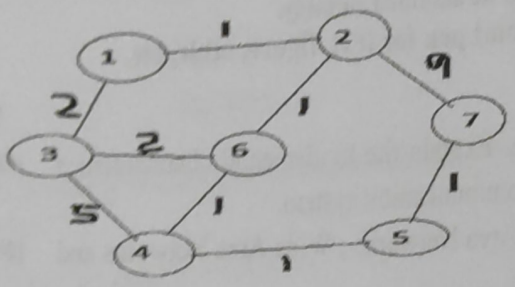



**Fig 5a.**

b) Distinguish between datagram and virtual circuits. Explain the routing in virtual circuits. [10 Marks] CO3

OR

6. a) Compare Dijkstra's Algorithm and Bellman Ford algorithm. [06 Marks] CO3
   b) Explain and derive delays in datagram packet switching. [04 Marks] CO3
   c) Define Bellman Ford Algorithm. Using Bellman Ford Algorithm to find shortest path from all the nodes to node 7 in the network given below. Draw the shortest path tree. [10 Marks] CO3




7. a) Discuss IP address classification and Identify the following IP addresses and their Address class: [06 Marks] CO3 L2
   i)200.58.20.165
   ii) 128.167.23.20
   Iii)16.196.128.50.
   b) Interpret tunneling approach of transmission of IPv6 packets over IPv4 tunnel with neat diagram. [04 Marks] CO4 L2
   c) Illustrate the concept of Fragmentation and Reassembly with the help of suitable diagram. [10 Marks] CO3 L3

OR

8. a) Describe the concept of classful addressing in IPv4.Illustrate with example. [10 Marks] CO3 L2
   b) Discuss IPV6 header format and mention its advantages. [10 Marks] CO3 L2,L1

9. a) Illustrate the three way handshake for establishing a TCP connection, with a diagram. [08 Marks] CO4 L2
   b) Discuss two types of DNS messages with its header format. [06 Marks] CO4 L2
   c) Paraphrase congestion control in TCP. [06 Marks] CO4 L2

OR

10. a) Explain the operation of OSPF with relevant diagram. [10 Marks] CO4 L2
    b) Discuss different categories of web documents. [10 Marks] CO4 L2

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**18CS53**

**FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022**

# DATABASE MANAGEMENT SYSTEM

**[Time: 3 Hours]** **[Maximum Marks: 100]**

**Instructions to students:**

**(i) Answer FIVE FULL Questions as per the choice.**
**(ii) Any Missing Data can be assumed suitably.**
**(iii)Use BLACK ball point pen for text, figure, table, etc.**

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Explain the characteristics of database approach with its advantages over file processing system . | [10 Marks] | CO1 | L2 |
| | b) | With a neat diagram explain the three-schema architecture with languages used at each level. | [10 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | Design and explain the ER diagram for LIC database by taking into account at least five entities with attributes and relationship. | [10 Marks] | CO1 | L3 |
| | b) | Explain with a neat sketch, the different phases of database design. | [10 Marks] | CO1 | L2 |
| 3. | a) | What are different types constraints on relationship types? Explain with examples. | [10 Marks] | CO1 | L2 |
| | b) | Explain different types of JOIN operations used in Relational Algebra with examples. | [10 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 4. | a) | With respect to the Relational data model, explain the concept of primary keys and Foreign keys. Illustrate your answer with examples. | [10 Marks] | CO1 | L2 |
| | b) | Consider the following schema<br>Sailors(Sid,Sname,Rating,age)<br>Boats(Bid,Bname,color)<br>Reserves(Sid,Bid,day)<br>Write queries in relational algebra<br>i. Write the names of sailor who have reserved boat number 103.<br>ii. Display names of sailor who have reserved green and red boat.<br>iii. Display the name of sailor and boat reserved on Thursday.<br>iv. Display the name of the sailor, whose age is 45 and not reserved any boats | [10 Marks] | CO1 | L3 |
| 5. | a) | Explain the following with example in SQL:<br>i) Group By Clause ii) Order By Clause | [04 Marks] | CO2 | L2 |
| | b) | Explain with example different data types used in SQL. | [04 Marks] | CO2 | L1 |
| | c) | Consider the following company database:<br>Employee(SSN,Ename, salary, superssn,Dno)<br>Department(Dnum,Dname,MgrSSN)<br>Location(Dnum,location)<br>Works(ESSN,Pno,hours) | [12 Marks] | CO2 | L3 |

Project(Pno,Pname)
Dependents(ESSN,Depname,Sex)
Write queries in SQL

i. Retrieve names of employee whose salary is greater than all the employee in department number 3
ii. Retrieve number of dependents for employee named Ravi.
iii. Display employee name and his/her supervisor name.
iv. Retrieve Pname of employee named Ravi.

