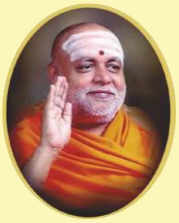

|| Jai Sri Gurudev ||

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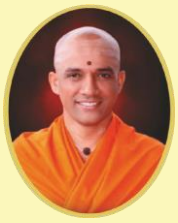

VTU – Dec. 2025/Jan. 2026– 7th Sem Question Papers

2022 - Scheme

2022-Sheme - Dec.2025/Jan.2026

Theory Question Papers for 7th Semester

Sl.No	Name of the Subject	Subject Code
1	Deep Learning and Reinforcement learning	BA701
2	Internet of Things	BCS701
3	Robotic Process Automation Design and Development	BCG701
4	Big Data Analytics	BIS701
5	Parallel Computing	BCS702
6	Data Security and Privacy	BAD703
7	Cryptography and Network Security	BCS703
8	Information and network Security	BIS703
9	Business Analytics	BAD714B
10	Software Quality Assurance	BIS714B
11	Embedded System	BIS714C
12	Big Data Analytics	BCS714D
13	Non – Traditional Machining	BME755A

CBCS SCHEME

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BAI701

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Deep Learning and Reinforcement Learning

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.	What is Deep Learning? Write a program to demonstrate the working of a deep neural network for classification task.	07	L1	CO1
	b.	Explain the prominent challenges involved in optimization during the training deep neural networks.	07	L2	CO1
	c.	Explain with an example how maximum likelihood estimation decomposes into a sum over training examples. List the key factors that influence the choice of mini batch size in deep learning.	06	L2	CO1
		OR			
Q.2	a.	Differentiate between conventional Machine learning and Deep Learning approaches in terms of feature extraction and representation learning. Illustrate your answer with a suitable diagram.? List the challenges associated with deep learning.	10	L2	CO1
	b.	Define surrogate Loss function, and early stopping. What are the key factors that influence the choice of minibatch size in deep learning?	10	L1	CO1
		Module – 2			
Q.3	a.	What is convolution layer? Explain the convolution neural network layers in detail.	10	L1	CO1
	b.	Explain the activation function used in Artificial Neural Networks: i) RLU (Rectified Linear Unit) ii) Logistic / Sigmoid Function iii) Tanh Function. iv) Softmax Function	10	L2	CO1
		OR			
Q.4	a.	With the help of an example, explain the convolution Operation. List the applications of Deep Learning.	10	L2	CO2
	b.	List and explain the evolution of Convolution Neural Network.	10	L2	CO2
		Module – 3			
Q.5	a.	Outline the CNN architecture in detail including its mathematical operations.	10	L2	CO2
	b.	Explain the working of Alex Net, Highlighting its key layers and features, with a suitable architecture diagram. Design and implement a Convolutional Neural Network for classification of image data set.	10	L2	CO2

		OR			
Q.6	a.	Illustrate the feature map transformations in LeNet – 5 for an input image of size 32 × 32. Develop and implement a deep learning network for forecasting time series data.	10	L2,3	CO2
	b.	List and explain the Gradient Descent Variants. What are the challenges in Training Deep Networks?	10	L3	CO2
		Module – 4			
Q.7	a.	How does unfolding a Recurrent Neural Network (RNN) represent recurrence as a computational graph? State any two advantages of unfolding.	10	L1	CO3
	b.	Explain Gated Recurrent Neural Networks (RNNs) with reference of LSTM and GRU. Describe their purpose and working.	10	L2	CO3
		OR			
Q.8	a.	List and explain the three parameters transformations in a RNN. What roles do skip connections play in deep RNNs?	10	L1	CO3
	b.	Explain the architecture and working of Bidirectional Recurrent Neural Networks (BRNN). How do they address the limitations of causal RNNs? List the applications in which they are most effective.	10	L2	CO3
		Module – 5			
Q.9	a.	Explain with an example, how Reinforcement Learning uses reward – driven trail and error in two environments, such as video games and self-driving cars.	10	L2	CO3
	b.	Compare traditional table – based Reinforcement Learning and Deep Reinforcement Learning using examples of Tic – Tac – Toe and chess.	10	L2	CO3
		OR			
Q.10	a.	Explain how a Mouse learns to find cheese in maze through interaction with its environment using the Reinforcement Learning framework?	10	L2	CO3
	b.	Explain how Reinforcement Learning was applied in Facebook's negotiation chatbot. How did self – play and reward – based learning improve negotiation behavior?	10	L1	CO3

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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.

