		Course Code: B23AM3101			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		DEEP LEARNING			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define Machine Learning.	1	1	2
	b).	List any four deep learning models used in Computer Vision	1	1	2
	c).	State the role of the activation function in a neural network	2	2	2
	d).	Illustrate how early stopping help in preventing overfitting in deep neural networks?	2	2	2
	e).	State one advantage of using batch normalization in deep neural networks.	3	1	2
	f).	What is backpropagation through time (BPTT)?	3	1	2
	g).	Explain how a sparse auto encoder enforce sparsity in the hidden layer?	4	2	2
	h).	Explain the role of optimization algorithms in training deep learning models?	4	2	2
	i).	Describe the significance of attention mechanism in the Transformer architecture.	5	2	2
	j).	Compare Boltzmann Machine and Restricted Boltzmann Machine	5	2	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Describe the perceptron learning algorithm.	1	2	5
	b).	Explain the concept of linear separability with a suitable example. Explain the importance of linear separabiity in the context of Perceptrons?	1	3	5
		OR			
3.	**a).**	Explain how the convergence theorem ensures the perceptron will eventually learn the correct weights given a dataset with linearly separable points.	1	2	5
	b).	Apply thresholding logic to implement a simple two input AND gate and OR gate using MP Neuron	1	3	5
		UNIT-2			
4.	**a).**	Explain one iteration of Stochastic Gradient Descent (SGD) and how it is used to update the weights during the training of a neural network	2	3	5

		with the help of an example			
	b).	Given the predicted outputs = [0.9, 0.2, 0.1] and true labels = [1, 0, 0], compute the categorical cross-entropy loss. Given predicted output $\hat{y}$ = 0.8 and target value y = 1, calculate the binary cross-entropy and mean squared error. Interpret the results.	2	3	5
		OR			
5.	**a).**	Apply Sigmoid, Tanh, and ReLU activation functions to the neuron's net input $z = w_1x_1 + w_2x_2 + b$ where $x_1 = 1, x_2 = -2, w_1 = 1.0,$ $w_2 = 1.0$, b=0	2	3	5
	b).	Given a weight vector w = [0.5, -0.3, 0.8], and a base loss value = 0.2, apply L1 regularization with λ = 0.01 and compute the regularized loss. For the same weight vector w = [0.5, -0.3, 0.8] and base loss = 0.2, apply L2 regularization with λ = 0.01 and compute the regularized loss	2	3	5
		UNIT-3			
6.	**a).**	Given a 5×5 input matrix and a 3×3 kernel with stride 1 and no padding, compute the resulting feature map after convolution with the help of an example.	3	3	5
	b).	Explain the structure and working of an LSTM cell with its key components.	3	2	5
		OR			
7.	**a).**	Explain the working principle of Convolutional Neural Networks	3	2	5
	b).	Differentiate between a standard RNN and a bidirectional RNN.	3	2	5
		UNIT-4			
8.	**a).**	Compare batch, mini batch and stochastic gradient descents	4	2	5
	b).	Explain the working principle of an undercomplete autoencoder and how it helps in feature learning.	4	2	5
		OR			
9.	**a).**	Explain Adam optimization algorithm	4	2	5
	b).	Describe regularized autoencoder	4	2	5
		UNIT-5			
10.	**a).**	Illustarte Alexnet arcitecture	5	2	5
	b).	Describe the process of object detection and how it differs from image classification.	5	2	5
		OR			
11.	**a).**	Demonstrate how Resnet overcomes vanishing gradient problem	5	3	5
	b).	Explain the concept of transfer learning and how it is beneficial in deep learning applications	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3102	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		COMPUTER NETWORKS			
		For AIML			
Time: 3 Hrs.				**Max. Marks: 70 M**	
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	What is the main function of the Physical Layer in the OSI model?	1	2	1
	b).	Name any two guided transmission media.	1	2	1
	c).	What is the maximum length of Ethernet cable	2	2	1
	d).	What is the purpose of Cyclic Redundancy Check (CRC)?	2	2	1
	e).	Expand CIDR and NAT.	3	2	1
	f).	Give an example of a classful IP address for Class C	3	2	1
	g).	State the primary function of the Transport Layer	4	2	1
	h).	Which protocol is unreliable but fast?	4	2	1
	i).	Define Domain Name System (DNS).	5	2	1
	j).	Name any two components of URL	5	2	1
				5 x 10 = 50 Marks	
		UNIT-1			
2.	**a).**	Demonstrate TCP/IP Protocol suite with neat sketch.	1	3	10
		OR			
3.	**a).**	Define computer network and Specify the Network Types.	1	2	5
	b).	Compare the OSI & TCP/IP reference models across **five** dimensions (layer count, service-interface, vendor neutrality, etc.)	1	3	5
		UNIT-2			
4.	**a).**	Differentiate between *stop-and-wait* and *go-back-N* protocols	2	3	5
	b).	15-bit Hamming code is received as 101110101101101. Determine if there is an error in the received code, and if so, correct it. Also, retrieve the original 11-bit data.	2	3	5
		OR			
5.	**a).**	Explain Cyclic Redundancy Check? Suppose we want to transmit the message 110010110 and protect it from errors using the CRC polynomial x3+x2 + 1. Use polynomial long division to determine the message that should be transmitted.	2	3	5

