SKR/KW/24/2178

Faculty of Science & Technology

Eighth Semester B.E. (Information Technology) (C.B.S.) Examination

DISTRIBUTED SYSTEMS

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question **1 OR** Question No. **2**.

(3) Solve Question **3 OR** Question No. **4**.

(4) Solve Question **5 OR** Question No. **6**.

(5) Solve Question **7 OR** Question No. **8**.

(6) Solve Question **9 OR** Question No. **10**.

(7) Solve Question **11 OR** Question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Draw and explain client-server model. 7

(b) Define issues in distributed system :

(i) Transparency

(ii) Scalability

(iii) Security

(iv) Resource Management. 6

OR

2. (a) What is meant by distribution transparency ? Explain different types of transparency with the help of example. 6

(b) Explain various computing models in distributed system. 7

3. (a) What is the role of dynamic binding in RPC ? 7

(b) What do you mean by communication ? Explain different types of communication in detail. 6

OR

4.	(a)	Differentiate between Local Procedure Call (LPC) and Remote Procedure Call.	7
	(b)	Why Stub and Skeleton are needed in remote procedure calls ? Elaborate it.	6
5.	(a)	With the help of diagrams explain the concept of threads in DS.	6
	(b)	Explain Election algorithm with respect to physical clock synchronization.	7
		OR	
6.	(a)	Explain different mutual exclusion algorithms with example.	6
	(b)	Explain Lamport's Logical clock algorithm.	7
7.	(a)	Define deadlock. Explain system model of distributed deadlock system in detail.	7
	(b)	What are Distributed System Models of Deadlock ? Elaborate it.	7
		OR	
8.	(a)	Describe various methods to handle the deadlock.	6
	(b)	Explain Chandy-Misra-Haas' edge chasing algorithm.	8
9.	(a)	Give different advantages of DSM system.	7
	(b)	Explain thrashing in detail with the help of example.	6
		OR	
10.	(a)	Discuss about various Consistency Models.	7
	(b)	Explain distributed shared memory architecture.	6
11.	(a)	Write short note on CORBA system.	7
	(b)	What do you mean by Voting protocols ? Explain its types.	7
		OR	
12.	(a)	Describe various file accessing models.	7
	(b)	What are different caching methods available ? Explain.	7

PRS/KS/24/2505

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

DISTRIBUTED SYSTEMS

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve question **1 OR** question No. **2**.

(3) Solve question **3 OR** question No. **4**.

(4) Solve question **5 OR** question No. **6**.

(5) Solve question **7 OR** question No. **8**.

(6) Solve question **9 OR** question No. **10**.

(7) Solve question **11 OR** question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Diagrams and chemical equations should be given wherever necessary.

(11) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Discuss various design issues of distributed operating systems. 6

   (b) Describe distributed computing models. 7

OR

2. (a) Discuss about Hardware and Software classification of distributed system. 7

   (b) Explain client server architecture model with proper block diagram. 6

3. (a) Explain various types of communication primitives in detail. 6

   (b) Explain the role of dynamic binding in Remote procedure cell. 7

OR

4. (a) Explain message format and different message buffering strategies in Message passing system. 6

   (b) What is meant by message communication ? Explain different types of communication in detail. 7

5. (a) Explain Lamport Algorithm for logical clock synchronization. Also explain the concept of vector logical clock. 7

   (b) Write a short note on mutual exclusion in distributed system. 6

OR

6.	(a)	Explain Bully and Ring Election Algorithms with proper example.	7
	(b)	Write notes on :	6
		(i) Mutual exclusion	
		(ii) Distributed transaction.	
7.	(a)	How to prevent deadlock in distributed system.	6
	(b)	Explain Edge chasing algorithm with example.	7
		OR	
8.	(a)	Explain the control organization of distributed deadlock detection.	7
	(b)	Explain path pushing algorithm in detail.	6
9.	(a)	Explain the architecture of distributed shared memory.	7
	(b)	Write short note on Granularity.	7
		OR	
10.	(a)	What are the consistency models in DSM and advantages ?	7
	(b)	Write notes on :	7
		(i) Granularity	
		(ii) Thrashing.	
11.	(a)	Write a detailed note on CORBA.	7
	(b)	Explain file caching methods in distributed system.	7
		OR	
12.	(a)	What are the desirable features of distributed filed system ?	7
	(b)	Discuss the various file accessing models.	7

SKR/KW/24/2186

Faculty of Science & Technology

Eighth Semester B.E. (Information Technology) (C.B.S.) Examination

E-COMMERCE AND ENTERPRISE RESOURCE PLANNING

Elective—IV

Time—Three Hours] [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Solve Question No. **11 OR** Question No. **12**.
(8) Assume suitable data wherever necessary.
(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Describe Generic Trade Cycle with the help of diagram. 7
   (b) Explain enterprise solution for large firms. 6

OR

2. (a) What is Web Hosting ? What are the advantages of a web hosting over self-hosting ? 7
   (b) Define E-Commerce and its trade cycle in detail. 6
3. (a) What is EDI ? Discuss various essential elements of EDI. 7
   (b) What are the advantages and disadvantages of electronic marked ? 6

OR

4. (a) Explain the concept of e-visibility and the e-shop. 6
   (b) Describe in detail the elements of e-commerce. 7
5. (a) What is electronic cash ? How does it work ? List the advantages and disadvantages of electronic cash. 6
   (b) Discuss different methods for online payments. 8

