CBCS SCHEME

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15CS51

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Define Management. Explain functions of management in detail **(08 Marks)**
   b. Explain nature and characteristics of management in detail. **(08 Marks)**

OR

2 a. Explain the levels of management. **(08 Marks)**
   b. List the difference between administration and management. **(04 Marks)**
   c. Explain the roles of Managers in detail. **(04 Marks)**

Module-2

3 a. Define Leadership. Explain leadership styles. **(08 Marks)**
   b. Explain Herzberg's Hygiene theory. **(08 Marks)**

OR

4 a. Explain techniques of coordination. **(08 Marks)**
   b. Explain steps in control process in detail. **(08 Marks)**

Module-3

5 a. Write the characteristics of Entrepreneurship and functions of entrepreneur. **(08 Marks)**
   b. Explain types of Entrepreneurship in detail. **(08 Marks)**

OR

6 a. List the difference between Entrepreneur and Entrepreneurship. **(04 Marks)**
   b. Explain stages of Entrepreneurial process in detail. **(08 Marks)**
   c. Explain barriers to entrepreneurship. **(04 Marks)**

Module-4

7 a. Enumerate the content of Project report. **(08 Marks)**
   b. Define ERP and explain its importance. **(08 Marks)**

OR

8 a. Define Project report and explain significance of report. **(08 Marks)**
   b. Explain steps involved in Project report writing. **(08 Marks)**

Module-5

9 a. List the functions of DIC's. **(08 Marks)**
   b. Explain KSSIDC. **(08 Marks)**

OR

10 a. List the characteristics of small scale industries. **(08 Marks)**
    b. Explain trademark , copy rights and patents. **(08 Marks)**

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CBCS SCHEME

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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 client server and peer-to-peer architecture.   (08 Marks)
   b. Describe HTTP with persistent and non-persistent connections.   (08 Marks)

OR

2 a. Discuss how files are distributed in peer-to-peer application.   (08 Marks)
   b. Demonstrate socket implementation using TCP.   (08 Marks)

Module-2

3 a. With a diagram, explain the connection-oriented multiplexing and de-multiplexing.
                                                                              (06 Marks)
   b. Elaborate the three way handshaking in TCP.   (05 Marks)
   c. Discuss Go-Back N protocol.   (05 Marks)

OR

4 a. With a neat sketch, explain the TCP segment and its services.   (08 Marks)
   b. Design rdt 2.0 protocol.   (08 Marks)

Module-3

5 a. With general format, explain various fields of IPV6.   (08 Marks)
   b. Define routing algorithm. List the broadcast routing algorithms. Explain any one of them.
                                                                              (08 Marks)

OR

6 a. Illustrate Routing Information Protocol (RIP) with suitable diagram.   (08 Marks)
   b. Explain the spanning tree algorithm and give its advantages and disadvantages.   (08 Marks)

Module-4

7 a. With a diagram, explain various components of GSM 2G cellular network architecture.
                                                                              (08 Marks)
   b. With a diagram, explain the following with respect to mobile IP:
      (i) Agent discovery   (ii) Registration with the home agent   (08 Marks)

OR

8 a. Illustrate the steps involved when a base station does decide to hand-off a mobile user.
                                                                              (08 Marks)
   b. Compare mobile IP and GSM mobility.   (04 Marks)
   c. With a diagram, explain the problem and its solution in direct routing. (04 Marks)

Module-5

9 a. With a neat diagram, explain the CDN operation.   (08 Marks)
   b. Briefly explain the properties of Video and Audio.   (08 Marks)

OR

10 a. Explain the working procedure of leaky bucket algorithm.   (08 Marks)
   b. Discuss the followings: (i) Adaptive streaming   (ii) DASH   (08 Marks)

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15CS53

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Discuss the main characteristics of the database approach and how it differs from traditional file systems. **(08 Marks)**

   b. Explain the component module of DBMS and their interactions with the help of neat diagram. **(08 Marks)**