**OR**

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. | a) | Explain insert, update and Alter statements with syntax and example in SQL. | [10 Marks] | CO2 | L2 |
| | b) | Briefly explain Views in SQL along with the syntax. Discuss the problems that may arise when one attempts to update a view. How are views practically implemented? | [10 Marks] | CO2 | L2 |
| 7. | a) | Explain informal design guidelines used as a measures to determine the quality of relation schema design. | [10 Marks] | CO3 | L2 |
| | b) | Explain Boyce-Codd normal form with example . How does it differ from 3 NF? Why is it considered a stronger form of 3 NF? | [10 Marks] | CO3 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8. | a) | Explain 1NF, 2NF and 3NF with suitable examples for each. | [10 Marks] | CO3 | L2 |
| | b) | Let R ={SSN, Ename,Pnumber,Pname,Plocation, Hours} and D={R1,R2,R3} where R1=EMP={SSN,Ename} R2= PROJECT= {Pnumber,Pname,Plocation} R3=WORKS_ON={SSN ,Pnumber,Hours} The following functional dependency holds on relation R F={ SSN→ Ename; Pnumber→{Pname,Plocation}; {SSN,Pnumber}→Hours. Prove that the above decomposition of relation R has the lossless join property. | [10 Marks] | CO3 | L3 |
| 9. | a) | Discuss the problems of deadlock and starvation and different approaches to deal with these problems. | [10 Marks] | CO4 | L2 |
| | b) | Explain two phase locking protocol with example. Prove that Strict Two Phase locking protocol guarantees Strict Schedule with example. | [10 Marks] | CO4 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | Explain time stamp ordering protocol for concurrency control. Explain the advantage of this protocol. | [10 Marks] | CO4 | L2 |
| | b) | Explain the problems that can occur when concurrent transactions are executed. Give examples for each. | [10 Marks] | CO4 | L2 |

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CS54

FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022

# DATABASE MANAGEMENT SYSTEM

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

**(i) Answer FIVE FULL Questions as per the choice.**
**(ii) Any Missing Data can be assumed suitably.**
**(iii)Use BLACK ball point pen for text, figure, table, etc.**

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Explain the characteristics of the database approach. | [10 Marks] | CO1 | L2 |
| | b) | Design an ER diagram for company database considering atleast five entities. | [10 Marks] | CO1 | L3 |
| | | **OR** | | | |
| 2. | a) | With a neat diagram explain three schema architecture and data independence. | [10 Marks] | CO1 | L2 |
| | b) | Consider student database with five entities and design an ER diagram. | [10 Marks] | CO1 | L3 |
| 3. | a) | Define the following terms and give examples for each with respect to relational model: [i] domain [ii] attributes [iii] tuples [iv] relations. | [10 Marks] | CO2 | L2 |
| | b) | Explain entity integrity, referential integrity and Foreign keys by considering company database. | [10 Marks] | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | Explain different types of update operation and constant violated by each one of them with example. | [10 Marks] | CO2 | L3 |
| | b) | With examples, explain the JOIN operation, EQUJOIN, NATURAL JOIN and DIVISION operation. | [10 Marks] | CO2 | L3 |
| 5. | a) | Explain the following concepts using SQL: [i] Schema and Catalog Concepts [ii] CREATE TABLE command [iii] Attribute datatypes and Domains. | [10 Marks] | CO3 | L3 |
| | b) | Explain schema change statement in SQL with examples. | [10 Marks] | CO3 | L3 |
| | | **OR** | | | |
| 6. | a) | With reference to Comapny database, explain SELECT_FROM _WHERE structure of basic SQL queries in detail. | [10 Marks] | CO3 | L3 |
| | b) | Explain views in SQL, in detail with examples. | [10 Marks] | CO3 | L2 |
| 7. | a) | Briefly explain informal design guidelines for relation schemas. | [10 Marks] | CO4 | L1 |
| | b) | List and explain the six inference rules for functional dependencies and give examples for each. | [10 Marks] | CO4 | L1 |
| | | **OR** | | | |
| 8. | a) | Explain 1NF, 2NF and 3NF by considering COMPANY database as an example. | [10 Marks] | CO4 | L3 |
| | b) | What are the properties of relational decompositions? Explain in detail. | [10 Marks] | CO4 | L2 |

9. a) Write short note on Transaction states and Additional operations. [06 Marks] CO5

b) Write short note on ACID Properties. [06 Marks] CO5

c) Write short note Testing for conflict serializability of a schedule. [08 Marks] CO5