OR

6. (a) Describe International, legal, ethical and tax issues. 7
   (b) Write short note on planning the E-Commerce project with implementation. 7

7.	(a)	Describe the 2 tier and 3 tier architecture of ERP.	7
	(b)	Write in detail the risks of ERP.	6
		OR	
8.	(a)	Describe ERP architecture with the help of diagram.	7
	(b)	Write short note on OLAP and SCM.	6
9.	(a)	Expain ERP implementation life cycle.	6
	(b)	Describe the roles of contract with vendors, consultants and employees.	7
		OR	
10.	(a)	Explain success and failure factors of an ERP implementation.	7
	(b)	Explain ERP Internet and WWW.	6
11.	(a)	Describe business modules of an ERP package in detail	7
	(b)	Explain integration of SAP ERP.	7
		OR	
12.	Write short notes on :		
	(a)	ERP present and ERP future.	
	(b)	Business module of an ERP package.	
	(c)	Material and Quality Management.	14

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Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

E-COMMERCE AND ENTERPRISE RESOURCE PLANNING

Elective – IV

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question **1 OR** Question No. **2**.

(3) Solve Question **3 OR** Question No. **4**.

(4) Solve Question **5 OR** Question No. **6**.

(5) Solve Question **7 OR** Question No. **8**.

(6) Solve Question **9 OR** Question No. **10**.

(7) Solve Question **11 OR** Question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Define E-commerce. Write a note on three types of E-commerce trade cycles with example. 9

   (b) What developments contributes to the emergence of the internet as an electronic commerce infrastructure ? 5

OR

2. (a) Explain E-commerce software for small, midsize and large enterprise. 8

   (b) Elaborate the concept of 4P's in the context of Internet trade. 6

3. (a) What are the advantages and disadvantages of electronic market ? 7

   (b) Explain the benefits of electronic data interchange. 6

OR

4. (a) Write a short note on website evolution mode. 4

   (b) Explain how Inter-organization transactions are carried out using e-commerce. 4

   (c) Discuss how information technology and E-commerce related in growth of business. 5

5. (a) What is electronic cash ? How it works ? List its advantages and disadvantages. 8

   (b) What are the requirements of e-commerce payment system ? 5

OR

6.		Write short notes on :	13
	(i)	Smart cards	
	(ii)	Electronic wallets	
	(iii)	Credit and charge cards.	
7.	(a)	Describe the 2 tier and 3 tier architecture of ERP.	7
	(b)	What are the benefits of ERP ?	7
		OR	
8.		Write notes on any **two** :	14
	(i)	Data warehouse.	
	(ii)	Data mining.	
	(iii)	OLAP.	
9.	(a)	Write a note on project management and monitoring.	7
	(b)	Write a note on success and failure factors of an ERP implementation.	6
		OR	
10.	(a)	Discuss in detail the various phases of implementation of ERP lifecycle.	7
	(b)	Write short notes on any **two** :	6
	(i)	Hidden cost.	
	(ii)	Role of consultant.	
	(iii)	Vendors.	
11.	(a)	Explain the Investment management subsystem of finance module.	7
	(b)	Discuss the future of ERP and E-commerce.	6
		OR	
12.	(a)	Discuss the case study for architecture and integration of SAP ERP.	7
	(b)	Explain sales and distribution module of cm ERP package in detail.	6

SKR/KW/24/2180

Faculty of Science & Technology
Eighth Semester B.E. (Information Technology) (C.B.S.) Examination
EMBEDDED SYSTEM
Elective–III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question **1 OR** Question No. **2**.
(3) Solve Question **3 OR** Question No. **4**.
(4) Solve Question **5 OR** Question No. **6**.
(5) Solve Question **7 OR** Question No. **8**.
(6) Solve Question **9 OR** Question No. **10**.
(7) Solve Question **11 OR** Question No. **12**.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Differentiate between Embedded System and General Purpose System. 6
   (b) Explain the skill required for an Embedded System. 7

OR

2. (a) What is Embedded System and write the application of Embedded System in detail ? 7
   (b) Explain in brief :
      (i) Components of Embedded System 3
      (ii) Classification of Embedded System. 3
3. (a) Write short note on in-circuit emulators. 5
   (b) Describe the function of embedded software development tools with their applications. 8

OR

4. (a) Write short notes on any **three** :
      (i) Complex cross compiler 3
      (ii) Host machine 3
      (iii) Target machine 3
      (iv) Linker locator. 3

	(b)	What are the different design goals ? Explain the need of co-design.	4
5.	(a)	Explain how interrupts are handled in RTOS.	7
	(b)	What are the three stages of an RTOS task ? Explain in brief.	7
		OR	
6.	(a)	Explain cooperating scheduling model.	4
	(b)	Difference between multiprocessing and multitasking.	4
	(c)	Write short notes on (any **two**) :	6
		(i) Message queue	
		(ii) Mailboxes	
		(iii) Semaphore.	
7.	(a)	Explain in brief Network Embedded System.	7
	(b)	Discuss and explain various types of wireless devices.	7
		OR	
8.	(a)	Difference between :	6
		(i) UART and USART	
		(ii) Serial and parallel communication.	
	(b)	List applications of wireless devices.	8
9.	(a)	Explain preprocessor directives used in Assembly Language Programming.	6
	(b)	Write advantages and disadvantages of JAVA in Embedded Programming.	7
		OR	
10.	(a)	What are the advantages and disadvantages of Object Oriented Programming ?	7
	(b)	Explain Assembly Language Programming with advantages.	6
11.	(a)	Write in detail the addressing modes of 8051 microcontroller.	6
	(b)	Draw and explain architecture of 8051 microcontroller in detail.	7
		OR	
12.	(a)	Explain I/O parts of 8051.	7
	(b)	Explain interrupts in 8051.	6

PRS/KS/24/2507

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

EMBEDDED SYSTEM

Elective – III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve question **1 OR** question No. **2**.

