Lib

Elective
4th year. Dec -2023

**Hall Ticket Number:**

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**CCMR7 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

## HIGH PERFORMANCE AND GRID COMPUTING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

| | | | |
|---|---|---|---|
| (a) | Give one difference between cluster computing and grid computing. | | CO1 |
| (b) | Name few applications of high performance grids. | | CO1 |
| (c) | What is OGSA? | | CO1 |
| (d) | Define Peer to Peer computing. | | CO2 |
| (e) | Discuss the Infrastructure management. | | CO2 |
| (f) | What are GT4 containers? | | CO2 |
| (g) | Define cluster. | | CO3 |
| (h) | List the categories of clusters. | | CO3 |
| (i) | What is scheduling in cluster computing? | | CO3 |
| (j) | Define load balancing. | | CO4 |
| (k) | What is job management system? | | CO4 |
| (l) | List the policies of resource utilisation. | | CO4 |
| (m) | What is load sharing? | | CO4 |
| (n) | What are modelling parameters? | | CO4 |

UNIT – I

| | | | |
|---|---|---|---|
| 2. (a) | Write notes on internet computing and grid computing. | (7M) | CO1 |
| (b) | Explain in detail about high performance computing and peer to peer computing. | (7M) | CO1 |

(OR)

| | | | | |
|---|---|---|---|---|
| 3. | (a) | Explain about grid computing protocols. | (7M) | CO1 |
| | (b) | Briefly explain the types of grids. | (7M) | CO1 |

UNIT – II

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|---|---|---|---|---|
| 4. | (a) | Mention in short about stateful web services in OGSA. | (7M) | CO2 |
| | (b) | Briefly write about WSRF specification. | (7M) | CO2 |

(OR)

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|---|---|---|---|---|
| 5. | (a) | Discuss about globus toolkit in detail. | (7M) | CO2 |
| | (b) | Explain GT4 architecture. | (7M) | CO2 |

UNIT – III

| | | | | |
|---|---|---|---|---|
| 6. | (a) | Explain the levels and layers of single system image. | (7M) | CO3 |
| | (b) | What is cluster programming environment and also specify the tools? | (7M) | CO3 |

(OR)

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|---|---|---|---|---|
| 7. | (a) | Explain about the approaches to parallel computing. | (7M) | CO3 |
| | (b) | Explain the architecture of cluster. | (7M) | CO3 |

UNIT – IV

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|---|---|---|---|---|
| 8. | (a) | Discuss about resource management system. | (7M) | CO4 |
| | (b) | Illustrate in detail about strategies of load balancing. | (7M) | CO4 |

(OR)

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|---|---|---|---|---|
| 9. | (a) | Explain job management system in detail. | (7M) | CO4 |
| | (b) | Discuss the different scheduling policies. | (7M) | CO4 |

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**CDMR5 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

## BUSINESS ANALYTICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is the main purpose of business intelligence? CO1
   (b) What is structured data? CO1
   (c) Define the term 'Digital Data'. CO1
   (d) What is the difference between data, information and knowledge? CO1
   (e) List various sources of digital data. CO2
   (f) Define data warehouse. CO2
   (g) List the data warehouse characteristics. CO2
   (h) Differentiate OLAP, ROLAP and HOLAP. CO2
   (i) What is the use of Pie Chart? CO3
   (j) List any two data visualization tools. CO3
   (k) Define time series analysis. CO3
   (l) List the advantages of Web Analytics. CO4
   (m) Build one use case of business analytics in medical field. CO4
   (n) What is Marketing Analytics? CO4

UNIT – I

2. (a) Describe in detail the different components of business analytics with its conceptual diagram. (7M) CO1
   (b) What are the challenges associated with use of unstructured data in growing organizations. (7M) CO1

(OR)

3. (a) Discuss the need of business analytics in the present business scenario. (7M) CO1
   (b) Explain the business analytics life cycle with a neat sketch. (7M) CO1

UNIT – II

4. (a) What is the significance of OLAP in data warehouse? Describe OLAP operations with necessary diagram/example. (7M) CO2
   (b) Discuss Database System vs Data Warehouse. (7M) CO2