			M	L	C
		Module – 1			
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 Rasberry 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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BCG701

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Robotic Process Automation Design and Development (UiPath)

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.

			M	L	C
		Module – 1			
Q.1	**a.**	Define Robotic Process Automation (RPA). Explain the typical phases of an RPA life cycle, from analysis to maintenance.	**10**	**L2**	**CO1**
	b.	Differentiate between the three main panel types in UiPath studio : Activities, properties and output. Provide the main function of each.	**10**	**L1**	**CO1**
		OR			
Q.2	**a.**	Differentiate between attended bots and unattended bots. Give one specific business use case for each.	**10**	**L2**	**CO1**
	b.	List and briefly explain the components of the UiPath platform (studio, orchestrator, Robot).	**10**	**L1**	**CO1**
		Module – 2			
Q.3	**a.**	Explain the concept and significance of selectors in UI Automation, write down the sequence of activities you would use to efficiently log into a web application.	**10**	**L2**	**CO2**
	b.	You need to extract a series of dynamic records (E.g. names and prices) from a table on a web page describe the purpose of a data shaping wizard and the steps involved in using it.	**10**	**L3**	**CO2**
		OR			
Q.4	**a.**	Describe the difference between input methods (simulate send window message default) for the type into activity, when would you prefer simulate?	**10**	**L2**	**CO2**
	b.	Explain the use of the anchor base activity. Describe a scenario where it provides a more reliable alternative than a partial selector.	**10**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Explain the role of the Excel Application scope activity. Outline the steps to read data from a specific sheet into a data table variable	**10**	**L2**	**CO3**
	b.	A bot has lead customer data into a data table. Explain how to use the For Each Row in Data Table activity and how to access the value of a specific column, say "Email Address", within the loop.	**10**	**L3**	**CO3**

		OR			
Q.6	**a.**	Differentiate between using the read range activity inside the excel application scope versus using the read range workbook activity.	**10**	**L2**	**CO3**
	b.	You need to insert a new column into an existing excel sheet to hold calculated "total" values. Outline the activities and steps required to achieve this.	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Describe the purpose and essentials property of the second outlook mail message activity. Explain the use of the get mail message output variable.	**10**	**L2**	**CO4**
	b.	A bot retrieves an email containing a word document template. Outline the sequence of activities to open the template and use the replace text activity to fill in placeholder like (Customer Name) and (Date).	**10**	**L3**	**CO4**
		OR			
Q.8	**a.**	List and briefly explain any 5 settings (or) properties you can use to filter the emails received by the get mail message activity.	**10**	**L2**	**CO4**
	b.	Identify difference between save attachment and save mail message activity. When would you use the latter?	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	List and explain the primary functions of any 5 essentials activities need for file and folder automation (E.g. copy, move, create).	**10**	**L2**	**CO5**
	b.	A bot has proceed data and needs to achieve the original source file. Outline the workflow logic and activity required to check if a file exists, then move it to an archive folder and finally create a log file noting the action.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Describe the use of the compress/zip files activity list 2 reasons why file compression is important in automation.	**10**	**L2**	**CO5**
	b.	Design a workflow logic to process a specific folder : find all files older than 30 days and delete them. Specify the activities and the filtering logic you would use.	**10**	**L3**	**CO5**