(3) Solve question **3 OR** question No. **4**.

(4) Solve question **5 OR** question No. **6**.

(5) Solve question **7 OR** question No. **8**.

(6) Solve question **9 OR** question No. **10**.

(7) Solve question **11 OR** question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (A) Explain any six software tools for designing an embedded system. 6

   (B) Explain the embedded software development process. 7

OR

2. (A) What are the characteristics and advantages of embedded systems ? 7

   (B) Write the application of embedded system in detail. 6

3. (A) What are different design goals ? Explain the need of co-design. 7

   (B) Explain in-circuit formulator. 6

OR

4. (A) Explain in detail the importance of embedded software development process. 7

   (B) Write short notes on any **two** : 6

   (i) Compiler

   (ii) Cross compiler

   (iii) Host machine.

5. (A) Explain the interrupt routines handled in RTOS. 6

(B) Differentiate between : 8

(i) Process and Threads

(ii) Light weighted threads and Heavy weighted threads.

OR

6. Write short notes on any **three** : 14

(i) RTOS Task scheduling Models.

(ii) Semaphore.

(iii) Memory management.

(iv) ISR.

7. (A) Draw and explain CAN bus protocol. 7

(B) Differentiate between : 6

(i) UART and USART

(ii) Serial and parallel communication.

OR

8. Discuss and explain the various types and applications of wireless devices. 13

9. (A) Write advantages and disadvantages of C++ in embedded programming. 6

(B) Describe preprocessor directives used in Assembly language programming. 7

OR

10. (A) Write advantages and disadvantages of Java in embedded programming. 6

(B) Write short note on Embedded programming in Java. 7

11. (A) Explain the architecture of 8051 microcontroller in detail. 7

(B) Write in detail the addressing modes of 8051 microcontroller. 7

OR

12. Write short notes on any **two** : 14

(i) Wireless communication protocol.

(ii) I/O ports.

(iii) Routing interfaces with as.

SKR/KW/24/2179

Faculty of Science & Technology
Eight Semester B.E. (Information Technology) (C.B.S.) Examination
GAMING ARCHITECTURE & PROGRAMMING

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Solve Question No. **11 OR** Question No. **12**.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data whenever necessary.
(10) Illustrate your answers whenever necessary with the help of neat sketches.

1. (a) What is Gameplay ? Explain game design principles. 6
   (b) Describe development phase in gameplay. 7

OR

2. (a) What is Abstraction ? Explain different types of abstraction in game development. 6
   (b) Define Token. Explain the concept of token with example. 7
3. (a) What is the research goal and explain blue-sky research. 7
   (b) Explain different architectural styles in detail. 7

OR

4. (a) How 'Tier-based' method involves incremental development for game architecture ? 7
   (b) Write in brief "The State of the Art". 7
5. (a) Discuss the seven golden principles of effective game design. 7
   (b) Explain the three lead balloons. 7

OR

6.	(a)	Write a short note on game platform in detail.	7
	(b)	Write notes on :	
		(i) Direct X	
		(ii) Open GL	7
7.	(a)	Describe the game build process.	6
	(b)	What is source control ? Explain in brief the different functionalities provided by source control system.	7

OR

8.	(a)	Explain different user interface components in detail.	6
	(b)	Explain different game scripting language.	7
9.	(a)	Explain chroma keys.	6
	(b)	Describe various graphics file format.	7

OR

10.	(a)	What is the main game loop ? Explain different steps & methods involved in the main loop.	6
	(b)	Write a basic sprite class and explain the various properties in it.	7
11.	(a)	Define 3D middleware. Explain the popular 3D engine currently in use.	6
	(b)	Explain about art and audio file format. Also state different method of file compression in use.	7

OR

12.	(a)	What are the resource files ? Why are they used ?	6
	(b)	Write a short note on 3D graphics pipeline.	7

PRS/KS/24/2506

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

GAMING ARCHITECTURE AND PROGRAMMING

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve question **1 OR** question No. **2**.

(3) Solve question **3 OR** question No. **4**.

(4) Solve question **5 OR** question No. **6**.

(5) Solve question **7 OR** question No. **8**.

(6) Solve question **9 OR** question No. **10**.

(7) Solve question **11 OR** question No. **12**.

(8) Assume suitable data wherever necessary.

(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What are the various phases in a game play ? Analyze and explain the process, people involved and the outcome of each phase. 8

(b) What do you mean by game ? What are the game design principles ? Explain. 5

OR

2. (a) What do you mean by abstraction in game development ? Describe about hardware abstraction. 6

(b) What are tokens ? List tokens of a pong game and draw : 7

(i) Token Interaction matrix

(ii) Token class hierarchy.

