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BCS701

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Internet of Things

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the characteristics and applications of IoT.	10	L2	CO1
	b.	List and explain the various IoT enabling technologies.	10	L2	CO1
OR					
Q.2	a.	What is IoT? Explain the generic block diagram of an IoT device.	10	L2	CO1
	b.	Describe the components of an IoT system and explain the IoT level-1 system with a diagram.	10	L2	CO1
Module – 2					
Q.3	a.	Describe the M2M system architecture and M2M gateway with block diagrams.	10	L2	CO2
	b.	Explain the need for IoT system management.	10	L2	CO2
OR					
Q.4	a.	Discuss the differences between M2M and IoT systems.	10	L3	CO2
	b.	Describe the IoT system management with NETCONF-YANG with a diagram.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the steps involved in IoT system design methodology with a diagram.	10	L2	CO3
	b.	Explain the following python data types with examples: i) Numbers ii) Strings iii) Lists iv) Tuples v) Dictionaries	10	L2	CO3
OR					
Q.6	a.	Explain the IoT system for weather monitoring.	10	L2	CO3
	b.	With a program, describe the File Handling functionality of python to read and write using file object.	10	L2	CO3

Module – 4

Q.7	a.	Explain the various components and peripherals of the Raspberry Pi board.	10	L2	CO4
	b.	Write a python program for switching LED based on reading LDR (Light Sensor) reading.	10	L3	CO4

OR

Q.8	a.	Describe the Home Intrusion Detection system using IoT.	10	L3	CO4
	b.	Explain the smart parking IoT system.	10	L3	CO4

Module – 5

Q.9	a.	Explain the components of Hadoop cluster and Hadoop MapReduce Job Execution.	10	L2	CO5
	b.	Write a short note on Apache Storm Framework.	10	L2	CO5

OR

Q.10	a.	Describe how Hadoop MapReduce for Batch Data Analysis with a diagram.	10	L2	CO5
	b.	Explain the key components of Hadoop YARN and its job execution framework.	10	L2	CO5

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BCS702

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Parallel Computing

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain in detail the classification of parallel computers according to Flynn's taxonomy. Compare SIMD and MIMD systems.	10	L1	CO1
	b.	Discuss shared memory and distributed memory architectures. Explain their working principle advantages and disadvantages.	10	L2	CO1
OR					
Q.2	a.	What is cache coherence? Explain snooping and directory based coherence mechanisms with suitable example.	10	L3	CO1
	b.	Explain non-determinism and race conditions in shared memory programs. How can they be avoided?	10	L3	CO1
Module – 2					
Q.3	a.	Explain GPU programming in detail.	10	L2	CO2
	b.	Describe input and output handling in MIMD and GPU systems.	10	L2	CO2
OR					
Q.4	a.	Explain Amdahl's law with example and discuss its significance.	10	L3	CO2
	b.	Write a short note on timing and performance measurement of parallel programs.	10	L3	CO2
Module – 3					
Q.5	a.	Define and explain the following MPI functions with syntax and purpose : i) MPI_Init() ii) MPI_Finalize() iii) MPI_Comm_Size() iv) MPI_Comm_rank()	10	L3	CO3
	b.	Explain the concept of point to point communication in MPI with suitable example.	10	L2	CO3
OR					
Q.6	a.	Explain the working of trapezoidal rule program in MPI.	10	L3	CO3
	b.	Compare the traditional global sum using process 0 as collector with tree structured global sum.	10	L3	CO3

Module – 4					
Q.7	a.	Explain the structure and working of an OpenMP “Hello world” program.	6	L2	CO4
	b.	Explain the purpose of the reduction clause in OpenMP with example.	6	L2	CO4
	c.	Write a OpenMP program to calculate n-Fibonacci using tasks.	8	L2	CO4
OR					
Q.8	a.	Define OpenMP. Explain the key features of OpenMP and its advantages over Pthreads.	6	L1	CO4
	b.	Explain the concept of variable scope in OpenMP with suitable example.	6	L2	CO4
	c.	Estimate the value of π .	8	L3	CO4
Module – 5					
Q.9	a.	Define GPU and GPGPU. Explain the need for GPGPU.	6	L1	CO5
	b.	Explain thread, block and grid in CUDA.	6	L2	CO5
	c.	Explain CUDA vector addition program with suitable example.	8	L3	CO5
OR					
Q.10	a.	Compare CUDA and OpenCL.	6	L1	CO5
	b.	Explain Kernel with shared memory.	6	L2	CO5
	c.	Explain Heterogeneous computing in detail.	8	L3	CO5