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BIS701

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.	Describe the 3 V's of Big Data and discuss the challenges faced with Big data.	10	L2	CO1
	b.	Explain the classification of digital data.	10	L2	CO1
		OR			
Q.2	a.	Discuss Big Data Analytics and explain the following terminologies : i) Symmetric Multiprocessor System ii) CAP Theorem.	10	L2	CO1
	b.	Explain the features and advantages and NOSQL. Discuss the types of NOSQL data bases.	10	L2	CO1
		Module – 2			
Q.3	a.	Discuss the need for Hadoop and its high level architecture.	10	L2	CO2
	b.	Illustrate MapReduce process with a word count example.	10	L3	CO2
		OR			
Q.4	a.	Discuss the limitation of HDFS and its solution. Explain the YARN architecture.	10	L3	CO2
	b.	Implement a MapReduce program in Java/Python/R to implement matrix multiplication.	10	L4	CO2
		Module – 3			
Q.5	a.	Discuss replication and Sharding in MongoDB.	10	L2	CO3
	b.	Illustrate the CRUD operations using MongoDB query language with examples.	10	L3	CO3
		OR			
Q.6	a.	Demonstrate the following operations in MongoDB query language with examples : i) Count ii) Limit iii) Sort iv) Skip.	10	L2	CO3
	b.	Explain the application of the following in MongoDB i) Cursors ii) Indexes iii) MongoExport iv) Aggregate function.	10	L2	CO3
		Module – 4			
Q.7	a.	Discuss the features of Hive. Explain the Hive architecture.	10	L2	CO3
	b.	Explain the DDL and DML commands in Hive.	10	L2	CO3
		OR			
Q.8	a.	Express the features and philosophy of Pig. Discuss ETL processing.	10	L2	CO3
	b.	Discuss the following in Pig. i. Relational operators – Foreach and Limit ii. Complex data types – Tuple and Map.	10	L2	CO3
		Module – 5			
Q.9	a.	Discuss the features of spark. Explain the spark software stack.	10	L2	CO4
	b.	Explain the steps involved between acquisition of data from multiple sources and its application in spark.	10	L2	CO4
		OR			
Q.10	a.	Discuss text mining and its applications. Explain the process of text minng.	10	L2	CO4
	b.	Implement a word count program in Hadoop and spark using Java/Python/R.	10	L4	CO4

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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.

			M	L	C
		Module – 1			
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 it 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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BAD703

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

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 model for network security with a neat diagram.	10	L2	CO1
	b.	What is Steganography? Describe different methods with examples.	10	L2	CO1
		OR			
Q.2	a.	Explain the play fair cipher encryption and decryption process with an example.	10	L2	CO1
	b.	Discuss various substitution techniques used in classical encryption.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the principles of public-key cryptosystem with a neat diagram.	10	L2	CO2
	b.	Write a short note on public key cryptanalysis.	6	L2	CO2
	c.	Illustrate the security features of ECC with examples.	4	L2	CO2
		OR			
Q.4	a.	Explain the Diffie-Hellman key exchange algorithm with an example and diagram.	10	L2	CO2
	b.	How does the Man-in-the Middle attack affect Diffie-Hellman? Explain.	6	L2	CO2
	c.	What is the role of a Pseudo Random Number Generator (PRNG) in cryptography?	4	L2	CO2
		Module – 3			
Q.5	a.	Describe key management fundamentals with neat diagram.	10	L2	CO3
	b.	Explain the governing aspects of key management.	10	L2	CO3
		OR			
Q.6	a.	Discuss the key generation, establishment and storage methods.	10	L2	CO3
	b.	Explain the importance of key usage and storage in cryptosystems.	10	L2	CO3

		Module – 4			
Q.7	a.	Explain web security considerations.	8	L2	CO4
	b.	Illustrate the working of Transport Layer Security (TLS).	6	L2	CO4
	c.	What is a Security Parameters Index (SPI) in IP security?	6	L2	CO4
		OR			
Q.8	a.	Describe the IP security overview and the need for IP security policies.	8	L2	CO4
	b.	What is Encapsulating Security Payload (ESP)? Explain its purpose.	6	L2	CO4
	c.	Illustrate the role and phases of Internet Key Exchange (IKE) protocol.	6	L2	CO4
		Module – 5			
Q.9	a.	Discuss various data hiding techniques in text.	10	L2	CO5
	b.	Explain the LSB (Least Significant Bit) encoding technique with a suitable example.	10	L2	CO5
		OR			
Q.10	a.	Explain watermarking and its intuitive and digital methods.	10	L2	CO5
	b.	Illustrate the process of data hiding in text using innocuous text techniques.	10	L2	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 , Xa = 157 , Xb = 293. Use the Diffie Hellman Key exchange algorithm to find Ya , Yb 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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CBCS SCHEME

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BIS703

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Information 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.	Explain the basic terminology of crypto along with its black box.	4	L2	CO1
	b.	Explain simple substitution cipher with an example.	8	L3	CO1
	c.	Discuss double transposition cipher with an example.	8	L3	CO1
		OR			
Q.2	a.	Explain modern crypto history.	6	L2	CO1
	b.	Describe the Taxonomy of cryptography.	7	L2	CO1
	c.	Describe the Taxonomy of cryptanalysis.	7	L2	CO1
		Module – 2			
Q.3	a.	Discuss the requirements of a cryptographic hash function.	6	L2	CO2
	b.	Explain Cryptographic Tiger Hash Algorithm.	10	L3	CO2
	c.	Explain the uses of a hash function.	4	L2	CO2
		OR			
Q.4	a.	Define secret sharing. Explain the concept of secret sharing using key escrow.	10	L3	CO2
	b.	Discuss the usage of random numbers with unpredictability.	6	L2	CO2
	c.	Explain the categorization of water marks.	4	L2	CO2
		Module – 3			
Q.5	a.	Define Randomness. Differentiate between deterministic and non-deterministic generators.	10	L2	CO3
	b.	Explain the freshness mechanism in detail.	10	L2	CO3
		OR			
Q.6	a.	Explain the problems related to passwords.	4	L2	CO3
	b.	Describe the dynamic password schemes based on challenge - response.	8	L2	CO3
	c.	Explain the Diffie-Hellman key agreement protocol.	8	L2	CO3