3. (a) What do you understand by blue-sky research ? Why it is dangerou ? 6

(b) With suitable diagram, explain the most popular architectural styles in detail. 8

OR

4. (a) What are core groups in software factory methods ? State their interactions. 7

(b) What are design patterns ? Explain design patterns that are commonly used in game development. 7

5. (a) What are the various game platforms used in game design ? Compare between different platforms. 7

(b) What do you mean by mask ? Illustrate 2D display technologies with an example. 6

OR

6. (a) Explain seven golden principles of effective game design. 7

(b) What do you mean by debugging ? Analyze different types of bugs in game development. 6

7. (a) Describe the steps involved in game build process. 5

(b) Explain the different game scripting languages. 4

(c) Explain various user interface components in detail. 4

OR

8. (a) Describe recommended directory structure for starting a project explaining each component and its significance. 7

(b) Differentiate between stack memory and heap memory. 6

9. (a) Analyze and explain various graphics file formats. 6

(b) Write a short note on : 7

(i) Croma key

(ii) Nice-clean exit

(iii) Sprites.

OR

10. (a) Write about two methods of drawing text on screen and discuss their advantages and disadvantages. 8

(b) What is the main game loop ? Analyze and explain different methods involved in the main loop. 5

11. (a) Explain different Image and Audio file formats in detail. 7

(b) What do you mean by middleware ? Discuss the popular 3D engines currently in use. 7

OR

12. (a) Differentiate between Lossy and Lossless compression techniques. 5

(b) Explain 3D graphics pipeline in detail. Write all input and operations performed on it by graphics pipeline. 9

SKR/KW/24/2669/2675/2682/2688

Faculty of Science & Technology
Eighth Semester B.Tech. Computer Science & Engineering/CE/IT/CT Examination
GPU ARCHITECTURE AND PROGRAMMING
PROG ELE-VI

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data whenever necessary.
(9) Illustrate your answers whenever necessary with the help of neat sketches.

1. (a) Explain architecture of GPU in detail. 7
   (b) Elaborate the 5 stages of RISC pipeline. 7

OR

2. (a) Explain importance of GPU caches. 7
   (b) Discuss about SIMD in GPU. 7
3. (a) What kind of GPU do you need for streaming ? Illustrate with example. 7
   (b) What are the levels of cache in GPU ? Elaborate its each level with example. 7

OR

4. (a) What are the 4 stages of graphics pipeline ? Discuss with example. 7
   (b) How does CUDA work with GPU ? Elaborate. 7
5. (a) Compare the synchronization issue with parallel programming issues in CUDA ? 7
   (b) Discuss in detail about different types of memories provided by CUDA. 7

OR

6. (a) Analyze the information needed to support the hardware component in CUDA. 7
   (b) Explain in detail about thread usage and Resource contentions. 7

7. (a) What are "thread blocks", "warps" and "grids" ? How are they related ? 7

(b) Discuss in detail about synchronization issues in CUDA. 7

OR

8. (a) Describe in detail about :

(i) DRAM scheduling policies

(ii) Memory hierarchy. 8

(b) Explain Memory Allocation and Memory Copying across devices with suitable example. 6

9. (a) Develop and OpenCL architecture with programming model specifications. 7

(b) Discuss Host Function and Kernel Function. 7

OR

10. (a) Explain in detail about OpenCL device memory model. 7

(b) Differentiate between training and inference GPU. 7

PRS/KS/24/2946/2952/2958/2964

Faculty of Science and Technology

B.Tech. (Computer Science and Engineering/CE/IT/CT) Semester—VIII (C.B.C.S.) Examination

GPU ARCHITECTURE AND PROGRAMMING

PROG ELE – VI

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve question **1 OR** question No. **2**.
(3) Solve question **3 OR** question No. **4**.
(4) Solve question **5 OR** question No. **6**.
(5) Solve question **7 OR** question No. **8**.
(6) Solve question **9 OR** question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data wherever necessary.

1.	(a)	What is CPU and GPU ? Give the difference between CPU and GPU design in detail.	7
	(b)	Describe in brief about GPU architecture and its components in detail.	7
		OR	
2.	(a)	Discuss about the 5 stages of RISC Pipeline.	8
	(b)	Explain the concepts of parallelism in GPU.	6
3.	(a)	Discuss in detail about different types of memories provided by CUDA.	9
	(b)	Generalize the key abstraction of CUDA parallel programming.	5
		OR	
4.	(a)	Explain the steps in building CUDA hardware component.	8
	(b)	Discuss in detail about different types of memories provided by CUDA.	6
5.	(a)	Demonstrate in detail about CUDA programming model.	7
	(b)	Design and discuss about scheduling policies in CUDA.	7
		OR	
6.	(a)	Describe the different libraries provided by CUDA.	6
	(b)	What is Memory ? What are the features of memory object buffer ?	8
7.	(a)	Explain DRAM Scheduling policies in detail.	8
	(b)	Explain Kernel fusion in detail.	6
		OR	
8.	(a)	What are the techniques for creating kernel from source code.	8
	(b)	Explain the main steps to execute a simple OpenCL application.	6
9.	(a)	Discuss in detail about OpenCL standard history.	8
	(b)	Explain in detail about OpenCL device memory model.	6
		OR	
10.	(a)	What is Kernel ? Describe in detail about the features of Kernel programming model.	8
	(b)	Describe in detail about OpenCL components.	6