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BCS703

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Cryptography and Network Security

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Obtain Ciphertext for the given plaintext “HILLCIPHER” by applying the Hill Cipher technique using key $K = \begin{bmatrix} 03 & 02 \\ 08 & 05 \end{bmatrix}$	7	L3	CO1
	b.	Write a short note on Steganography and its advantages and disadvantages.	6	L2	CO1
	c.	With a neat diagram, explain the model for network security.	7	L2	CO1
OR					
Q.2	a.	State the rules used for encryption in PLAYFAIR cipher and encrypt the message “COMPUTER” using the keyword “ENGINEERING” using PLAYFAIR cipher.	7	L3	CO1
	b.	Describe simple XOR and one – time pad encryption techniques with an example and their difficulties.	7	L2	CO1
	c.	With a block diagram, explain the various steps involved in encryption and key generation of the DES algorithm.	6	L2	CO1
Module – 2					
Q.3	a.	Demonstrate the Diffie – Hellman key exchange algorithm.	8	L2	CO2
	b.	Perform encryption and decryption using the RSA algorithm given public key is 6 for two prime numbers 17 and 31 with message 3.	7	L3	CO2
	c.	Describe the fundamental requirements that a public key cryptosystem must meet to ensure security.	5	L2	CO2
OR					
Q.4	a.	Explain briefly the elliptic curve cryptography and mention two applications.	8	L2	CO2
	b.	Let $q = 719$ and $g = 5$, $X_a = 157$, $X_b = 293$. Use the Diffie Hellman Key exchange algorithm to find Y_a , Y_b and Secret key K .	7	L3	CO2
	c.	Briefly explain the security aspects of the RSA algorithm.	5	L2	CO2

Module – 3					
Q.5	a.	Explain the symmetric key distribution using Asymmetric Encryption.	7	L2	CO3
	b.	Explain the role of cryptographic hash functions in message authentication with a neat diagram.	8	L2	CO3
	c.	Discuss the general elements of an X.509 certificate.	5	L2	CO3
OR					
Q.6	a.	What is Key Management? Explain with a neat diagram, how key usage can be controlled in encryption and decryption using control vectors.	7	L2	CO3
	b.	Describe the architecture of the Public Key Infrastructure X.509 (PKIX) model with a neat diagram.	8	L2	CO3
	c.	Write a short note on the various schemes of public key distribution.	5	L2	CO3
Module – 4					
Q.7	a.	Explain functions and cryptographic algorithms used in S/MIME functionality.	8	L2	CO4
	b.	Define TLS and explain its architecture with a neat diagram.	7	L2	CO4
	c.	Bring out the differences between Kerberos version 4 and version 5.	5	L2	CO4
OR					
Q.8	a.	Describe remote user authentication using asymmetric encryption.	8	L2	CO4
	b.	Explain Pretty Good Privacy (PGP) message transmission and reception with a neat diagram.	7	L2	CO4
	c.	Elaborate on the various security approaches that address web security threats.	5	L2	CO4
Module – 5					
Q.9	a.	How does Domain Keys Identified Mail (DKIM) address the threats posed by email attackers and what is its strategy for email authentication?	8	L2	CO5
	b.	Explain Internet Key Exchange (IKE) key determination features.	7	L2	CO5
	c.	Explain Basic combinations of Security Associations.	5	L2	CO5
OR					
Q.10	a.	Illustrate the key components of the Internet mail architecture with a clear diagram.	8	L2	CO5
	b.	Explain the Encapsulating IP Security Payload.	7	L2	CO5
	c.	Describe the functional flow of Domain Keys Identified Mail (DKIM).	5	L2	CO5