**OR**

10. a) Explain Two-phase locking techniques for concurrency control. [10 Marks] CO5

b) Explain concurrency control based on timestamp ordering. [10 Marks] CO5

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CS52

FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022

# JAVA AND J2EE

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer FIVE FULL Questions as per the choice.
(ii) Any Missing Data can be assumed suitably.
(iii)Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | List and explain the salient features of Java. | [08 Marks] | CO1 | L2 |
| | b) | List and explain the use of super and final along with code snippets. | [06 Marks] | CO1 | L2 |
| | c) | With neat diagram, explain the applet architecture. | [06 Marks] | CO1 | L2 |
| | | OR | | | |
| 2. | a) | Develop a simple Java applet application to display a string "Hello world!" on the window. | [06 Marks] | CO1 | L3 |
| | b) | How multiple inheritance is achieved in java along with code snippets? | [06 Marks] | CO1 | L3 |
| | c) | Explain:<br>i. try<br>ii. catch<br>iii. final<br>iv. throw<br>v. throws . | [08 Marks] | CO1 | L2 |
| 3. | a) | With neat diagram, explain the thread life cycle. | [06 Marks] | CO2 | L2 |
| | b) | Explain the delegation event model. | [06 Marks] | CO2 | L2 |
| | c) | Explain the TCP/IP client/server sockets. | [08 Marks] | CO3 | L2 |
| | | OR | | | |
| 4. | a) | Write a program for creating multiple threads using Runnable Interface. | [08 Marks] | CO2 | L3 |
| | b) | Define synchronization and explain synchronization method along with code snippets. | [06 Marks] | CO2 | L2 |
| | c) | Explain Interthread communication with an example. | [06 Marks] | CO2 | L2 |
| 5. | a) | List out the difference between the AWT and swings. | [08 Marks] | CO3 | L2 |
| | b) | Explain two key swing features. | [06 Marks] | CO3 | L2 |
| | c) | Explain MVC Architecture. | [06 Marks] | CO3 | L2 |
| | | OR | | | |

6. a) Design and implement a simple swing application to change the background and foreground color when you click on a button in the window using Jbutton. [10 Marks]

b) Design and implement a simple swing application to display a simple calculator and perform all the basic operations. [10 Marks]

7. a) List and explain the various JDBC Driver types. [06 Marks]

b) Explain JDBC packages. [04 Marks]

c) List and explain the Java to database connectivity steps along with code snippets. [10 Marks]

**OR**

8. a) Design and implement a simple JDBC application program. [10 Marks]

b) Write a note on [10 Marks]

i. session Java Bean.

ii. ii. Entity Java Bean.

9. a) Explain the servlet lifecycle. [06 Marks]

b) Illustrate how tomcat webserver is configured for development of servlet. [08 Marks]

c) Explain the Javax Servlet package. [06 Marks]

**OR**

10. a) Write a program using RMI concept such as client and server program in which client send Hello message to server and server replies for client. [08 Marks]

b) List and explain the various JSP tags and its usages. [08 Marks]

c) Explain Session Tracking in servlets. [04 Marks]

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CS56

FIFTH Semester B.E. Degree Semester End Examination (SEE), FEB/MAR-2022

# THEORETICAL FOUNDATION OF COMPUTER SCIENCE

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer ANY FIVE FULL Questions as per choice.
(ii) Any Missing Data can be assumed suitably.
(iii)Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Define a DFA and the languages accepted by it. | [05 Marks] | CO1 | L1 |
| | b) | Design a DFA which accepts odd number of a's and odd number of b's. | [05 Marks] | CO1 | L4 |
| | c) | Design a DFA with Σ={a,b} and to accept strings which are<br>a) Not ending with "baa"<br>b) Ending with "abb" | [10 Marks] | CO1 | L4 |

**OR**

2. a) Minimize the following DFA using table filling algorithm [10 Marks] CO1 L4

| δ | a | b |
|---|---|---|
| →S | A | D |
| *A | B | S |
| B | C | A |
| C | A | B |
| D | S | E |
| *E | D | S |

b) Convert the following NFA to a DFA [10 Marks] CO1 L4

| δ NFA | 0 | 1 |
|---|---|---|
| →p | pq | p |
| q | rs | t |
| r | pr | t |
| *s | ϕ | ϕ |
| *t | ϕ | ϕ |

3. a) Using identities prove that the regular languages are closed under union & intersection. [08 Marks] CO2 L5

b) State and prove pumping lemma for Regular Languages. Prove that $L = \{a^n b^n \mid n>=0\}$ is not regular. [12 Marks] CO2 L4

**OR**

4. a) Write the Table filling algorithm to find the distinguishable pairs in a DFA 'M'. [08 Marks] CO2 L1

b) State and prove pumping lemma for Regular Languages. Prove that $L = \{ 0^n 1^n \mid n>=0\}$ is not regular. [12 Marks] CO2 L4

5. a) Explain the Chomsky Hierarchy. [10 Marks]

b) Define the following terms with examples [10 Marks]

i. Left most derivation ii. Right most derivation

iii. Parse tree iv. Ambiguity

OR

6. a) Formally define the language accepted by empty stack and final state [08 Marks]

method. [12 Marks]

b) Write context free grammars for the following

i) $L(G) = \{a^n b^n c^n : n \geq 1\}$

ii) $L(G) = \{w : n_a(w) > n_b(w)\}$

iii) $L(G) = \{ ww^R : w \in \{a,b\}^+\}$

iv) $L(G) = \{ a^n b^{n+1} : n \geq 1\}$

7. a) Explain the algorithm to convert a CFG to PDA with the help of an example. [08 Marks] CO4

b) Obtain a PDA to accept the language $L = \{wCw^R\}$ by a final state. Give the graphical representation for PDA obtained. Show the moves made by the PDA for the string aabCbaa. [12 Marks] CO4