(OR)

5. (a) Discuss the difference between OLTP and OLAP with relevant examples. (7M) CO2
   (b) Describe the major components of the Data Warehousing Process. (7M) CO2

UNIT – III

6. (a) Demonstrate the usage of bar-chart, column chart and pi-chart in MS Excel with respect to business analytics. (7M) CO3
   (b) Explain the importance of Error metrics in details. (7M) CO3

(OR)

7. (a) Explain forecasting models for Stationary time series. (7M) CO3
   (b) Explain RMSE and MAPE in detail. (7M) CO3

UNIT – IV

8. (a) What is Social Media Analytics? Discuss with examples the increasing popularity of Social Media Analytics among consumer companies for influencing consumer decision making. (7M) CO4



   (b) Asses how business analytics is used in health care domain. Mention two real time use cases. (7M) CO4

(OR)

9. (a) Justify the phrase "Business analytics as solution for business challenges". (7M) CO4
   (b) Brief application areas of business analytics. Also mention the impact of business analytics on those areas. (7M) CO4

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**CMMR4 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

## SOFT COMPUTING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) How can soft computing be practically applied to address specific challenges in real-world scenarios? Provide examples of its applications. CO1
   (b) How can you address the ambiguity and vagueness of complex systems? CO1
   (c) Define terms "crossover" in the context of genetic algorithms. CO1
   (d) How is unsupervised learning different from supervised learning? CO2
   (e) Define sigmoid activation function. CO2
   (f) Draw a simple perceptron networks. CO2
   (g) Do you think probability and fuzzy logic are related to each other? Justify. CO3
   (h) Represent the complement of fuzzy set operations using venn diagram. CO3
   (i) What is the cartesian product of relations in crisp system? CO3
   (j) What is the primary objective of a genetic algorithm? CO4
   (k) How does the genetic algorithm incorporate random search for optimization? CO4
   (l) What is the concept of Stochastic Hill Climbing in optimization algorithms? CO4
   (m) How do genes contribute to the functionality of a genetic algorithm? CO4
   (n) What key aspects define the role of populations in a genetic algorithm? CO4

UNIT – I

2. (a) Explain multilayer feed-forward network with a neat sketch. (7M) CO1
   (b) Calculate the net input for the network having inputs [x1, X2] = [0.2, 0.6] and the weight [w1, w2] = [0.3, 0.7], the bias is included as b = 0.45. (7M) CO1

(OR)

3. (a) Design a Hebb net to implement NOR function using with bipolar inputs and targets. (7M) CO1
   (b) What is perceptron? What is its role in Artificial Neural Network? Explain. (7M) CO1

UNIT – II

4. (a) What is the fundamental purpose of the perceptron training algorithm in machine learning? Write the basic training algorithm. (7M) CO2
   (b) Draw a flow chart for backpropagation network (7M) CO2

(OR)

5. (a) List the key features that distinguish Kohonen Self-Organizing Networks from other types of neural networks. (7M) CO2
   (b) What is the primary objective of Adaptive Resonance Theory (ART) in Artificial Neural Networks? (7M) CO2

UNIT – III

6. (a) What is a crisp set and how does it differ from fuzzy sets in terms of handling uncertainty in data representation? Explain with suitable example. (7M) CO3
   (b) Explain different defuzzification methods. (7M) CO3



(OR)

7. Define fuzzy propositions. Explain different fuzzy propositions. CO3

UNIT – IV

8. Explain the basic operators in Genetic Algorithm. CO4

(OR)

9. (a) Distinguish between Generic Algorithms and Traditional Algorithms, outlining their respective characteristics, applications and fundamental differences. (7M) CO4
   (b) Write a short note on the evolution of genetic algorithms. (7M) CO4

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**CMMR4 (R20)**

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**COMR4 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