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BCS755C

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Software Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the different activities of a generic process framework for software engineering.	10	L2	CO1
	b.	With necessary sketches, explain two common evolutionary process models.	10	L2	CO1
OR					
Q.2	a.	Write a short note on following specialized process model. i) Component Based Development ii) Formal Method Model	10	L2	CO1
	b.	With a neat diagram explain unified process with its different phases.	10	L2	CO1
Module – 2					
Q.3	a.	Define requirement engineering. Why it is necessary? Explain seven distinct tasks of requirement engineering.	10	L2	CO2
	b.	Develop a use-case template description for safe home system considering home owner as a primary Stake-holder.	10	L3	CO2
OR					
Q.4	a.	Develop following UML diagrams for access camera surveillance via the internet display camera view function : i) Activity diagram ii) Swimlane diagram	10	L3	CO2
	b.	With suitable examples, explain the data modeling concepts covering data objects, data attributes and relationships.	10	L2	CO2
Module – 3					
Q.5	a.	Define twelve agility principles for those who want to achieve agility.	10	L2	CO3
	b.	With a neat diagram, explain extreme programming process.	10	L2	CO3
OR					
Q.6	a.	Write a short note on: i) Scrum ii) Feature Driven Development (FDD)	10	L2	CO3
	b.	Explain the different principles that guide each frame work activity.	10	L2	CO3

Module – 4

Q.7	a.	With a help of a neat diagram explain translating the requirements model into design model.	10	L2	CO4
	b.	Briefly explain quality guidelines and quality attributes with respect to design process.	10	L2	CO4

OR

Q.8	a.	Briefly explain the taxonomy of architecture styles.	10	L2	CO4
	b.	Explain the generic structure of architectural context diagram. Also illustrate context diagram for the “Safe Home Security Function”.	10	L3	CO4

Module – 5

Q.9	a.	Write a short note on: i) Garvin’s Quality Dimensions ii) Mc.Call’s Duality Factors Features	10	L2	CO5
	b.	Explain a reference model for a technical reviews.	10	L2	CO5

OR

Q.10	a.	Explain the different object oriented testing strategies.	10	L2	CO5
	b.	In detail explain the control structure testing.	10	L2	CO5

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BTE755C

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Embedded Systems Applications

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the general features and characteristics that distinguish embedded systems from general purpose computers.	10	L2	CO1
	b.	Describe the difference between a Microprocessor Unit (MPU) and a Microcontroller Unit (MPU) with examples.	10	L2	CO1
OR					
Q.2	a.	Discuss the significance of low power dissipation in embedded system and how it is achieved.	10	L2	CO1
	b.	Classify embedded systems based on MCU data word lengths and give example for each category.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the architectural differences between Von-Neumann and Harvard Architecture in microcontrollers and their impact on performance.	10	L2	CO2
	b.	What is RAM? What is static RAM? Explain the working of one bit SRAM cell with a neat diagram.	10	L2	CO2
OR					
Q.4	a.	Discuss the main strategies used to design low power embedded systems and the importance of power management.	10	L2	CO2
	b.	Explain the purpose of pull up and pull down resistors in digital circuits and their role in microcontroller input pins.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the working principle of a thermistor and how it can be used as a temperature sensor in embedded systems.	10	L2	CO3
	b.	Describe the types of light sensors commonly used in embedded systems and their typical applications.	10	L2	CO3
1 of 2					

OR

Q.6	a.	Explain static and dynamic seven segment LED displays and their differences in power consumption and operation.	10	L2	CO3
	b.	Discuss the principle of stepper motors and the different driving methods used for controlling their rotation.	10	L2	CO3

Module – 4

Q.7	a.	Explain the basic functional blocks of a mobile phone. Draw and label the block diagram of a mobile phone receiver.	10	L2	CO4
	b.	Describe the concept of frequency reuse in cellular networks and discuss how co-channel interference is mitigated. Draw a diagram illustrating frequency reuse with hexagonal cells.	10	L2	CO4

OR

Q.8	a.	Explain the working of an Antilock Braking System (ABS) in automobiles. Mention the key components. Draw the block diagram of the ABS system.	10	L2	CO4
	b.	Define a Brain Machine Interface (BMI) and describe its main stages. Draw a block diagram of a BMI system.	10	L2	CO4

Module – 5

Q.9	a.	Explain the concept of a systems perspective in embedded design. How does perspective help in understanding complex products?	10	L2	CO5
	b.	Outline the step by step procedure for product design starting from need identification to hardware software and mechanical design. Draw a block diagram summarizing this process.	10	L2	CO5

OR

Q.10	a.	Discuss the importance of ergonomic design in product development. What role do anthropometric measurements play? Provide examples where ergonomic design is critical.	10	L2	CO5
	b.	Describe the PCB design process from schematic symbol creation to routing and layers. Why is proper component placement important? Illustrate with a block flow diagram of PCB design steps.	10	L2	CO5