OR

2   a. Draw an ER-diagram for AIRLINE database schema with atleast five entity types and specify primary key and structural constraints and weak entity type. **(10 Marks)**

   b. Define the following terms:
     i)   Weak entity type
     ii)   Degree of a relationship type
     iii) Role names and recursive relationship. **(06 Marks)**

Module-2

3   a. Discuss the different types of update operations on relational database. Explain how the basic operations deals with constraint violations. **(08 Marks)**

   b. Explain the data types available for attribute specification in SQL. **(08 Marks)**

OR

4   a. Consider the two tables T_1 and T_2. Show the results of the following operations:

T_1

P	Q	R
10	a	5
15	b	8
25	a	6

T_2

A	B	C
10	b	6
25	c	3
10	b	5

    i) $T_1 \bowtie_{T_1.P=T_2.A} T_2$

    ii) $T_1 \bowtie_{T_1.Q=T_2.B} T_2$

    iii) $T_1 \Join_{T_1.P=T_2.A} T_2$

    iv) $T_1 \bowtie_{T_1.Q=T_2.B} T_2$

    v) $T_1 \bowtie_{(T_1.P=T_2.A \text{ AND } T_1.R=T_2.C)} T_2$ **(10 Marks)**

   b. Explain Unary relational operations with an example. **(06 Marks)**

Module-3

5 Consider the following schema of order database

SALESMAN (Salesmanid, name, city, commission);

CUSTOMER (Custid, custname, city, grade, salesmanid);

ORDERS (Ordno, purchaseamt, orddate, custid, salesmanid);

Write SQL queries for the following:

i) Find the name and numbers of all salesman who had more than one customer.

ii) Count the customers with grade above Bangalore's average.

iii) List all the salesman details whose first name is 'John'.

iv) List all salesman and indicate those who have and don't have customers in their cities (Use UNION operation).

v) Use the delete operation by removing salesman with id = 2000. **(16 Marks)**

OR

6 a. Explain three-tier architecture with neat diagram. **(08 Marks)**

b. Define stored procedure. Explain creating and calling of stored procedure with an example. **(08 Marks)**

Module-4

7 a. Define normal form. Explain 1NF, 2NF and 3NF with suitable example. **(08 Marks)**

b. Discuss insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with example. **(08 Marks)**

OR

8 a. Explain the four informal guidelines that may be used as measures to determine the quality of relation schema design. **(08 Marks)**

b. Write an algorithm for finding a minimal cover 'F' for a set of functional dependencies 'E'. Find the minimal cover for the given set of FD's

G: {A → BCDE, CD → E} **(08 Marks)**

Module-5

9 a. Discuss the atomicity, durability, isolation and consistency preserving properties of a database transaction. **(08 Marks)**

b. Why concurrency control is needed demonstrate with example? **(08 Marks)**

OR

10 a. Discuss Two-Phase Locking Technique for concurrency control. **(10 Marks)**

b. Explain NO-UNDO/REDO Recovery based on deferred update. **(06 Marks)**

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Automata Theory and Computability

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*
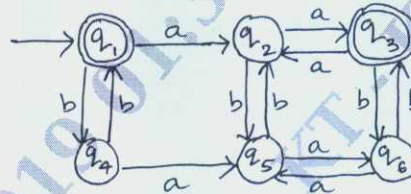
Module-1

1 a. Briefly describe the applications of Theory of computation.   **(04 Marks)**
   b. Define DFSM. Build DFSM for the following languages.