SKR/KW/24/2183

Faculty of Science & Technology
Eighth Semester B.E. (Information Technology) (C.B.S.) Examination
MACHINE LEARNING
Elective–III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question **1 OR** Question No. **2**.
(3) Solve Question **3 OR** Question No. **4**.
(4) Solve Question **5 OR** Question No. **6**.
(5) Solve Question **7 OR** Question No. **8**.
(6) Solve Question **9 OR** Question No. **10**.
(7) Solve Question **11 OR** Question No. **12**.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Explain variance reduction averaging technique. 7
   (b) Explain the process of designing a learning system. 6

OR

2. (a) Explain Bayesian linear regression in detail. 7
   (b) What is machine learning ? Enumerate and describe various applications of it. 6
3. (a) Describe perception learning algorithm with suitable example. 7
   (b) Explain back propagation learning with example. 7

OR

4. (a) Explain two layer linear approximation. 7
   (b) Explain non-linear hypothesis with perception. 7
5. (a) What is factor analysis ? Explain in detail. 6
   (b) Explain dual mode representation in Kernel based learning. 7

OR

6. (a) Explain Bayesian Neural Network along with its application. 7

(b) How dimensionality–reduction is significance in machine learning ? Explain the advantages of it. 6

7. (a) Explain how approximation and estimation errors are related to each other. 7

(b) Explain the limitations of inference machines. Explain. 7

OR

8. (a) Explain K-nearest neighbour algorithm with example. 7

(b) Write short notes on : 7

(i) Target class

(ii) Inductive bias

(iii) Feed forward network.

9. (a) Explain the following terms (any **two**) : 6

(i) Gaussian Kernel

(ii) Linear Kernel

(iii) Polynomial Kernel.

(b) Explain structural risk minimization in detail. 7

OR

10. (a) Explain Hybrid Monte Carlo algorithm in detail. 7

(b) Differentiate between Boosting, Bootstrapping and bagging. 6

11. (a) Explain various exploration strategies in detail. 7

(b) Write short notes on (any **two**) : 6

(i) Temporal difference learning

(ii) Semi-supervised learning

(iii) Accuracy and Confidence boosting.

OR

12. (a) Explain fundamental algorithm for hypothesis class and target class. 7

(b) Explain reinforcement learning with suitable example. 6

PRS/KS/24/2510

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

MACHINE LEARNING

Elective – III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question **1 OR** Question No. **2**.
(3) Solve Question **3 OR** Question No. **4**.
(4) Solve Question **5 OR** Question No. **6**.
(5) Solve Question **7 OR** Question No. **8**.
(6) Solve Question **9 OR** Question No. **10**.
(7) Solve Question **11 OR** Question No. **12**.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What is machine learning ? Describe various applications of it. 7
   (b) Explain different types of machine learning with suitable example. 7

OR

2. (a) Define the terms : 9
   (i) Bias
   (ii) Variance decomposition
   (iii) Linear basic function.
   (b) Explain Bayesian linear regression in detail. 5
3. (a) Describe perception learning algorithm with suitable example. 7
   (b) Explain linear discriminant for 2-classes. 6

OR

4. (a) Differentiate between supervised and unsupervised learning techniques. 7
   (b) Explain back propagation learning with example. 6
5. (a) What is Neural Network ? Explain Feed forward Neural Network. 7
   (b) Explain K-means algorithm along with its applications. 6

OR

6. (a) Write a short note on :
   (i) Regularization
   (ii) Boosting 6
   (b) State and explain EM algorithm. 7

7.	(a)	Explain k-nearest neighbor algorithm with example.	7
	(b)	Write a note on VC-dimension in detail.	6
		OR	
8.	(a)	Define and explain the following terms :	8
		(i) Hypothesis class.	
		(ii) Target class.	
	(b)	What are the limitations of machine learning ?	5
9.	(a)	What is maximum margin classifier ? Explain it.	4
	(b)	Write a note on :	9
		(i) Boot strapping	
		(ii) Bagging	
		(iii) Boosting.	
		OR	
10.	(a)	Write and explain structural risk minimization.	7
	(b)	Explain the importance and applications of support vector machine.	6
11.	(a)	Explain Monte-Carlo algorithm in detail.	7
	(b)	Explain Reinforcement learning and value iteration.	7
		OR	
12.	(a)	What is model based learning ? Explain its importance.	9
	(b)	Describe the process of Occam's learning in detail.	5

SKR/KW/24/2182

Faculty of Science & Technology
Eighth Semester B.E. (Information Technology) (C.B.S.) Examination
PATTERN RECOGNITION
Elective–III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question **1 OR** Question No. **2**.
(3) Solve Question **3 OR** Question No. **4**.
(4) Solve Question **5 OR** Question No. **6**.
(5) Solve Question **7 OR** Question No. **8**.
(6) Solve Question **9 OR** Question No. **10**.
(7) Solve Question **11 OR** Question No. **12**.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What is Pattern Recognition ? Explain it's application with example. 7
   (b) Explain the following terms with suitable example : 6
      (i) Random variable
      (ii) Venn Diagram.

OR

2. (a) Explain histogram. Illustrate the use of histogram in statistical decision theory. 7
   (b) Explain following types of event with example : 6
      (i) Independence event
      (ii) Mutually exclusive event.
3. (a) Describe the steps for calculation of moments of random variable. 7
   (b) Explain following normal density functions : 6
      (i) Standard normal density
      (ii) Univariate normal density.