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21CS71

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Big Data Analytics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define Data and Big Data and also discuss the evolution of Big Data. (06 Marks)
- b. List and explain the characteristics of Big Data. (04 Marks)
- c. Write a note on Massive Parallel processing platforms and cloud computing in Big Data scenario. (10 Marks)

OR

- 2 a. With a neat diagram, explain data architecture design. (10 Marks)
- b. Explain the application of Big Data Analytics in Healthcare systems and detection of marketing frauds. (10 Marks)

Module-2

- 3 a. Define Hadoop. With a neat diagram, explain Hadoop core components and Ecosystem components. (10 Marks)
- b. Illustrate YARN based execution model and its function with a neat diagram. (10 Marks)

OR

- 4 a. What are the design features of HDFS and also explain the functions of Name Node and Data Node. (10 Marks)
- b. Explain Apache Sqoop Import and Export methods, with a neat diagram. (10 Marks)

Module-3

- 5 a. Discuss the characteristics of NOSQL data store along with the features in NOSQL transactions. (10 Marks)
- b. Define key-value store with an example. List the advantages and limitations of key value store. (10 Marks)

OR

- 6 a. Give the comparison between NOSQL and SQL/RDBMS. (05 Marks)
- b. With a neat diagram, explain the following shared-nothing architecture for Big data tasks:
 - i) Master slave distribution model
 - ii) Peer-to-peer distribution model(10 Marks)
- c. List and explain the MongoDB data types. (05 Marks)

Module-4

- 7 a. With a neat diagram, illustrate MapReduce process on client submitting a job. (08 Marks)
- b. With an example, illustrate the execution of MapReduce technique. (08 Marks)
- c. Illustrate Matrix-Vector multiplication using MapReduce. (04 Marks)

OR

- 8 a. With a neat diagram, illustrate Hive integration and work flow steps. (10 Marks)
b. With a neat diagram, explain the pig architecture for scripts data flow and processing. (10 Marks)

Module-5

- 9 a. Write a note on the following:
i) Linear Relationship
ii) Non-linear Relationship
iii) Outliers (08 Marks)
b. With an example problem, explain the working of Apriori algorithm to generate candidate item set. (12 Marks)

OR

- 10 a. With a neat diagram, explain text mining process. (12 Marks)
b. Write a note on the following:
i) Web content Mining
ii) Web usage Mining. (08 Marks)

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Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Cloud Computing

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define Cloud. Explain Cloud Computing reference model. (10 Marks)
- b. Explain characteristics and benefits of cloud computing. (10 Marks)

OR

- 2 a. Explain in brief the services provided by following cloud service provider
i) Amazon Web Service ii) Microsoft Azure (10 Marks)
- b. Explain Hadoop service and Manjrasoft Aneka. (10 Marks)

Module-2

- 3 a. Define Virtualization and explain hardware level virtualization with its pro's and con's of virtualization. (10 Marks)
- b. Explain the characteristics of the virtualized environment. (10 Marks)

OR

- 4 a. Demonstrate the virtualization with an example and what are its benefits. (06 Marks)
- b. Explain how virtualization plays as a core technology for cloud computing and what is the major resolution introduced by web 2.0. (08 Marks)
- c. Explain the three major components and advantages that are characterized by virtualized environments. (06 Marks)

Module-3

- 5 a. With neat diagram, explain the cloud computing architecture. (10 Marks)
- b. Explain the following in detail :
i) Hardware as service ii) Platform as service iii) Software as service. (10 Marks)

OR

- 6 a. Explain different types of clouds. (10 Marks)
- b. Explain the open challenges faced in cloud computing in detail. (10 Marks)

Module-4

- 7 a. Explain cloud security risk in detail. (10 Marks)
- b. Explain virtual machine security in detail. (10 Marks)

OR

- 8 a. Explain security of virtualization. (10 Marks)
- b. Explain security risks posed by a management OS. (10 Marks)

Module-5

- 9 a. Explain the various storage and communication services provided by AWS. (10 Marks)
- b. Describe the core components of Google APP Engine. (10 Marks)

OR

- 10 a. Discuss in detail the following media applications of cloud computing technologies:
i) Animoto ii) Maya Rendering with Aneka iii) Video encoding on cloud. (10 Marks)
- b. Establish the relationship on how the cloud computing technology can be applied to support ECG monitoring. (10 Marks)

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Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Internet of Things (IoT)