   i) $L = \{w \in \{a, b\}^* : \text{every a in w is immediately followed by b}\}$

   ii) $L = \{w \in \{a, b\}^* : \text{w does not contain substring aab}\}$.   **(08 Marks)**

   c. Describe Machine based hierarchy of language classes.   **(04 Marks)**

OR

2 a. For the following NDFSM, use ndfsmtodfsm to construct an equivalent DFSM. Begin by showing the value of eps (q) for each state q :   **(08 Marks)**
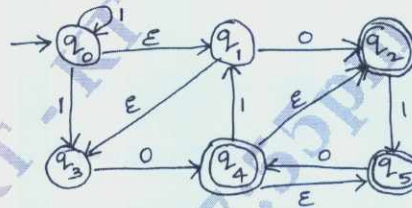

   b. Let M be the following DFSM. Use minDFSM to minimize M.   **(08 Marks)**

Module-2

3 a. Define Regular Expression. Write regular expression for the following :

   i) $L = \{w \in \{a, b\}^* : \text{w does not end in ba}\}$

   ii) $L = \{w \in \{0 - 9\}^* : \text{w corresponds to the decimal encoding, without leading 0's , of an odd natural number}\}$.   **(06 Marks)**

   b. Consider the FSM M. Use the fsmtoregexheuristic algorithm to construct a regular expression that describes L(M).   **(05 Marks)**
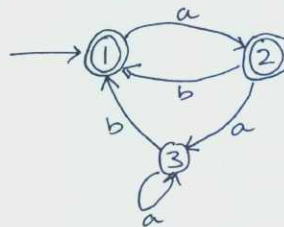
c. Consider the FSM M. Use fsmtoregex algorithm to construct a regular expression that describes L(M). **(05 Marks)**
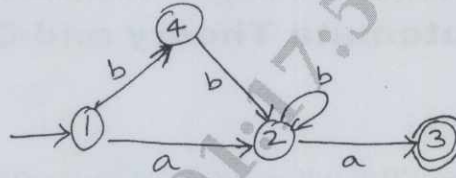
OR

4 a. Show that regular languages are closed under complement and set difference. **(06 Marks)**

b. State and prove pumping lemma theorem for regular languages. And show that the language $L = \{a^n b^n : n \geq 0\}$ is not regular. **(10 Marks)**

Module-3

5 a. Define CFG. Design CFG for the languages.
i) $L = \{a^i b^j | 2i = 3j + 1\}$ ii) $L = \{0^{n+2} 1^n | n \geq 1\}$. **(08 Marks)**

b. Define Chomskey Normal form. Convert the following CFG to CNF.
$S \rightarrow a\ ACa$
$A \rightarrow a\ |\ B$
$B \rightarrow C\ |\ c$
$C \rightarrow cC|\ E$. **(08 Marks)**

OR

6 a. Define Ambiguity. Consider the grammar $E \rightarrow + EE\ |\ * EE\ |\ - EE\ |\ x\ |\ y$. Find the leftmost, rightmost derivations and parse trees for the string " + * - xyxy". **(07 Marks)**

b. Define PDA. Design a PDA to accept the following language.
$L = \{ww^R : w \in \{a, b\}^*\}$. Draw the transition diagram for the constructed PDA. **(09 Marks)**

Module-4

7 a. Design a TM to accept the language $L = \{a^n b^n | n \geq 1\}$. Obtain the transition table and transition diagram. Also show the instantaneous description for the string "aabb". **(11 Marks)**

b. Explain the working principle of TM with diagram. **(05 Marks)**

OR

8 a. State and prove pumping theorem for CFL's shown that the language $L = \{a^n b^n c^n : n \geq 0\}$ is not context free. **(10 Marks)**

b. Explain the hierarchy within the class of CFL's (hierarchy of languages). **(03 Marks)**

c. Show that CFL's are closed under reverse. **(03 Marks)**

Module-5

9 a. Explain Multitape TM, with diagram. **(05 Marks)**

b. Prove that every language accepted by a multitape TM is acceptable by some standard TM. **(06 Marks)**

c. Explain the model of Linear Bounded Automata. **(05 Marks)**

OR

10 Write short notes on :
a. Undecidable languages.
b. Halting problem of TM.
c. Post correspondence problem.
d. Church – Turing Thesis. **(16 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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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Object Oriented Modeling and Design

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a.   List and explain the stages involved in OO – methodology.   (08 Marks)
    b.   Explain briefly three models used to describe a system.   (08 Marks)