OR

8. a) Define the following with suitable examples: [10 Marks] CO4

i) PDA ii) NPDA

iii) Instantaneous description of PDA iv) Moves

b) Construct an NPDA that accepts the language generated by the grammar. [10 Marks] CO4

S→aABC

A→ aB / a

B→ bA / b

C→ c

9. a) Eliminate useless symbols & productions for the following grammar. [10 Marks] CO5

S → aA | bB

A → aA | a

B → bB

D → ab | Ea

E → aC | d

b) Convert the following grammar to Chomsky Normal Form. [10 Marks] CO5 L4

S→ ABa

A→ aab

B→ Ac

OR

10. a) Design a TM to accept the language $L = \{0^n 1^n : n \geq 1\}$ & give transition diagram for same. [10 Marks] CO5 L4

b) Write short notes on: [10 Marks] CO5 L1

i) Multi tape Turing Machines.

ii) Multi-dimensional Turing Machines.

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**18CS53**

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# DATABASE MANAGEMENT SYSTEM

[Time: 3 Hours] [Maximum Marks: 100]

Instructions to students:

(i) Answer FIVE FULL Questions as per choice.

(ii) Any Missing Data can be assumed suitably.

(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Explain with a neat sketch, the different phases of database design. | [08 Marks] | CO1 | L2 |
| | b) | Notown Records has decided to store information about musicians who perform on its albums in a database. Each musician that records at Notown has an SSN, a name, an address, and a phone number. Each instrument used in songs recorded at Notown has a name and a musical key. Each album has a title, a copyright date, a format and an album identifier. Each song recorded at Notown has a title and an author. Each musician may play several instruments, and a given instrument may be played by several musicians. Each album has a number of songs on it, but no song may appear on more than one album. Each song is performed by one or more musicians, and a musician may perform a number of songs. Each album has exactly one musician who acts as its producer. A musician may produce several albums, of course. Design an ER diagram that captures this information. | [08 Marks] | CO1 | L4 |
| | c) | Bring out the important advantages and disadvantages of DBMS over file system. | [04 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | Discuss the characteristics of database management system. | [08 Marks] | CO1 | L2 |
| | b) | Define entity, entity set, attribute with respect to ER model. List different types of attributes along with their symbols. | [08 Marks] | CO1 | L2 |
| | c) | Define data independence? List and explain different types of data independences. | [04 Marks] | CO1 | L2 |
| 3. | a) | Discuss the various types of constraints on relationship types? Explain each with example. | [10 Marks] | CO1 | L2 |

b) Consider the following schema [10 Marks] CO1

Sailors(Sid,Sname,Rating,age)
Boats(Bid,Bname,color)
Reserves(Sid,Bid,day)
Write queries in relational algebra.

1. Find the names of sailors who have reserved the boat 'Clipper'.
2. Display names of sailor who have reserved green and red boat.
3. Find all sailors with a rating above 7.
4. Find the colors of boats reserved by Andy

**OR**

4. a) Explain any five relational algebra operators along with syntax and purpose. [10 Marks] CO1

b) Consider the relations [10 Marks] CO1

City (city_name, state)
Hotel (name, address)
City_hotel (hotel_name, city_name, owner)
Write queries in relational algebra.

(i) Find the names and address of hotels in Agra.
(ii) List the names of cities which have no hotel.
(iii) List the names of the hotels owned by 'Taj Group'.
(iv) List the names of cities & corresponding state which have hotels owned by 'Taj Group'.

5. a) Consider the following relational database: [10 Marks] CO2

STUDENT (name, student#, class, major)
COURSE (cname, course#, credithrs, dept)
SECTION (sectionID, course#, sem, year, instructor)
GRADE_REPORT (student#, sectionid, grade)
PREREQUISITE (course#, prerequisite#)
Specify the following queries in SQL on the above database schema.

(i) Retrieve the names of all students majoring in 'CS' (Computer Science).
(ii) Retrieve the names of all courses taught by Professor Henry in 2010
(iii) Delete the record for the student whose name is 'Smith' and whose student number is 17.
(iv) Insert a new course <'Knowledge Engineering', 'CS4390', 3, 'CS'>

b) Explain the concept of Assertions & Triggers in SQL with syntax & suitable examples. [10 Marks] CO2