		Module – 4			
Q.7	**a.**	Explain the key life cycle with a neat diagram.	**4**	**L2**	**CO4**
	b.	Discuss key distribution approaches to acquiring shared keys from a KC.	**10**	**L2**	**CO4**
	c.	Explain the key storage risk factor.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain the fields of X.509 version 3 public-key certificate.	**8**	**L2**	**CO4**
	b.	Explain the public-key certificate management models.	**12**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain simple SSL hand shake protocol.	**10**	**L2**	**CO5**
	b.	Discuss the SSL key management in detail.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Discuss WLAN design issues.	**5**	**L2**	**CO5**
	b.	Explain GSM and UMTS key management.	**10**	**L2**	**CO5**
	c.	Discuss the usage of cryptography in video broadcasting.	**5**	**L2**	**CO5**

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CBCS SCHEME

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BAD714B

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Business 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.	List some capabilities of information systems that can facilitate managerial decision making.	8	L2	CO1
	b.	List and briefly describe Simon's four phases of decision making.	6	L2	CO1
	c.	What is Business Intelligence? Describe a High-Level Architecture of Business Intelligence.	6	L2	CO1
		OR			
Q.2	a.	Explain how financial services are more personalized with AI support.	8	L2	CO1
	b.	Define Chatbot. What are the major drivers of Chatbot technology?	6	L2	CO1
	c.	What is descriptive analytics? What are the various tools that are employed in descriptive analytics?	6	L2	CO1
		Module – 2			
Q.3	a.	List some of the characteristics (metrics) that define the readiness level of data for an analytics study.	8	L2	CO2
	b.	Explain simple taxonomy of data.	8	L2	CO2
	c.	What are the critical success factors for Big data analytics?	4	L2	CO2
		OR			
Q.4	a.	What is a Box-and-Whisker's plot? What types of statistical information does it represent?	8	L2	CO2
	b.	How to define Big data? Explain the 'V's' that are used to define Big data.	8	L2	CO2
	c.	What are the most important assumptions for linear regression?	4	L2	CO2
		Module – 3			
Q.5	a.	List fundamental characteristics of data warehousing.	8	L2	CO3
	b.	Describe the major components of a data warehouse.	8	L2	CO3
	c.	Bring out differences between OLAP and OLTP data analysis technique in data warehouses.	4	L2	CO3

		OR			
Q.6	**a.**	Explain different types of chart and graphs used for information visualization.	**8**	**L2**	**CO3**
	b.	What is a business report? What are the main characteristics of a good business report?	**8**	**L2**	**CO3**
	c.	What is an information dashboard? List three layers of information portrayed on dashboards.	**4**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Define data Mining. Explain the major characteristics and objectives of data mining.	**8**	**L2**	**CO4**
	b.	Explain some major data mining methods.	**8**	**L2**	**CO4**
	c.	List factors that are considered in assessing the model.	**4**	**L2**	**CO4**
		OR			
Q.8	**a.**	List and briefly discuss the major components of a quantitative model.	**8**	**L2**	**CO4**
	b.	What are the major data mining processes?	**8**	**L2**	**CO4**
	c.	Define what it means to perform decision making under assumed certainity, risk and uncertainity.	**4**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What is text mining? What are some of the most popular application areas of text mining?	**10**	**L2**	**CO5**
	b.	What are the most common tasks addressed by NLP?	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain Social Network Analysis metrics.	**10**	**L2**	**CO5**
	b.	What is Social Media analytics? List best practices in social media analytics.	**10**	**L2**	**CO5**