OR

2   a.   Explain with a neat diagram, how an association class participate in another association.   (08 Marks)
    b.   What is an association end? What are the different properties of end?   (08 Marks)

Module-2

3   a.   Explain the requirement diagrams with UML models.   (08 Marks)
    b.   Explain three different levels of use-case detailed description.   (08 Marks)

OR

4   a.   What is SSD? What are the steps to develop SSD based on activity diagram?   (08 Marks)
    b.   What is the purpose of statechart? List the primary steps for developing a state chart.   (08 Marks)

Module-3

5   a.   List and explain sequence of software development stages.   (08 Marks)
    b.   Design the initial class diagram for ATM system.   (08 Marks)

OR

6   a.   Explain the steps to construct the domain state model.   (08 Marks)
    b.   How are classes identified in domain class model? Briefly explain.   (08 Marks)

Module-4

7   a.   Define object responsibility. Explain it briefly.   (08 Marks)
    b.   What is an objective of use-case controller class? Explain the ways to create it.   (08 Marks)

OR

8   a.   What are the three steps to be followed in developing first cut sequence diagram? Explain Briefly.   (08 Marks)
    b.   Write a short note on following :
      i) Design class symbols ii) Design class notation.   (08 Marks)

Module-5

9   a.   Define design pattern. Explain essential elements of design pattern.   (08 Marks)
    b.   Explain the process of how design pattern solve design problem.   (08 Marks)

OR

10   a.   Explain the process of how to use and how to select the design pattern.   (08 Marks)
    b.   Explain in detail adopter design pattern.   (08 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
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 enum? With a program, explain how enumeration is used as class.   **(09 Marks)**
   b. What is autoboxing? Write a program to illustrate how auto boxing occurs in methods and explain briefly.   **(07 Marks)**

OR

2 a. What are annotations? List different built-in annotations. Explain any one.   **(04 Marks)**
   b. Define Marker annotation and single member annotation with an example.   **(04 Marks)**
   c. Write a program to obtain annotations at runtime by use of reflection.   **(08 Marks)**

Module-2

3 a. What is collection framework? Explain collection interface and its methods.   **(08 Marks)**
   b. Write a java program to create an ArrayList of objects of type string. Add any five strings, display size and contents of list. Remove any two strings and display size and contents.   **(08 Marks)**

OR

4 a. Write a note on TreeMap class.   **(06 Marks)**
   b. What are comparators? Explain briefly.   **(05 Marks)**
   c. Explain vector class with an example.   **(05 Marks)**

Module-3

5 a. What is string? Explain different string constructors.   **(07 Marks)**
   b. Write a java program to sort array of strings using compareTo( ) function.   **(05 Marks)**
   c. Write a short note on replace( ) and substring( ) methods of StringBuffer class.   **(04 Marks)**

OR

6 a. Write a program in java to replace all the matching substring with a given string.   **(06 Marks)**
   b. Explain indexOf( ) and lastIndexOf( ) methods of string class with an example.   **(05 Marks)**
   c. Write a note on charAt( ) and setCharAt( ) functions of StringBuffer class.   **(05 Marks)**

Module-4

7 a. Explain Servlet life cycle with an example.   **(05 Marks)**
   b. Define Cookie. Write a Servlet program to add a cookie.   **(08 Marks)**
   c. List different classes and interfaces of javax.servlet package.   **(03 Marks)**

OR

8 a. What is JSP? Explain different types of JSP tags.   **(10 Marks)**
   b. What is session? Explain how to create session attribute using JSP.   **(06 Marks)**

Module-5

9 a. Describe the various steps of JDBC with code snippets.   **(10 Marks)**
   b. Write a note on Database Metadata and ResultSet metadata.   **(06 Marks)**

OR

10 a. Write a note on different types of drivers.   **(04 Marks)**
   b. What is ResultSet? How to make ResultSet Scrollable.   **(04 Marks)**
   c. Write a Java program to execute database transaction.   **(08 Marks)**

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Fifth Semester B.E. Degree Examination, June/July 2019
Artificial Intelligence