**OR**

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. | a) | Consider the following company database:<br>Employee (SSN,Ename, salary, superssn,Dno)<br>Department (Dnum,Dname,MgrSSN)<br>Location (Dnum,location)<br>Works (ESSN,Pno,hours)<br>Project (Pno,Pname)<br>Dependents (ESSN,Depname,Sex)<br>Write queries in SQL<br>i. Retrieve names of employee whose salary is greater than all the employee in department number 3<br>ii. Retrieve number of dependents for employee named Ravi.<br>iii. Display employee name and his/her supervisor's name.<br>iv. Retrieve Pname of employee named Ravi. | [10 Marks] | CO2 | L3 |
| | b) | Explain the various methods by which nesting of queries is achieved with the help of suitable examples. | [10 Marks] | CO2 | L3 |
| 7. | a) | What is the need for normalization? Explain 1NF, 2NF and 3NF with examples. | [10 Marks] | CO3 | L3 |
| | b) | Define & explain Boyce-Codd normal form with the help of an example. How does it differ from 3 NF? Why is it considered a stronger form of 3 NF? | [10 Marks] | CO3 | L3 |
| | | **OR** | | | |
| 8. | a) | State the informal guidelines for relation schema design. Illustrate how violation of these guidelines may be harmful. | [08 Marks] | CO3 | L4 |
| | b) | Define the following & explain with examples.<br>i) Nonadditive join or lossless join property<br>ii) Partial functional dependency<br>iii) Dependency preservation property | [06 Marks] | CO3 | L3 |
| | c) | Define multi valued dependency. Explain 4NF with example. | [06 Marks] | CO3 | L3 |
| 9. | a) | Explain time stamp ordering algorithm with example. | [08 Marks] | CO4 | L3 |
| | b) | Prove that Strict 2PL protocol guarantees Strict Schedule with example. | [08 Marks] | CO4 | L4 |
| | c) | Explain how to resolve deadlock and starvation problems. | [04 Marks] | CO4 | L3 |
| | | **OR** | | | |
| 10. | a) | Explain the 2PL with examples and along with its advantages. | [08 Marks] | CO4 | L3 |
| | b) | Explain Multiple-granularity locking with example and also explain under what circumstances is it used. | [08 Marks] | CO4 | L3 |
| | c) | Discuss time stamp ordering protocol for concurrency control. | [04 Marks] | CO4 | L2 |

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CS52

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# JAVA and J2EE

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer FIVE FULL Questions as per choice.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | With syntax and sample code outline the mechanism in which one object acquires all the properties and behaviors of parent object. Also inspect different types of relationship between classes. | [07 Marks] | CO1 | L2 |
| | b) | Analyze the following code snippet for errors if any and quote the reasons, if no errors write the output for the same.<br>void quiz( ){<br>try { int b=2/0;}<br>catch(Exception e)<br>{ System.out.println( "Caught exception" ); }<br>catch(ArithmeticException ae)<br>{ System.out.println( "Caught exception again" ); } } | [03 Marks] | CO2 | L3 |
| | c) | List all the limitations of the procedural programming that led to the paradigm of "object oriented programming". All object-oriented programming languages provide mechanisms that help to implement the object-oriented model – Illustrate with appropriate examples. | [10 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | List all the methods which are called in sequence when an applet begins. With code sample demonstrate **AppletContext** and **showDocument( )**. | [06 Marks] | CO1 | L1 |
| | b) | Illustrate with a neat diagram the mechanism behind, "Write once and run anywhere" nature of java. List and discuss at least two development tools from JDK. Write a brief note on Data types in Java. | [06 Marks] | CO1 | L3 |
| | c) | Illustrate with sample code, the mechanism that Java provides for partitioning the class name space into more manageable chunks. Also detail the access protection mechanism using four categories of visibility for class members with an example. (example should contain 2 packages P1 and P2, P1 with 3 classes and P2 with 2 classes). | [08 Marks] | CO1 | L3 |

3. a) With the general form of synchronized block illustrate the need for synchronization in multithreaded programming, and also briefly discuss importance of synchronization for threads. [06 Marks]

b) Review how key events are generated and explain handling keyboard event with code sample of keyboard input in java. [08 Marks]

c) Illustrate with code sample how to print the addresses and names of the local machine and two Internet web sites. [06 Marks]

**OR**

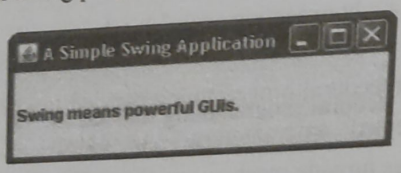
4. a) With an appropriate code snippet illustrate the usage and function of the following methods in multithreaded programs:
i) run() ii) isAlive() iii) setpriority() [06 Marks]

b) Demonstrate with example how to handle mouse event using delegation event model in java. [08 Marks]

c) Illustrate how inner classes can be used to simplify the code when using event adapter classes. [06 Marks]

5. a) With examples detail the key methods which will be used when working with Frame windows. [10 Marks]

b) Create a swing application to produce window output as shown below, also detail how Swing programs differ from both the console-based programs and the AWT-based programs through the structure of the swing program. [10 Marks]




**OR**

6. a) Elucidate two key features of Swing. [06 Marks]

b) List all the types of Buttons defined by Swing and briefly discuss about the methods that controls the behaviour of buttons. [06 Marks]

c) Explain with an example steps to follow to use a scroll pane. [08 Marks]

7. a) Give an overview of JDBC packages and different types of JDBC drivers. [10 Marks]

Consider the preparedStatement as given below,
String query= "insert into Books (bookName, firstName, lastName) values(?,?,?)";
PreparedStatement pstatement = ___.preparedStatement (_____);
Complete the above code segment to set the values for the book records to be inserted into the database as follows, also illustrate the advantages of using PreparedStatement.