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CBCS SCHEME

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BIS714B

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

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 SQA. Summarize the main characteristics of the environment for which software quality assurance (SQA) methods were developed.	10	L2	CO3
	b.	Explain the main objectives of software quality assurance activities in a software project.	06	L2	CO3
	c.	Define the following terms : (i) Software (ii) Software errors (iii) Software faults (iv) Software failures	04	L1	CO3
		OR			
Q.2	a.	List nine causes of software errors and discuss any 3 in detail with suitable example.	10	L1 L2	CO3
	b.	Describe the key categories and associated factors in McCall's software quality model using an illustrative model tree diagram.	10	L2	CO3
		Module – 2			
Q.3	a.	List components of software project life cycle. Discuss review and software maintenance components in detail.	10	L2	CO2
	b.	List and describe software quality assurance infrastructure components that help in error prevention and process improvement.	10	L2	CO2
		OR			
Q.4	a.	List and explain the objectives of proposal draft review.	10	L2	CO2
	b.	Discuss the factors that affect the extent of the contract review.	04	L2	CO2
	c.	Describe the recommended avenues for implementing a major contract review.	06	L2	CO2
		Module – 3			
Q.5	a.	Describe the prototyping model with the help of a neat diagram. Also discuss its advantages and disadvantages.	08	L2	CO1
	b.	Identify and discuss three types of data used in the application model for measuring SQA defect removal effectiveness and cost.	06	L2	CO1
	c.	Define software testing and describe the key terms related to the formal operative characteristics of testing.	06	L1 L2	CO1

		OR			
Q.6	**a.**	Discuss the different stages of the top-down testing approach with help of a neat diagram.	**08**	**L2**	**CO1**
	b.	Explain black box and white box testing concepts with suitable examples. Also list their advantages and disadvantages.	**12**	**L1 L2**	**CO1**
		Module – 4			
Q.7	**a.**	Interpret the main components of project progress control and describe how each contribute to effective project management.	**10**	**L2**	**CO4**
	b.	Briefly discuss how computerized tools are used to control both risk management activities and project schedules during project execution.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Discuss the various categories of software development process metrics with suitable example.	**08**	**L2**	**CO4**
	b.	With neat diagram discuss the 4 stage process of defining software quality metrics.	**08**	**L2**	**CO4**
	c.	Define the concept of Help Desk (HD) services and describe three types of HD quality metrics with example.	**04**	**L1 L2**	**CO4**
		Module – 5			
Q.9	**a.**	Describe the steps involved in ISO 9000 – 3 certification process with neat diagram.	**10**	**L2**	**CO5**
	b.	With neat diagram discuss the structure of ISO/IEC 15504 process assessment model.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Using Fishbone diagram illustrate and explain the architecture of IEEE/EIA Std 12207 software life cycle processes.	**10**	**L2**	**CO5**
	b.	State and explain the underlying concepts of verification and validation according to IEEE standard 1012 – 1998.	**10**	**L2**	**CO5**

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CBCS SCHEME

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BIS714C

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

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.	Describe the elements of an embedded system with a block diagram.	8	L2	CO1
	b.	Give comparison between RISC and CISC architecture.	6	L2	CO1
	c.	i) Explain SRAM cel ii) Explain Big Endian and Little Endian operation and give examples.	6	L2	CO1
		OR			
Q.2	a.	Give the differences between a micro controller and micro processor.	8	L2	CO1
	b.	With neat diagram, explain the differences between Harvard and Von-Neumann architecture.	8	L2	CO1
	c.	Describe the functions of optocoupler I2C and IrDA for embedded system.	4	L2	CO1
		Module – 2			
Q.3	a.	Define and explain operational and non-operational quality attributes of an embedded system.	10	L2	CO2
	b.	With a functional block diagram, explain the working of a washing machine.	10	L2	CO2
		OR			
Q.4	a.	With a neat flow diagram, explain high level language sources file to machine language conversion.	6	L2	CO2
	b.	Compare Data Flow Graph (DFG) and Conditional Data Flow Graph (CDFG) model with an example.	6	L2	CO2
	c.	With the help of FSM model, explain the design and operation of automatic seat belt warning system.	8	L2	CO2
		Module – 3			
Q.5	a.	Define the term operating system with a neat diagram, explain the operating system architecture.	8	L2	CO2
	b.	Explain monolithic and micro Kernels with suitable examples for each.	6	L2	CO3
	c.	Explain task, process and threads.	6	L2	CO3