## SMART SENSOR TECHNOLOGIES

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define sensor. CO1
   (b) List the factors responsible in selection of a transducer. CO1
   (c) Relate sensitivity in a sensor. CO1
   (d) Outline the sensors which are used in industrial applications. CO1
   (e) What is optical sensor? CO2
   (f) Why are CCD images better than CMOS? CO2
   (g) Name the commonly used thermoelectric transducer. CO2
   (h) Explain sensor data acquisition. CO3
   (i) Interpret the sensor interfaces. CO3
   (j) Illustrate the impact of integrating sensory functions. CO3
   (k) Recall the relation between clk and sync pin while interfacing MCU with sensor. CO4
   (l) List the advantages and disadvantages of smart sensor. CO4
   (m) What components make up a sensor node in WSN? CO5
   (n) Outline the micro and nanoscale sensors used in aircraft. CO5

UNIT – I

2. (a) Explain briefly about the dynamic characteristics of sensors. (7M) CO1
   (b) What are the test inputs of the transducer? (7M) CO1

(OR)

| | | | | |
|---|---|---|---|---|
| 3. | (a) | Summarize the applications of emerging sensor technologies. | (7M) | CO1 |
| | (b) | Categorize the mechanical and thermal characterization of a sensor. | (7M) | CO1 |

UNIT – II

| | | | | |
|---|---|---|---|---|
| 4. | (a) | Explain in detail about motion sensor. | (7M) | CO2 |
| | (b) | Model the construction and working of LDR with neat sketch. | (7M) | CO2 |

(OR)

| | | | | |
|---|---|---|---|---|
| 5. | (a) | Define thermal sensor. Classify various temperature sensors. | (7M) | CO2 |
| | (b) | Inspect the details on photo resistive sensors. | (7M) | CO2 |

UNIT – III

| | | | | |
|---|---|---|---|---|
| 6. | (a) | Explain the working of signal conditioning and data processing unit in case of smart sensor. | (7M) | CO3 |
| | (b) | Develop the sensor fusion algorithms to interface MCU with sensor. | (7M) | CO3 |

(OR)

| | | | | |
|---|---|---|---|---|
| 7. | (a) | What is an MCU? How do microcontrollers unit's work? | (7M) | CO3 |
| | (b) | Summarize the techniques and system considerations in MCUs for sensor interface. | (7M) | CO3 |

UNIT – IV

| | | | | |
|---|---|---|---|---|
| 8. | (a) | Develop telemetry with smart sensors. | (7M) | CO4 |
| | (b) | Explain the classification of electromechanical system and any one applications of MEMS. | (7M) | CO4 |



(OR)

| | | | | |
|---|---|---|---|---|
| 9. | (a) | Rephrase the future sensors and semiconductor capabilities. | (7M) | CO5 |
| | (b) | Construct smart sensors in industrial applications and consumer applications. | (7M) | CO5 |

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**CSH42 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

**DEEP LEARNING**

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

| | | |
|---|---|---|
| (a) | What is a biological neuron? | CO1 |
| (b) | Name two activation functions | CO1 |
| (c) | What is a neural network? | CO1 |
| (d) | Explain supervised learning. | CO2 |
| (e) | What is perceptron? | CO2 |
| (f) | Define sparse autoencoders. | CO2 |
| (g) | Give one application of autoencoders. | CO3 |
| (h) | Define padding. | CO3 |
| (i) | What is a pooling layer? | CO3 |
| (j) | What is parameter sharing? | CO4 |
| (k) | Explain Backpropagation Through Time (BTT). | CO4 |
| (l) | Define Bidirectional RNN. | CO4 |
| (m) | What is selective read? | CO4 |
| (n) | Explain about gated recurrent unit. | CO4 |

UNIT – I

2. (a) What is Perceptron Network? Explain the Perceptron Learning Rule. (7M) CO1
   (b) Explain McCulloch-Pitts Neuron in detail. (7M) CO1

(OR)

3. Explain in detail about Multiple Adaptive Linear neurons. CO1

UNIT – II

4. (a) What is autoencoders? Write a short note on autoencoders. (7M) CO2
   (b) Explain Undercomplete Autoencoder. (7M) CO2

(OR)