OR

4. (a) Explain three methods of estimation of parameters from samples. 7

(b) Prove that E (ax + by) = a E (x) + b E (y). Assume that x & y are discrete random variables. 6

5. (a) Explain K-Nearest Neighbour Technique. 7

(b) Differentiate between Parametric and Non-Parametric decision technique. 7

OR

6. (a) Explain the following with suitable example : 8

(i) Euclidean distance

(ii) City block distance

(iii) Maximum distance.

(b) Explain adaptive decision boundary algorithm in detail. 6

7. (a) Write short notes on : 8

(i) Linear Embedding

(ii) Fisher Linear Discriminant.

(b) Explain principle component analysis. 6

OR

8. (a) Explain dimension reduction technique with example. 7

(b) Explain component analysis with suitable example. 7

9. (a) Explain singular value decomposition. 6

(b) Explain discrete Fourier transform along with its application. 7

OR

10. (a) Explain independent component analysis. 6

(b) Explain the Hear transform. 7

11. Explain following algorithms with suitable example : 13

(i) The single linkage algorithm

(ii) The complete linkage algorithm

(iii) The average linkage algorithm.

OR

12. Explain following algorithms with suitable example : 13

(i) Forgy's algorithm

(ii) K-Means algorithm.

PRS/KS/24/2509

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

PATTERN RECOGNITION

Elective – III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve question **1 OR** question No. **2**.
(3) Solve question **3 OR** question No. **4**.
(4) Solve question **5 OR** question No. **6**.
(5) Solve question **7 OR** question No. **8**.
(6) Solve question **9 OR** question No. **10**.
(7) Solve question **11 OR** question No. **12**.
(8) Assume suitable data wherever necessary.
(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Illustrate the overview of pattern recognition system. 7
   (b) Explain supervised and unsupervised learning with example. 6

OR

2. (a) Discuss various applications of pattern recognition. 7
   (b) Differentiate supervised learning and un-supervised learning. 6
3. (a) What are the challenges in Bayesian decision theory ? 7
   (b) Define the term loss, risk and decision rule. 6

OR

4. (a) Explain any three distance measures with example :
   (i) Euclidean distance
   (ii) Edit distance
   (iii) Hausdorff distance
   (iv) Manhattan distance
   (v) Mutual Neighborhood Distance (MND). 6
   (b) Write and explain minimum distance classifier with example. 7
5. (a) Explain C means algorithm in detail. 7
   (b) In detail explain about graph theoretic approach to pattern clustering. 7

OR

6. (a) State and explain various clustering Techniques. 7
   (b) Discuss Hypothesis testing in cluster validity. 7

7. (a) Explain various features of stochastic grammar. 7
   (b) Discuss structural pattern recognition in detail. 7

OR

8. (a) Write short note on KL-transform. 7
   (b) Describe various elements of formal grammar. 7
9. (a) Specify the two assumptions used in the design of Hidden Markov model. Write the parameters of Hidden Markov model. 6
   (b) Explain linear support vector machine. 7

OR

10. Write short note on : 13
   (i) Hidden Markov Model.
   (ii) Role of feature selection in SVM.
11. (a) Explain fuzzy pattern classifier. 6
   (b) Discuss fuzzy logic vs crisp logic. 7

OR

12. (a) Illustrate pattern classification with genetic algorithm. 7
   (b) Write the applications of genetic algorithms and explain the limitations of genetic algorithms. 6

SKR/KW/24/2670/2676/2683/2689

Faculty of Science & Technology
Eighth Semester B.Tech. Computer Science and Engineering/CE/IT/CT Examination
PREDICTIVE ANALYTICS-REGRESSION AND CLASSIFICATION
PROG ELE-VII

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data whenever necessary.
(9) Diagrams and chemical equation should be given whenever necessary.
(10) Illustrate your answers whenever necessary with the help of neat sketches.

1. (a) What are the different types of predictive models commonly used in various fields ? 7

(b) What are some real-world examples of how predictive models are being used in different industries ? 7

OR

2. (a) What is the basic principle behind the least squares method in the context of predictive analytics ? 7

(b) What are the key advantages and disadvantages of using least squares methods for predicitive modelling ? 7

3. (a) What are normal equations, and how do they relate to least squares methods in predictive analytics ? 7

(b) Are there any limitations or disadvantages to using normal equations compared to other methods like gradient descent ? 7

OR

4. (a) What are the key assumptions required for the Gauss-Markov theorem to hold ? What are the limitations of the Gauss-Markov theorem ? 7

   (b) In what situations is LASSO regression particularly well-suited ? Consider specific data characteristics or modelling goals. 7

5. (a) How can feature engineering be used to improve the "geometry" of a regression model, making it easier to learn and interpret ? 7

   (b) What are some real-world examples where the "geometry" and feature engineering play crucial roles in achieving successful regression analysis ? 7

OR

6. (a) What is statistical inference, and how does it apply to regression coefficients ? 7

   (b) What are the challenges associated with checking model assumptions, especially in the context of complex models or large datasets ? 7

7. (a) What are the limitations of using R-squared as the sole criterion for comparing models ? 7

   (b) How can you interpret the coefficients in a logistic regression model ? 7

OR

8. (a) What is Root Mean Squared Error (RMSE) and how does it measure the performance of a predictive model ? 7

   (b) What are Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) and how are they used in predictive analytics ? 7

9. (a) What is model complexity, and how does it relate to the bias and variance of a predictive model ? 7

   (b) Provide example of real-world scenarios where understanding the bias-variances trade off was crucial for achieving success in machine learning projects. 7

OR

10. (a) What is multicollinearity, and how does it affect the interpretation of regression coefficients in a model ? 7

    (b) How can bootstrap regression be implemented in Python using libraries ? 7

PRS/KS/24/2947/2953/2959/2965

Faculty of Science and Technology

B.Tech. (Computer Science and Engineering/CE/IT/CT) Semester—VIII (C.B.C.S.) Examination

PREDICTIVE ANALYTICS – REGRESSION AND CLASSIFICATION

PROG. ELE. – VII

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve question **1 OR** question No. **2**.