	b).	Illustrate HDLC Protocol with the elaborative explanation of its frames.	2	3	5
		UNIT-3			
6.	**a).**	An organization using a Class B IP address (172.32.0.0) wants to divide its network into 8 subnets. a) Determine the new subnet mask in both dotted decimal and CIDR notation. b) Calculate the number of hosts per subnet. List the network addresses for each subnet.	3	3	5
	b).	Describe various network layer services in details	3	2	5
		OR			
7.	**a).**	State the major difference between Distance Vector Routing and Link State Routing. Discuss how these routing techniques work.	3	3	10
		UNIT-4			
8.	**a).**	Illustrate the TCP three-way handshake process and discuss its importance in connection establishment.	4	3	5
	b).	Demonstrate the process of congestion control in the transport layer using Go-back-N protocol.	4	3	5
		OR			
9.	**a).**	Illustrate and explain UDP and its packet format.	4	3	5
	b).	Explain the principles of congestion control in TCP	4	2	5
		UNIT-5			
10.	**a).**	Explain SMTP in detail. Give its uses, state strengths and weakneses	5	2	5
	b).	Discuss about World WideWeb in detail	5	2	5
		OR			
11.	**a).**	Explain in detail about DNS and its frame format.	5	2	5
	b).	Write short notes on File Transfer Protocol	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

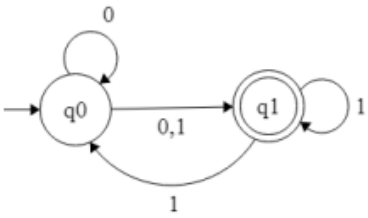
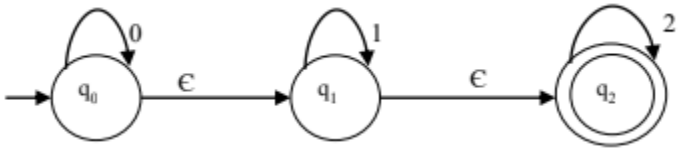
NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3103
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		NATURAL LANGUAGE PROCESSING			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	What is tokenization? Give an example.	1	1	2
	b).	Outline statistical language model.	1	2	2
	c).	Illustrate a regular expression to match a valid email address.	2	2	2
	d).	What is the minimum edit distance? How is it useful in spell correction?	2	1	2
	e).	Define lexical semantics.	3	1	2
	f).	What is discourse coherence?	3	1	2
	g).	List any two applications of Natural Language Generation.	4	1	2
	h).	Explain Direct Machine Translation?	4	2	2
	i).	Define stemming and lemmatization with one example each.	5	1	2
	j).	Describe the role of WordNet in NLP?	5	2	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain challenges of NLP and how Indian languages influence processing.	1	2	5
	b).	Identify tokenization with Python code for a paragraph input.	1	3	5
		OR			
3.	**a).**	Explain different grammar-based language models with examples.	1	2	5
	b).	Use unigram and bigram estimates and calculate probabilities of a given sentence.	1	3	5
		UNIT-2			
4.	**a).**	Construct a finite state automaton (FSA) to recognize dates in DD/MM/YYYY format.	2	3	5
	b).	Explain Context free grammar with examples.	2	2	5
		OR			
5.	**a).**	Compute the minimum edit distance between the words "intention" and "execution".	2	3	5
	b).	Explain how POS tagging helps in syntactic analysis. Give examples.	2	2	5