5. Explain in detail about Contractive Autoencoders. CO2

UNIT – III

6. (a) Give the difference between ANN, CNN and RNN. (7M) CO3
   (b) What is weight sharing in CNN? (7M) CO3

(OR)

7. Explain in detail about the architecture and working of LeNET. CO3

UNIT – IV

8. (a) Write short notes on: (7M) CO4
      (i) Selective Forget
      (ii) Selective Write
      (iii) Selective Read
   (b) Give a note on the applications of RNN. (7M) CO4

(OR)

9. (a) Explain Bidirectional RNN. (7M) CO4
   (b) Explain about vanishing and exploding gradients. (7M) CO4

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(b) Define 0/1 knapsack problem. Given N = 3, W = 4, profit [] = {1, 2, 3}, weight [] = {4, 5, 1} find the optimal solution. (7M) CO4

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# B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

## INTRODUCTION TO ALGORITHMS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is priori analysis? CO1
   (b) Define collapsing rule. CO1
   (c) Is $2^{n+1} = O(2^n)$? Justify. CO1
   (d) Define Minimum Spanning Tree CO2
   (e) What is meant by articulation point? CO2
   (f) Define edge relation in a graph CO2
   (g) What is meant by feasible solutin? CO3
   (h) Give an application of task scheduling. CO3
   (i) What is the result of the recurrences which fall under first case of Master's theorem (let the recurrence be given by T(n) = aT(n/b) + f(n) and f(n) = nc? CO3
   (j) What is a non deterministic algorithm? CO4
   (k) Define polynomial equivalence of two problems. CO4
   (l) Define principle of optimality. CO4
   (m) Given S1 =' abcabcde' and S2 = "adefcde". Find length of the longest subsequence between s1 and s2. CO4
   (n) Give the recurrence relation for telescope scheduling. CO4

### UNIT – I

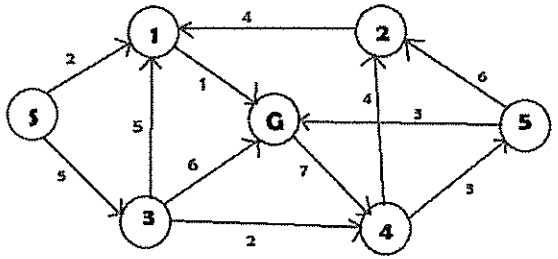
2. (a) Explain about asymptotic notation giving an example. (7M) CO1
   (b) Write an algorithm to sort a set of numbers using merge sort and analyse its complexity. (7M) CO1

(OR)

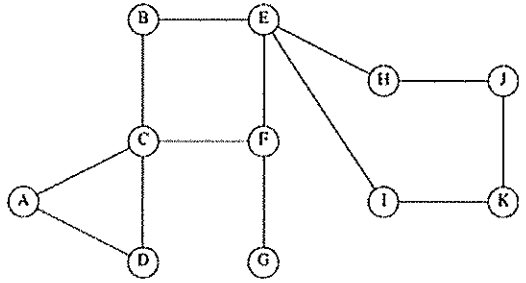
3. (a) Explain with example algorithm for union of sets using weighting rule. (7M) CO1
   (b) Write an algorithm to sort a set of numbers using quick sort and analyse its complexity. (7M) CO1

UNIT – II

4. (a) Identify the single source shortest path using Dijkstra's algorithm where the source vertex is S. (7M) CO2



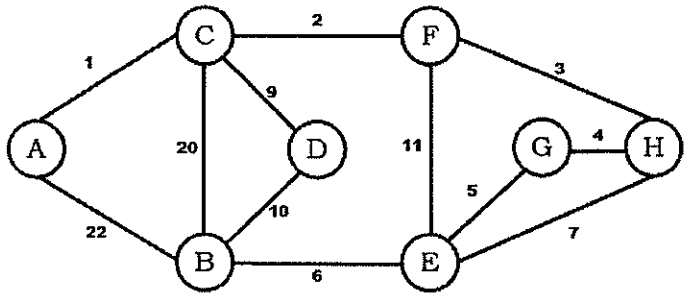

   (b) Identify the biconnected components for the following graph. Explain step by step process. (7M) CO2