(i) bookName = J2EE, firstName= Jim, lastName=Keogh.
(ii) bookName=Java, firstName=Herbert, lastName=Schildt.

| | | | | | |
|---|---|---|---|---|---|
| | b) | Discuss about Enterprise Java Beans by explaining when to use EJB, types of EJB and its advantages. | [10 Marks] | CO4 | L2 |
| | | **OR** | | | |
| 8. | a) | Discuss all the commonly used methods of ResultSet interface. | [10 Marks] | CO4 | L1 |
| | b) | With an example demonstrate ResultSet interface to retrieve the data of 3rd row from college table. (Assume table is created with necessary attributes) | [06 Marks] | CO4 | L3 |
| | c) | What type of information does deployment descriptor file of EJB contain? | [04 Marks] | CO4 | L1 |
| 9. | a) | Illustrate with an example how to create and use custom tags in JSP. Summarize the Tag libraries in JSTL, with their uniform resource identifier (URI) and Tag prefix. | [10 Marks] | CO4 | L4 |
| | b) | What are the different ways for session tracking? | [06 Marks] | CO4 | L1 |
| | c) | Briefly explain the need of java remote method invocation. | [04 Marks] | CO4 | L2 |
| | | **OR** | | | |
| 10. | a) | Classify the Scripting Tags and demonstrate the same with code snippets. Discuss all the major features of the custom tags. | [10 Marks] | CO4 | L2 |
| | b) | With an example code demonstrate how to build, run and test a servlet. | [10 Marks] | CO4 | L4 |

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CS54

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# DATABASE MANAGEMENT SYSTEM

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer FIVE FULL Questions as per choice.
(ii) Any Missing Data can be assumed suitably.
(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Explain the important advantages and disadvantages of DBMS over file Processing system. | [10 Marks] | CO1 | L2 |
| | b) | Define entity, entity set, attribute with respect to ER model. List different types of attributes along with their symbols. | [10 Marks] | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | With a neat block diagram explain the DBMS architecture with different levels of abstraction. Also explain the languages used at each level. | [10 Marks] | CO1 | L2 |
| | b) | Design an ER Diagram for Hospital management system by considering at least minimum 5 entities, attributes and relationship. | [10 Marks] | CO1 | L3 |
| 3. | a) | Consider the following schema for a company database.<br>Employee (Name, SSN, Address, Sex, Salary, Dno)<br>Department (Dname, Dnumber, MGR SSN, MGRSTART DATE)<br>Dept_Location (Dnumber, Dlocations)<br>Project (Pname, Pnumber, Plocation, Dnum)<br>Works_on (ESSN, Pno, Hours)<br>Dependent (ESSN, Dependent_name, Sex, Ddate, Relationship)<br>Write the queries in relational algebra to<br>i. Retrieve the name and address of all employees who work for the research department<br>ii. Find the name of employees who are not working in any projects.<br>ii. List all projects on which employee Smith is not working.<br>v. Retrieve the names of employees who have at least 3 dependents. | [10 Marks] | CO2 | L3 |
| | b) | Define the following terms with an example.<br>i. Entity Integrity Constraint<br>ii. Relation schema<br>ii. Domain Constraint<br>v. Database State | [10 Marks] | CO2 | L1 |

**OR**

4. a) Explain different types of JOIN operations used in Relational Algebra with examples. [10 Marks] CO2

   b) Explain the following relational algebra operations. Illustrate each of them with an example. [10 Marks] CO2

      i. Select
      ii. Rename operation
      iii. Difference
      iv. Cartesian Product

5. a) Explain the following with example [10 Marks] CO3

      i. Group By Clause
      ii. Order By Clause
      iii. Aggregate Function
      iv. v > ALL V

   b) Explain different data types that are allowed for SQL attributes with examples. [05 Marks] CO3 L2

   c) Explain Set theoretic operations used in SQL with example. [05 Marks] CO3 L2

**OR**

6. a) Consider the following relation schema [10 Marks] CO3 L3

   Project (P_No, P_Name, P_Incharge)
   Employee (E_No, E_Name)
   Assigned_to (P_No, E_No)
   Write the SQL Queries for the following:

      i. List details of employees who are working on all the projects.
      ii. List E_No of employees who are not working on project number 2K.
      iii. List the names of employees who are working in the same project as employee named 'Tom'.
      iv. List the names of employees who are not working in any project.

   b) Explain with example how Triggers and Assertions are used in SQL. Explain the advantage of each one. [10 Marks] CO3

7. a) State the informal guidelines for relational schema design. Illustrate how violation of these guidelines may be harmful. [10 Marks] CO4

   b) Explain the following with examples. [10 Marks] CO4

      i. Multi-valued Dependencies, Fourth Normal Form
      ii. Join Dependencies and Fifth Normal Form