		OR			
Q.6	**a.**	Explain the concept of 'deadlock with a neat diagram. Mention the different conditions which favors a deadlock situation.	**10**	**L2**	**CO3**
	b.	With a block diagram, explain the embedded system development environment with function of the components used in brief.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	With a neat and labeled diagram, explain the ARM core dataflow model. Describe the function of major components such as the register file, ALU, barrel shifter and multiplier.	**10**	**L2**	**CO4**
	b.	With a neat and labelled diagram, explain register organization in the ARM processor. Also, describe the structure and function of the Current Program Status Register (CPSR).	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Describe the different stages of the ARM pipeline [e.g, 3-stage for ARM7, 5-stage for ARM9 and 6-stage for ARM10] and what operation is performed in each stage.	**10**	**L2**	**CO4**
	b.	Describe the working of a simplified Von Neumann architecture with cache and a simplified Harvard architecture with TIMs.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With a neat and labeled diagram, describe the data flow between the barrel shifter and the Arithmetic Logic Unit (ALU) in ARM data processing instructions. Explain the function of different shift operations – LSL, LSR, ASR, RDR and RRX.	**10**	**L2**	**CO5**
	b.	Explain in detail Arithmetic, Logical and comparison instruction in ARM.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Describe how LDR/STR and LDM/STM instruct operate, along with examples showing pre-indexing, post–indexing and auto increment/decrement addressing model.	**10**	**L3**	**CO5**
	b.	Explain the following ARM processor instructions : i) Software Interrupt (SWI) Instruction. ii) Program Status Register (PSR) Instruction	**10**	**L2**	**CO5**

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CBCS SCHEME

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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.

			M	L	C
		Module – 1			
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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CBCS SCHEME

USN BME755A

Seventh Semester B.E/B.Tech. Degree Examination, Dec.2025/Jan.2026
Non-Traditional Machining

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
1	a.	Define Non-Traditional Machining (NTM) and explain its need.	5	L1	CO1
	b.	Classify NTM processes based on the type of energy used, giving one example each.	5	L2	CO1
	c.	Discuss the selection criteria for choosing on NTM process for a given job.	10	L3	CO1
		OR			
2	a.	Compare traditional and non-traditional machining processes.	10	L1	CO1
	b.	List advantages, limitations and applications of NTM processes.	10	L2	CO1
		Module – 2			
3	a.	Explain with neat sketch the construction and working of Ultrasonic Machining (USM).	8	L2	CO2
	b.	Describe process parameters affecting MRR and surface finish in USM.	8	L3	CO2
	c.	List advantages, limitations and applications of USM.	4	L1	CO2
		OR			
4	a.	Explain the working principle and construction of Abrasive Jet Machining (AJM) with neat sketch.	8	L2	CO2
	b.	Discuss the effect of process parameters such as carrier gas pressure, abrasive type and stand – off distance.	8	L3	CO2
	c.	State advantages and applications of AJM.	4	L1	CO2
		Module – 3			
5	a.	Explain with neat sketch the construction and working of Electro Chemical Machining (ECM).	8	L2	CO3
	b.	Discuss process parameters affecting performance of ECM.	8	L3	CO3
	c.	Differentiate between Electrochemical Grinding (ECG) and Electrochemical Honing (ECH).	4	L2	CO3

		OR			
6	a.	Explain with neat sketch the working of Chemical Machining (CHM) process.	8	L2	CO3
	b.	Describe Maskants and Etchants used in CHM.	6	L3	CO3
	c.	Write advantages, limitations and applications of CHM.	6	L1	CO3
		Module – 4			
7	a.	Explain the construction and working of Electrical Discharge Machining (EDM).	8	L2	CO4
	b.	Describe functions of dielectric fluid and flushing methods in EDM.	6	L3	CO4
	c.	Explain the principle and working of Wire EDM (WEDM).	6	L2	CO4
		OR			
8	a.	Explain the set up and working of Plasma Arc Machining (PAM) with neat sketch.	8	L2	CO4
	b.	Discuss process parameters and safety precautions in PAM.	8	L3	CO4
	c.	Mention advantages and limitations of PAM.	4	L1	CO4
		Module – 5			
9	a.	Explain the principle, setup, working of Laser Beam Machining (LBM).	10	L2	CO5
	b.	Write advantages, limitations and applications of LBM.	5	L1	CO5
	c.	Explain how laser parameters influence machining accuracy and surface quality.	5	L2	CO5
		OR			
10	a.	Explain the principle and working of Electron Beam Machining (EBM).	10	L2	CO5
	b.	Compare LBM and EBM based on principle, Equipment and applications.	5	L2	CO5
	c.	Write advantages, limitations and applications of EBM.	5	L1	CO5

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