(3) Solve question **3 OR** question No. **4**.

(4) Solve question **5 OR** question No. **6**.

(5) Solve question **7 OR** question No. **8**.

(6) Solve question **9 OR** question No. **10**.

(7) Due credit will be given to neatness and adequate dimensions.

(8) Illustrate your answers wherever necessary with the help of neat sketches.

(9) Assume suitable data wherever necessary.

1. (a) What do you mean by supervised learning ? Explain in short the types of supervised learning. 7

(b) Define linear regression. How do we fit linear regression model ? 7

OR

2. (a) State and prove Gauss Markov theorem. 7

(b) Compare homoskedasticity and heteroskedasticity. 7

3. (a) Discuss AIC and BIC with example. 7

(b) Explain the process of best subset selection in detail. 7

OR

4. (a) What is multicollinearity ? Why multicollinearity is a problem ? Discuss steps to identify multicollinearity. 7

(b) Explain the forward stepwise and backward stepwise selection process in short. 7

5. (a) Explain Class of III posed problem in detail. 7

(b) Differentiate between LASSO and Ridge regression technique. 7

OR

6.	(a)	Describe in brief Capital Asset Pricing model.	7
	(b)	Explain the risk premium associated with equity.	7
7.	(a)	Discuss the bootstrap statistics with example.	7
	(b)	Explain the bootstrap framework and bootstrap regression model.	7
		OR	
8.	(a)	Explain long term forecasting in reference to trend in detail.	7
	(b)	Discuss autoregressive model in detail.	7
9.	(a)	Write a short note on regression model for Granger Causality.	7
	(b)	Explain logistic regression with logit-link and probit-link.	7
		OR	
10.	(a)	What is discriminant analysis ? discuss types of discriminant analysis. Explain any one in detail.	7
	(b)	Explain generalized linear model for regression and classification.	7

SKR/KW/24/2668/2674/2681/2687

Faculty of Science & Technology
Eighth Semester B.Tech. Computer Science & Engineering Examination/CE/IT/CT
REINFORCEMENT LEARNING
PROG ELE-VI

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data whenever necessary.
(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What is reinforcement learning, and how does it differ from other machine learning approaches ? 7
   (b) Give examples of real-world applications where reinforcement learning is used. 7

OR

2. (a) Explain bandit algorithm and its role in decision-making. 7
   (b) Describe UCB algorithm to decide which arm to pull in a multi-armed bandit scenario. 7
3. (a) How does Median Elimination algorithm work in bandit problems, and why is it useful ? 7
   (b) What is a policy gradient in bandit algorithms, and how does it help the agent learn to make better decisions over time ? 7

OR

4. (a) Explain full RL algorithm in detail. 7
   (b) What are Markov Decision Processes (MDPs), and how do they structure decision-making problems in reinforcement learning ? 7
5. (a) Describe Bellman optimality in reinforcement learning. 7
   (b) Why is Bellman optimality important for agents to learn and improve their decision-making abilities ? 7

OR

6. (a) What is dynamic programming ? How does it help agents to solve problems in reinforcement learning ? 7

(b) How do TD (Temporal Difference) methods assist agents in learning from experiences ? 7

7. (a) Give a brief overview of eligibility traces. 7

(b) What is the use of Function Approximation ? Explain its two types. 7

OR

8. (a) Discuss the Least Squares Methods used in reinforcement learning. 5

(b) Write short notes on :

(i) Fitted Q

(ii) DQN

(iii) Policy Gradient. 9

9. (a) What are the advantages of Hierarchical Reinforcement Learning ? 7

(b) Describe the key components of Hierarchical Reinforcement Learning. 7

OR

10. (a) Explain POMDP. 5

(b) What are the key components of a POMDP ? 9

PRS/KS/24/2945/2951/2957/2963

Faculty of Science and Technology

B.Tech. (Computer Science and Engineering/CE/IT/CT) Semester—VIII (C.B.C.S.) Examination

REINFORCEMENT LEARNING

PROG. ELE. – VI

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve question **1 OR** question No. **2**.
(3) Solve question **3 OR** question No. **4**.
(4) Solve question **5 OR** question No. **6**.
(5) Solve question **7 OR** question No. **8**.
(6) Solve question **9 OR** question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data wherever necessary.
(9) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Define the Reinforcement Learning (RL) and describe its key elements. 7
   (b) Analyze the different approaches employed in Reinforcement Learning (RL). 7

OR

2. (a) Evaluate the concept of Multi-Armed bandit and explain its key components in detail. 7
   (b) Compare the exploration and exploitation in decision-making processes. 7
3. (a) Analyze the concept of Markov Decision Processes (MDPs) in reinforcement learning. 7
   (b) Describe how Bellman Equations formalize the principles of optimality. 7