(OR)

5. (a) Write an algorithm for all pairs shortest path. analyse its time and space complexity. (7M) CO2
   (b) Develop an algorithm for finding the minimum spanning tree using Kruskal's method. Trace the algorithm for the following graph. (7M) CO2






UNIT – III

6. (a) Write algorithm for Knapsack problem using Greedy method and analyse its time complexity. (7M) CO3
   (b) Solve T(n) = 2T(n / 2) + nlogn using master's theorem. (7M) CO3

(OR)

7. (a) If Huffman coding is used for data compression determine the Huffman code for the given data and draw the Huffman tree for the "ABRACABADRA". (7M) CO3
   (b) Explain Strassens matrix multiplication and analyze its time complexity. (7M) CO3

UNIT – IV

8. (a) Explain the relationship between P, NP, NP-Hard and NP Complete. (7M) CO4
   (b) What is Matrix Chain Multiplication? Given 4 matrices of dimensions 40 × 20, 20 × 30, 30 × 10, 10 × 30. Find the minimum number of multiplications needed. (7M) CO4

(OR)

9. (a) Prove that 3CNF-SAT is NP Complete. (7M) CO4

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**FSMR4 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

**MEAN STACK**

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What does MEAN stand for in MEAN stack architecture? CO1
   (b) Describe the purpose of web storage in browsers. CO1
   (c) What is the purpose of MongoDB? CO1
   (d) What is the function of Node.js? CO2
   (e) List few types of injection attacks. CO2
   (f) How does Node.js manage child threads? CO2
   (g) What is a collection in MongoDB? CO3
   (h) What is the purpose of the remove() method in MongoDB? CO3
   (i) What is NoSQL and when would you choose it over traditional databases? CO3
   (j) What do you understand by the term 'Version Control System'? CO4
   (k) What is a Git repository? CO4
   (l) What is $scope? CO4
   (m) List the directives in AngularJS. CO4
   (n) What is the use of factory method in AngularJS? CO4

UNIT – I

2. (a) What is Bootstrap, and what purpose does it serve in web development? (7M) CO1
   (b) Develop a simple webpage layout using Bootstrap's grid system and components. (7M) CO1

(OR)

3. (a) Design a simple MEAN stack application and describe the purpose of each component in your design. (7M) CO1
   (b) How do you differentiate between Canvas and SVG? (7M) CO1

UNIT – II

4. (a) How does Node.js handle asynchronous operations and why is it considered efficient for such tasks? (7M) CO2
   (b) List and explain the features of Node.js. (7M) CO2

(OR)

5. (a) What is Node.js and how does it differ from traditional server-side environments? (7M) CO2
   (b) How does dependency injection function in software development? (7M) CO2

UNIT – III

6. (a) How do you create a collection named 'employees'? (7M) CO3
   (b) How do you use Node.js to insert a record into MongoDB? Explain with code snippet. (7M) CO3

(OR)

7. (a) How does MongoDB handle user authentication for logins? (7M) CO3
   (b) How does Node.js handle data removal in MongoDB? Explain with code snippet. (7M) CO3

UNIT – IV

8. (a) How do you differentiate between Git and GitHub? (7M) CO4



   (b) How do you effectively work with a local Git repository? (7M) CO4

(OR)

9. (a) What are the key practices and considerations when working with a remote Git repository? (7M) CO4
   (b) What is the role of the DOM in web development and how does it enable interaction and manipulation within web pages? (7M) CO4

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**FSMR4 (R20)**

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**ITH44 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

# WEB SERVICES USING SPRING BOOT

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define POJO and brief its significance in the context of spring. CO1
   (b) How does dependency injection contribute to the modularity of spring applications? CO1
   (c) Describe the purpose of aspects in the spring framework. CO1
   (d) What are the environments and profiles in spring? CO2
   (e) How are join points selected using pointcuts in spring AOP? CO2
   (f) What is the purpose of runtime value injection in spring? CO2
   (g) What is the primary purpose of spring MVC in building web applications? CO3
   (h) What is the significance of configuring a data source when working with spring and JDBC? CO3
   (i) List two essential components that constitute a flow in spring web flow. CO3
   (j) Write short notes on Spring Boot CLI? CO4
   (k) Name one notable feature in Spring Boot. CO4
   (l) What is the role of auto-configuration in Spring Boot? CO4
   (m) Provide a concise definition of Spring Boot Internals. CO4
   (n) How does Spring Boot handle MVC auto-configuration? CO4