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 AI technique? List less desirable properties and representation of knowledge. **(08 Marks)**

   b. Explain production system with components and characteristics. List the requirement of good control strategies. **(08 Marks)**

OR

2 a. List and explain the AI problem characteristics. **(08 Marks)**

   b. Explain constraint satisfaction and solve the cryptarithmetic problem :
CROSS + ROADS = DANGER. **(08 Marks)**

Module-2

3 a. List and explain the issues in knowledge Representation. **(08 Marks)**

   b. State and explain the algorithm to convert predicates to clausal form. **(08 Marks)**

OR

4 a. Consider the following predicates
     i) Man (Marcus)
     ii) Pompeian (Marcus)
     iii) born (Marcus, 40)
     iv) $\forall x$; man (x) $\rightarrow$ mortal (x)
     v) $\forall x$: Pompeian (x) $\rightarrow$ died (x, 79)
     vi) erupted (volcano, 79)
     vii) $\forall x : \forall t_1 : \forall t_2$: mortal (x) $\wedge$ born (x, t_1) $\wedge$ gt(t_2-t_1, 150) $\rightarrow$ dead (x, t_2)
     viii) now = 1991
     ix) $\forall x : \forall t : [\text{alive}(x, t) \rightarrow \sim \text{dead} (x, t)] \wedge [\sim \text{dead}(x, t) \rightarrow \text{alive}(x, t)$
     x) $\forall x : \forall t_1 : \forall t_2$: died (x, t_1) $\wedge$ gt (t_2, t_1) $\rightarrow$ dead (x, t_2)
   Prove that : $\sim$ alive (Marcus, now) **(10 Marks)**

   b. What is matching in rule based system? briefly explain the different proposals for matching. **(06 Marks)**

Module-3

5 a. What is non monotonic reasoning? Explain the logics and approaches for non monotonic reasoning. **(08 Marks)**

   b. Why truth maintenance systems are required? Explain different types truth maintenance systems. **(08 Marks)**

OR

6 a. Explain Dempster – Shafer theory with example. **(08 Marks)**

   b. Define semantic net. Represent the following sentence using partitioned semantic net :
     i) Every dog in town has bitten the constable
     ii) Every dog has bitten every mail carrier. **(08 Marks)**

Module-4

7 a. Define conceptual dependency. List goals and primitive acts with meaning. (08 Marks)
   b. Explain the scripts with components. Write the script for the Restaurant. (08 Marks)

OR

8 a. State and explain the MINIMAX algorithm with example. (08 Marks)
   b. Explain iterative deepening. Write algorithms for Depth First iterative depending and Iterative deepening A*. (08 Marks)

Module-5

9 a. What is Natural language processing? Explain the steps in process. (08 Marks)
   b. Explain the spell checking with different techniques. (08 Marks)

OR

10 a. What is learning? Explain the Winston's learning program with example. (08 Marks)
    b. Explain the expert system and knowledge acquisition process, with example. (08 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2019
Embedded Systems

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a.   Define an embedded system. With a neat diagram, explain the components and characteristics of an embedded system.   **(10 Marks)**
    b.   Explain any six design metrics used in designing of embedded system.   **(06 Marks)**

OR

2   a.   With a neat flow diagram, explain the various activities for software design process of an embedded system.   **(10 Marks)**
    b.   Explain the 3 classes of an embedded systems. Further discuss the skills required for an embedded system designer.   **(06 Marks)**

Module-2

3   a.   Explain synchronous serial input and synchronous serial output operations with a neat diagram.   **(08 Marks)**
    b.   Write a note on :   i) SDIO   ii) CAN BUS.   **(08 Marks)**

OR

4   a.   Explain the process of serial data communication using the SPI, SCI and SI ports. **(10 Marks)**
    b.   Explain IrDA and ZigBee wireless protocols.   **(06 Marks)**

Module-3

5   a.   Explain the classification and sources of interrupt with an example. **(08 Marks)**
    b.   Explain interrupt latency and interrupt service deadline.   **(08 Marks)**