**OR**

8. a) What is the need for normalization? Explain 1NF, 2NF, 3NF with examples. [10 Marks] CO4

b) Consider the universal relation R={A,B,C,D,E,F,G,H,I,J} and the set of functional dependencies F={{A,B}→{C}, {A}→{D,E}, {B}→{F}, {F}→{G,H}, {D}→{I,J}}. What is the key for R? Decompose R into 2 NF and then 3 NF relations. [10 Marks] CO4 L3

9. a) Explain the following with example. [10 Marks] CO5 L1
   i. Time stamp ordering protocol
   ii. Deadlock and Starvation

   b) Which of the following schedules is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules. [10 Marks] CO5 L3
   i. r1(x); r3(x); w1(x); r2(x); w3(x);
   ii. r1(x); r3(x); w3(x); w1(x); r2(x);
   iii. r3(x); r2(x); w3(x); r1(x); w1(x);
   iv. r3(x); r2(x); r1(x); w3(x); w1(x);

**OR**

10. a) Explain two phase locking protocol with example and advantages with other protocols. [10 Marks] CO5 L2

   b) Explain the problems that can occur when concurrent transactions are executed. Give examples for each. [10 Marks] CO5 L2

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CS56

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# THEORITICAL FOUNDATION OF COMPUTER SCIENCE

[Time: 3 Hours] [Maximum Marks: 100]

**Instructions to students:**

(i) Answer FIVE FULL Questions as per choice.

(ii) Any Missing Data can be assumed suitably.

(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Define the following terms: | [12 Marks] | CO1 | L1 |
| | | i) String ii) Length of String iii) Language iv) Alphabet<br>v) Concatenation of Strings vi) Power of an Alphabet | | | |
| | b) | Define a DFA and Construct a DFA to accept strings of 0's and 1's ending with the string "000". | [08 Marks] | CO1 | L1 |
| | | **OR** | | | |
| 2. | a) | List a few applications of finite automata and regular expressions. | [06 Marks] | CO1 | L1 |
| | b) | Convert the following NFA to DFA | [06 Marks] | CO1 | L2 |

| δ | 0 | 1 |
|---|---|---|
| → p | {q,s} | {q} |
| * q | {r} | {q,r} |
| r | {s} | {p} |
| * s | ϕ | {p} |

| | | | | | |
|---|---|---|---|---|---|
| | c) | Show that the language defined by a regular expression is also defined by a finite automaton (Thomson Construction). | [08 Marks] | CO1 | L3 |
| 3. | a) | State and prove pumping lemma for regular languages. | [10 Marks] | CO2 | L3 |
| | b) | Prove that regular sets are closed under union, concatenation, and Kleene closure. | [10 Marks] | CO2 | L3 |
| | | **OR** | | | |
| 4. | a) | Write the Table filling algorithm to find the distinguishable pairs in a DFA. | [08 Marks] | CO2 | L1 |

b) Minimize the following DFA using table filling algorithm, [12 Marks] CO2 L4

| δ | 0 | 1 |
|---|---|---|
| →A | B | E |
| B | C | F |
| *C | D | H |
| D | E | H |
| E | F | I |
| *F | G | B |
| G | H | B |
| H | I | C |
| *I | A | E |

5. a) Define the following: [12 Marks] CO3 L1
i) Grammar ii) CFG iii) LMD
iv) RMD v) Derivation tree vi) Yield of a tree

b) Consider the grammar S→ aS / aSbS / ε. For the string "aab", show that there are two [08 Marks] CO3 L2
i)LMD ii) RMD iii) Parse Trees

**OR**

6. a) Write context free grammars for the following: [12 Marks] CO3 L1

i) $L(G) = \{a^n b^m c^m d^n : m, n \geq 1\}$

ii) $L(G) = \{w: na(w) = nb(w)\}$

iii) $L(G) = \{wwR: w \varepsilon (a+b)^*\}$

b) Show that the following grammar is ambiguous and write an equivalent unambiguous grammar for the same. [08 Marks] CO3 L3
E → E+E / E*E / (E) / id

7. a) Define the following [10 Marks] CO4 L1

i) Pushdown Automata ii) Instantaneous description of PDA
iii) Moves

b) Design a PDA to accept the language $L = \{a^n b^{2n} : n \geq 1\}$ by empty stack or final state method. [10 Marks] CO4 L5

**OR**

8. a) With a neat diagram explain the working of a pushdown automata. [10 Marks] CO4 L1

b) Design a PDA to accept the language $L = \{ww^R : w \in \{0,1\}^*\}$ by empty stack or final state method. [10 Marks] CO4 L5

9. a) State and prove pumping lemma for context free languages. [10 Marks] CO5 L3

b) Convert the following grammar to CNF and GNF [10 Marks] CO5 L3
E → E+E / E*E / (E) / a / b / c

## OR

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | With a neat diagram explain the model of a Turing machine. | [10 Marks] | CO5 | L1 |
| | b) | Design a Turing Machine to accept the language $L = \{0^n 1^n 2^n : n \geq 1\}$. | [10 Marks] | CO5 | L5 |

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CS55

FIFTH Semester B.E. Degree Summer Semester End Examination (SSEE), October 2022

# DATA COMMUNICATION NETWORKS

[Time: 3 Hours] [Maximum Marks: 100]

Instructions to students:

(i) Answer FIVE FULL Questions as per choice.