UNIT – I

2. (a) How does spring utilize POJO and what distinct advantages do they offer in comparison to other approaches for application development? (7M) CO1
   (b) Contrast the process of wiring beans using XML configuration in Spring with syntax. (7M) CO1

(OR)

3. (a) Explain spring templates, contrast types with code snippets. (7M) CO1
   (b) Explain importing configurations in Spring. (7M) CO1

UNIT – II

4. (a) Explain the concept of conditional beans in spring. (7M) CO2
   (b) Explain the principles of Aspect-oriented programming in spring. (7M) CO2

(OR)

5. (a) Compare creating annotated aspects with declaring aspects in XML in Aspect oriented spring. (7M) CO2
   (b) How does spring handle auto writing ambiguity? (7M) CO2

UNIT – III

6. (a) Explain the process of processing forms in a Spring web application. (7M) CO3
   (b) Explain the various mechanisms Spring MVC provides for accepting and handling request input in a web application. (7M) CO3

(OR)



7. (a) Explain how to write a simple controller in Spring MVC including key annotations and methods. (7M) CO3
   (b) Describe the steps involved in configuring Web Flow within the Spring framework and its relevance in web application development. (7M) CO3

UNIT – IV

8. (a) Compare and contrast the Spring Boot CLI with ApplicationRunner and CommandLineRunner discussing their respective uses and advantages. (7M) CO4
   (b) Provide a step-by-step guide on implementing a ToDo App with Spring Boot Web. (7M) CO4

(OR)

9. (a) Provide an overview of building web applications with Spring Boot, covering Spring MVC, MVC Auto-Configuration, and a practical example with a ToDo app. (7M) CO4
   (b) Explain the steps of creating a simple Spring Boot Application. (7M) CO4

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**ITH44 (R20)**

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**VLMR4 (R20)**

B.TECH. DEGREE EXAMINATION, DECEMBER-2023

Semester VII [Fourth Year] (Regular)

# LOW POWER VLSI DESIGN

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What are the Sources of Power Dissipation? CO1
   (b) What is Reverse diode leakage current? CO1
   (c) State the reason for getting the glitching power dissipation. CO1
   (d) What is bus encoding? CO2
   (e) What is operand isolation? CO2
   (f) List different logic styles for low power. CO2
   (g) What is PTL? CO2
   (h) What is sleep transistor? CO3
   (i) Define power gating. CO3
   (j) What is the need of scaling? CO3
   (k) What is loop fusion? CO4
   (l) What is DVFS? CO4
   (m) List different low power software approaches. CO4
   (n) What is loop peeling? CO4

## UNIT – I

2. (a) Explain Switching Power Dissipation with an example. (7M) CO1
   (b) What are the effects of reducing the power supply voltage VDD on switching power dissipation? (7M) CO1

(OR)

3. (a) Write short notes on Dynamic voltage and Frequency scaling. (7M) CO1
   (b) Explain any three Short-Channel effects. (7M) CO1

UNIT – II

4. (a) Explain the benefits of Hardware-Software Co-design. (7M) CO2
   (b) What is the use of FSM state encoding and partitioning. (7M) CO2

(OR)

5. (a) Explain the different techniques involved in Glitching power minimization. (7M) CO2
   (b) Distinguish between module level clock gating and register level clock gating. (7M) CO2

UNIT – III

6. Explain the following terms: CO3
   (i) Transistor stacking
   (ii) Isolation strategy.

(OR)

7. Explain VTCMOS approach and MTCMOS approach. CO3

UNIT – IV

8. Explain the low power software approaches. CO4

(OR)

9. Explain the basic adiabatic amplification and logic gates. CO4

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