OR

6   a.   With a neat diagram, explain DMA transfer in an embedded system.   **(08 Marks)**
    b.   List and explain any 6 Linux device drivers.   **(08 Marks)**

Module-4

7   a.   Distinguish between function, ISR and Task.   **(08 Marks)**
    b.   Explain shared data problem and solution for shared data problem.   **(08 Marks)**

OR

8   a.   What is a semaphore? Explain P and V semaphore function along with a signal or notification property.   **(08 Marks)**
    b.   List and different IPC functions and also explain pipe functions and socket function.
                                                                             (08 Marks)

Module-5

9   a.   Discuss the importance and service provided by RTOS in embedded system designing.
                                                                             (08 Marks)
    b.   Explain the three approaches used for interrupt routines in RTOS environment and handling of interrupt source calls.   **(08 Marks)**

OR

10 a.   What is RTOS? Explain the design principles when using an RTOS to design an embedded system.   **(08 Marks)**
    b.   Explain : i) IDE   ii) Target system.   **(08 Marks)**

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
·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. Define exception. With syntax and code snippets, explain try, catch, throw and finally used in exception handling. **(09 Marks)**
   b. Explain with code snippets optimal parameters and named arguments. **(07 Marks)**

OR

2 a. Differentiate between break and continue statements with code snippets. **(02 Marks)**
   b. With example, explain checked and unchecked statements and expressions. **(06 Marks)**
   c. Write a C# program to perform the following: Read marks obtained for 3 subjects, calculate average and display grade according to the following cases. Use switch statement.
   $70 \le avg \le 80 \rightarrow$ "outstanding"
   $60 < avg \le 69 \rightarrow$ "First class"
   $50 < avg \le 59 \rightarrow$ "Second class"
   $40 < avg \le 49 \rightarrow$ "Average class"
   Otherwise $\rightarrow$ "Fail class" **(08 Marks)**

Module-2

3 a. Demonstrate Boxing and unboxing with code snippets. **(06 Marks)**
   b. Discuss two different operators to cast data safely in C#. Give examples. **(06 Marks)**
   c. Differentiate between class and structure. **(04 Marks)**

OR

4 a. What is a gagged array? Write a C# program to create a gagged array, populate this array with values and to display contents of the same. **(06 Marks)**
   b. Demonstrate ref and out parameters with suitable examples for each. **(10 Marks)**

Module-3

5 a. Write a C# program to design a method to calculate sum and average of 'n' numbers using params array. **(08 Marks)**
   b. What is garbage collection? Why it is needed? Explain the steps taken by garbage collector to destroy objects. **(08 Marks)**

OR

6 a. Explain inheritance with examples. How it is used in class? What are the advantages of using inheritance? **(06 Marks)**
   b. Define and explain abstract class and scaled class. **(04 Marks)**
   c. What is an interface? How it is defined in C#? Demonstrate with examples how to implement interfaces in class. **(06 Marks)**

Module-4

7 a. Explain two types of properties in C# with syntax and example for each. **(06 Marks)**
   b. Define indexer with syntax. **(02 Marks)**
   c. Write a C# program to create, manipulate and iterate through the contents of List Collection class. Show Add, Remove, RemoveAt and Insert methods. Give necessary comments for each method. **(08 Marks)**

OR

8 a. Write a C# program to demonstrate a generic solution for swapping of 2 integers and swapping of 2 strings. **(08 Marks)**
   b. Differentiate between Dictionary < Tkey, Tvalues > collection class and sorted list < Tkey, Tvalues > collection class. **(08 Marks)**

Module-5

9 a. What is LINQ? With suitable example, explain ordering, grouping and aggregating data. **(10 Marks)**
   b. Explain overloading of increment and decrement operations in C#. **(06 Marks)**

OR

10 a. Demonstrate defining an enumerator by using an iterator. **(08 Marks)**
   b. Explain the concept of declaring an event, subscribing to an event, unsubscribing from an event and raising an event in C#. **(08 Marks)**

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