(ii) Any Missing Data can be assumed suitably.

(iii) Use BLACK ball point pen for text, figure, table, etc.

| | | | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| 1. | a) | Define data communication. List and explain the fundamental characteristics and components of a data communication system with relevant diagram. | [06 Marks] | CO1 | L2 |
| | b) | Distinguish between LAN, WAN and MAN with an example. | [06 Marks] | CO1 | L2 |
| | c) | Explain TCP/IP protocol suite, with neat diagram, and briefly discuss the functions of all the protocols of TCP/IP model. | [08 Marks] | CO1 | L1, L2 |
| | | **OR** | | | |
| 2. | a) | List and explain the responsibilities of the Transport layer of OSI Model. | [06 Marks] | CO1 | L1, L3 |
| | b) | With neat diagram explain mesh and bus topology with its advantages and disadvantages. | [08 Marks] | CO1 | L2 |
| | c) | Describe in brief the modes of communication between two devices with supporting diagrams. | [06 Marks] | CO1 | L2 |
| 3. | a) | Explain FDMA and TDMA with neat diagram. | [10 Marks] | CO2 | L2 |
| | b) | Differentiate between ALOHA and Slotted ALOHA with relevant diagrams. | [10 Marks] | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | Explain stop-and-wait ARQ protocol with its design and write sender site algorithm. | [10 Marks] | CO2 | L4 |
| | b) | Draw a CRC encoder and decoder for CRC code with C (7, 4). Also explain how this CRC design works, with an example. | [10 Marks] | CO3 | L3 |
| 5. | a) | Write Bellman Ford Algorithm. Consider the network in Fig. 5(a). Use Bellman Ford Algorithm to find shortest path from all the nodes to node D. Draw the shortest path tree. | [08 Marks] | CO3 | L4 |

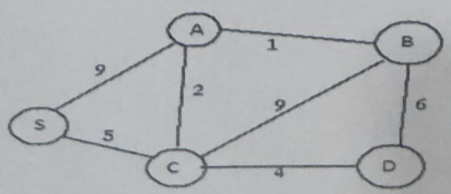


Fig.5(a)

| | | | | | |
|---|---|---|---|---|---|
| | b) | With relevant diagram explain fair queuing and weighted fair queuing. | [08 Marks] | CO3 | L2 |
| | c) | State advantages and disadvantages of virtual circuit packet switching network. | [04 Marks] | CO3 | |
| | | **OR** | | | |
| 6. | a) | Demonstrate the concept of Dijkstra algorithm. Explain the algorithm with suitable example. | [06 Marks] | CO3 | L3 |
| | b) | Explain FIFO and priority queuing with neat diagram. | [06 Marks] | CO3 | L2 |
| | c) | Illustrate congestion control. List all policies used for the congestion control. Explain any two policies used for the congestion control in detail. | [08 Marks] | CO3 | L2 |
| 7. | a) | Explain the different fields of IPV4 header with the help of a diagram. | [08 Marks] | CO3 | L2 |
| | b) | Find the netid, hosted and their address class for the following IP Addresses:<br>(i) 200.58.20.165 ii)128.127.23.20<br>iii)16.196.128.50 iv)150.156.10.10 | [06 Marks] | CO3 | L3 |
| | c) | Elaborate the concept of Sub Netting with Example. | [06 Marks] | CO3 | L2 |
| | | **OR** | | | |
| 8. | a) | What is classful addressing? Discuss Class A, Class B, Class C, Class D and Class E addresses with its ranges in decimal dotted notation and example. | [06 Marks] | CO4 | L2 |
| | b) | Explain fragmentation and reassembly with neat diagram. | [06 Marks] | CO4 | L2 |
| | c) | Explain IPv6? List its advantages over IPv4. Also explain its frame format. | [08 Marks] | CO4 | L2 |
| 9. | a) | What do you understand by "3-way Hand Shake" in TCP. Explain with neat diagram. Also explain TCP connection termination process with diagram. | [08 Marks] | CO5 | L2 |
| | b) | Explain operation of OSPF with different stages. | [12 Marks] | CO5 | L2 |
| | | **OR** | | | |
| 10. | a) | Draw the structure of TCP segment. List and explain the feature of TCP. | [06 Marks] | CO5 | L1, L2 |
| | b) | Elaborate the concept of Domain Name System in the Internet. | [06 Marks] | CO5 | L2 |
| | c) | Explain different categories of WEB documents. | [08 Marks] | CO5 | L2 |

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