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What is IoT? Differentiate between IoT and M2M and IoT and WOT. (10 Marks)
- b. Explain the Evolution of IoT with diagram and example. (10 Marks)

OR

- 2 a. Explain the Interdependence and reach of IoT over various application domains and Networking paradigms. (10 Marks)
- b. Explain the Enabling IoT and Complex Interdependence of Technologies. (10 Marks)

Module-2

- 3 a. Define Sensor, explain the functional block of a typical sensor node in IoT. (10 Marks)
- b. List and explain different types of sensing providing an example for each. (10 Marks)

OR

- 4 a. What is an actuator? Explain the different types of actuators with an example for each. (10 Marks)
- b. Explain the sensor and actuators characteristics with examples. (10 Marks)

Module-3

- 5 a. List and explain data Formats in IoT Applications. (10 Marks)
- b. Explain the various processing Topologies in IoT. (10 Marks)

OR

- 6 a. List and explain the key considerations in IoT device design and selection. (10 Marks)
- b. What is processing off loading? Explain the three key aspects of processing offloading. (10 Marks)

Module-4

- 7 a. Explain IEEE 802.15.4 IoT Access Technology. (10 Marks)
- b. Explain the Zigbee Connectivity Protocol in IoT. (10 Marks)

OR

- 8 a. Explain the Wireless HART Network Architecture. (10 Marks)
- b. Explain the Bluetooth device network architecture and protocol stack. (10 Marks)

Module-5

- 9 a. What is Device Management, explain any Two Device Management Protocols. (10 Marks)
- b. What is Framework? Explain different Interoperability Frameworks. (10 Marks)

OR

- 10 a. Explain different types of Data Protocols. (10 Marks)
- b. Explain the following with neat diagram : (10 Marks)
- i) EnOcean
 - ii) DLNA
 - iii) Konnex

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BCS714D

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Big Data Analytics

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Define Big Data Analytics. Explain classification of analytics.	10	L2	CO1
	b.	List and explain the terminologies used in Big Data Environments.	10	L2	CO1
OR					
Q.2	a.	Explain Hadoop ecosystem with a neat diagram.	10	L2	CO1
	b.	What is NOSQL? Explain the different types of NOSQL databases with an example.	10	L2	CO1
Module - 2					
Q.3	a.	With a neat diagram explain Hadoop distributed file system architecture.	10	L2	CO2
	b.	Give the HDFS commands to perform the following operations: i) To get the list of directories and files at the root of HDFS ii) To create a directory (Say sample) in HDFS iii) To copy a file from HDFS to local file system iv) To display the contents of an HDFS file on console.	10	L3	CO2
OR					
Q.4	a.	Explain anatomy of HDFS file read and write.	10	L2	CO2
	b.	With a neat diagram, demonstrate YARN architecture.	10	L3	CO2
Module - 3					
Q.5	a.	What is MongoDB? Explain creation of database, dropping of database and datatypes of MongoDB.	10	L3	CO3
	b.	Write the MongoDB commands to perform the following operations: i) To find the number of documents in the students collection. ii) To retrieve the first 3 documents from the students collection where in the grade is VII. iii) To sort the documents from the students collection in the ascending order of StudName. iv) To skip the first 2 documents from the students collection. v) To sort the documents from the students collection in the descending order of StudName.	10	L3	CO3

OR

Q.6	a.	Demonstrate the following: i) Aggregate function with an examples. ii) MapReduce function in MongoDB with examples.	10	L3	CO3
	b.	Demonstrate the following methods with an example for each: i) Save() ii) Find() iii) Update() iv) Insert()	10	L3	CO3

Module – 4

Q.7	a.	What is Hive? Explain Hive architecture with a neat diagram.	10	L2	CO4
	b.	Explain bucketing with an example.	5	L2	CO4
	c.	What is Pig? Explain the key features of Pig.	5	L2	CO4

OR

Q.8	a.	Explain the anatomy of Pig, Pig philosophy and execution modes of Pig.	10	L2	CO4
	b.	Explain any five relational operators of Pig with an example.	10	L2	CO4

Module – 5

Q.9	a.	Explain the five layer architecture for running applications using spark stack.	10	L2	CO5
	b.	Explain the main features of spark with a neat diagram.	10	L2	CO5

OR

Q.10	a.	Define text mining. With a neat diagram explain the text mining process.	10	L2	CO5
	b.	With a neat diagram, explain the three phases of web usage mining.	10	L2	CO5

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