OR

4. (a) Analyze the concepts of On-Policy First-Visit and Every-Visit Monte Carlo (MC) Control in. 7
   (b) Explain the Cauchy sequence and Green's equation. 7
5. (a) Describe how Dynamic Programming methods compute optimal value functions. 7
   (b) Explain Policy Iteration and Value Iteration Algorithms. 7

OR

6. (a) Illustrate the effectiveness of Temporal Difference (TD) Learning in Reinforcement Learning. 7
   (b) Explain different types of TD control methods, such as SARSA and Q-learning to improve decision-making policies. 7

7. (a) Describe how Eligibility Tracesare used to improve the efficiency and generality of learning algorithm. 7

(b) Analyze the concept of Policy Gradients in reinforcement learning. 7

OR

8. (a) What are some common algorithms and techniques used in full Reinforcement Learning ? 7

(b) How does the Least Squares Method contribute to solving reinforcement learning problems ? 7

9. (a) Explain application of POMDPS. 7

(b) What are the core principles and components of the Deep Q-Network (DQN) algorithm in reinforcement learning ? 7

OR

10. (a) Explain REINFORCE algorithm and challenges in implementing the REINFORCE algorithm. 7

(b) What are the main components and principles underlying the architecture of Hierarchical Reinforcement Learning (HRL) ? 7

SKR/KW/24/2187

Faculty of Engineering & Technology

Eighth Semester B.E. (Information Technology) (C.B.S.) Examination

WIRELESS SENSOR NETWORKS

(Elective–IV)

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. 1 **OR** Question No. 2.
(3) Solve Question No. 3 **OR** Question No. 4.
(4) Solve Question No. 5 **OR** Question No. 6.
(5) Solve Question No. 7 **OR** Question No. 8.
(6) Solve Question No. 9 **OR** Question No. 10.
(7) Solve Question No. 11 **OR** Question No. 12.
(8) Due credit will be given to neatness and adequate dimensions.
(9) Assume suitable data wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Explain the various WSN standards. 7
   (b) Explain quality of service challenges in WSN. 7

OR

2. (a) What are the various design issues associated with WSN ? 7
   (b) Which network protocol are used by the WSN devices ? Explain. 7
3. (a) Explain classification of WSN with suitable example. 7
   (b) Draw and explain the structure of protocol stack for WSN. 6

OR

4. (a) Differentiate between WLAN, OSI and WSN. 6
   (b) With required diagram explain key issues in sensor node structure. 7
5. (a) What is Traffic adaptive medium access ? Explain in brief. 7
   (b) Explain MAC layer related sensor network properties. 6

OR

PRS/KS/24/2514

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

WIRELESS SENSOR NETWORKS

Elective – IV

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve question **1 OR** question No. **2**.

(3) Solve question **3 OR** question No. **4**.

(4) Solve question **5 OR** question No. **6**.

(5) Solve question **7 OR** question No. **8**.

(6) Solve question **9 OR** question No. **10**.

(7) Solve question **11 OR** question No. **12**.

(8) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Discuss various sensor network architectural elements in detail. 6

(b) Write a short note on WSN standards (any **one**). 8

(i) IEEE 802.15.4

(ii) Zig-bee

OR

2. (a) What are different Network characteristics ? Also state network application. 7

(b) What are design issues associated with WSN ? 7

3. (a) Explain with relevant sketch function of a sensor node. 8

(b) With required diagram explain the single node hardware and software architecture of WSN. 5

OR

4. (a) Explain classification of WSN with suitable example. 7

(b) Differentiate between WLAN, OSI and WSN. 6

5. (a) Explain MAC layer related sensor network properties. 6

(b) Explain S-MAC, DS-MAC and MS-MAC. 7

OR

6. (a) Explain the Traffic adaptive medium Access. 6

(b) State and explain about self organizing mac. 7

6. (a) Explain the following contention based protocols :
   (i) CSMA
   (ii) ALOHA. 6
   (b) Elaborate on requirements and design constraints for wireless MAC protocol. 7
7. (a) What do you mean by flooding ? Suggest some method to replace flooding. 7
   (b) What are the routing challenges and design issues in WSN ? 7

OR

8. (a) Discuss the problem in data dissemination and gathering in WSN. 7
   (b) Explain in detail about geographical routing. 7
9. (a) Explain why TCP does not work well in WSN. 7
   (b) Explain the traditional transport protocol in detail. 6

OR

10. (a) What do you mean by Authenticity ? Explain message authentication code and signature. 7
   (b) Give the design of transport protocol. 6
11. (a) Discuss design issues involved in network management. 6
   (b) Write short notes on :
   (i) Mate OS
   (ii) Magnet OS. 7

OR

12. (a) Explain WSN management models. 7
   (b) State main features of Tiny OS. 6

7.	(a)	Explain in detail geographical routing.	7
	(b)	Explain about the various higher level design issues.	7
		OR	
8.	(a)	What are different routing strategies in WSN ? Explain each in brief.	8
	(b)	What is flooding and its variants ? Explain effect of flooding in network performance.	6
9.	(a)	Explain why TCP does not work well in WSN.	5
	(b)	What do you mean by Authenticity ? Explain message authentication code and signature.	8
		OR	
10.	Explain about any **two** :		13
	(i)	Signature	
	(ii)	Transport protocol design	
	(iii)	Traditional transport protocol.	
11.	(a)	What are the key design issues of OS for WSN ?	8
	(b)	Explain mate OS and magnet OS.	5
		OR	
12.	(a)	Discuss WSN management models.	7
	(b)	What are WSN management design issues ?	6