		UNIT-3			
6.	**a).**	Build a simple Python function to disambiguate a word using WordNet.	3	3	5
	b).	Explain different types of ambiguity in natural language.	3	2	5
		OR			
7.	**a).**	Describe meaning representation techniques in semantic analysis.	3	2	5
	b).	Identify Discourse Coherence and Structure using a small paragraph of your choice.	3	3	5
		UNIT-4			
8.	**a).**	Explain the architectural components of a Natural Language Generation (NLG) system?	4	2	5
	b).	Build a rule-based machine translation system to translate English to Hindi.	4	3	5
		OR			
9.	**a).**	Discuss key problems in Machine Translation involving Indian Languages.	4	2	5
	b).	Apply direct MT to translate from English to Telugu.	4	3	5
		UNIT-5			
10.	**a).**	Explain the use of NLP in Information Extraction and Question Answering Systems.	5	2	5
	b).	Apply Porter Stemmer and WordNet Lemmatizer to a paragraph using NLTK in Python.	5	3	5
		OR			
11.	**a).**	Describe various lexical resources used in NLP (e.g., WordNet, FrameNet, Penn Treebank).	5	2	5
	b).	Explain how automatic text summarization is done..	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3104	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		AUTOMATA THEORY & COMPILER DESIGN			
		(For AIML)			
Time: 3 Hrs.				**Max. Marks: 70 M**	
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	Construct DFA to accept set of all strings over {0,1} and having even zero's and even one's	1	3	2
	b).	Construct regular expression to denote set of strings set of all strings beginning with 01 and ending with 10	1	3	2
	c).	Construct Context free grammar for L= { WCW^R / W in (0+1)* }	2	3	2
	d).	Differentiate regular grammar and context free grammar.	2	2	2
	e).	Explain the Role of Lexical analysis in Compilers	3	2	2
	f).	Differentiate top down and bottom up parsers	3	2	2
	g).	Differentiate LR(0) item and LR(1) item	4	2	2
	h).	Explain about SDD	4	2	2
	i).	What is Basic block?	5	1	2
	j).	Differentiate the lexical errors and syntax errors	5	2	2
				5 x 10 =50Marks	
		UNIT-1			
2.	**a).**	Construct DFA from the following NFA 	1	3	5
	b).	Explain the applications and limitations of FA	1	2	5
		OR			
3.	**a).**	Construct NFA from the following ε-NFA 	1	3	5

	b).	Construct NFA with ϵ moves equivalent to the RE (ab + aab)*	1	3	5
		UNIT-2			
4.	**a).**	Apply pumping lemma to show the set of all even length palindrome strings is not regular.	2	3	5
	b).	Construct LMD and RMD for the string abba from the CFG S□aSbS / bSaS / ε	2	3	5
		OR			
5.	**a).**	Show that the following CFG is ambiguous, construct parse trees for the ambiguous string. S□S+S/ S*S/a/b	2	3	5
	b).	Apply pumping lemma on CFL to prove the following language is not CFL L= $\{a^n b^n c^n / n>=1\}$	2	3	5
		UNIT-3			
6.	**a).**	Explain different phases of compiler with neat diagram	3	2	5
	b).	Explain the Recognition of Tokens	3	2	5
		OR			
7.	**a).**	Explain the working of Predictive parser. Construct Predictive parsing table for the following CFG S□iEtSS^1/a S^1□eS/ ε E□b	3	3	10
		UNIT-4			
8.	**a).**	Explain in detail about parser generator YACC	4	2	5
	b).	Translate the expression a = (b * -c)+(b * -c) into Quadruples, triples and indirect triples.	4	3	5
		OR			
9.	**a).**	Explain how SLR parser operates, Construct SLR parsing table for the grammar S□AA A□aA/b	4	3	10
		UNIT-5			
10.	**a).**	Explain different sources of optimization	5	2	5
	b).	Explain about code generation from DAG	5	2	5
		OR			
11.	**a).**	Explain about basic block optimization.	5	2	5
	b).	Explain about the storage organization and stack allocation of space	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3105	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		NOSQL DATABASES			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Why are NoSQL databases becoming popular in modern application development?	1	2	2
	b).	What is a key-value data model? Name one database that uses this model	1	1	2
	c).	Differentiate between update consistency and read consistency.	2	2	2
	d).	What is a quorum in distributed databases, and why is it used?	2	1	2
	e).	What is a key-value store?	3	1	2
	f).	State one limitation of key-value stores when handling related data	3	1	2
	g).	What is meant by schema flexibility in document databases?	4	1	2
	h).	Name one scenario where a document database is not the best choice	4	1	2
	i).	What is a graph database?	5	1	2
	j).	State one situation in which a graph database is not an ideal choice for data management.	5	1	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain the concept of aggregate-oriented databases. How do aggregates influence schema design, data access, and performance in NoSQL systems?	1	2	10
		OR			
3.	**a).**	Write a short note on column-family stores. Mention one real-world use case where a column-family store is preferred	1	2	5
	b).	What is impedance mismatch in database systems? How does it affect application development with relational databases?	1	2	5
		UNIT-2			
4.	**a).**	Explain the main differences between sharding and replication. Provide one advantage of using both techniques together.	2	2	5
	b).	Discuss how relaxing consistency can improve availability and performance in distributed databases. Give an example.	2	2	5

		OR			
5.	**a).**	Discuss CAP theorem in detail and explain, with examples, how modern systems relax consistency or durability to meet scalability and availability needs.	2	2	10
		UNIT-3			
6.	**a).**	Describe the architecture and core features of key-value store databases.	3	2	10
		OR			
7.	**a).**	Explain how key-value stores support storing session information and user profiles in web applications	3	2	5
	b).	Compare the use of key-value stores for shopping cart data versus complex multi-operation transactions	3	2	5
		UNIT-4			
8.	**a).**	Describe two suitable use cases for a document database and explain why its data model is appropriate for these scenarios	4	2	10
		OR			
9.	**a).**	Discuss the features of column-family data stores and identify two applications where they provide significant advantages.	4	2	10
		UNIT-5			
10.	**a).**	Explain how graph databases represent and manage connected data using nodes and edges. Illustrate with an example from social networking or recommendation engines	5	2	10
		OR			
11.	**a).**	Describe the challenges of making schema changes in an RDBMS versus a NoSQL data store.	5	2	5
	b).	Discuss common limitations or drawbacks of graph databases	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3106
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		EXPLORATORY DATA ANALYSIS			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define Exploratory Data Analysis.	1	1	2
	b).	What are the types of data involved in EDA?	1	1	2
	c).	List any two visual tools used in EDA.	2	1	2
	d).	Write the use of seaborn in EDA	2	2	2
	e).	What is the significance of merging data frames in transformation?	3	2	2
	f).	Define discretization and binning.	3	1	2
	g).	What is the role of percentiles in descriptive statistics?	4	2	2
	h).	Mention different types of correlation analysis.	4	2	2
	i).	What is model evaluation in machine learning?	5	1	2
	j).	Define model deployment.	5	1	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Describe the different steps involved in Exploratory Data Analysis	1	2	5
	b).	Explain how EDA differs from classical and Bayesian analysis.	1	2	5
		OR			
3.	**a).**	Explain various measurement scales used in EDA	1	2	5
	b).	Discuss the importance and tools available for EDA using Python	1	2	5
		UNIT-2			
4.	**a).**	Illustrate any three visual aids for EDA using Seaborn with example.	2	2	5
	b).	Explain the steps to perform EDA on personal email data	2	2	5
		OR			
5.	**a).**	Demonstrate the process of selecting the best chart for given data types.	2	3	5
	b).	Describe the data refactoring and cleansing techniques used in the case study	2	2	5

		UNIT-3			
6.	**a).**	Explain techniques for handling missing data in data transformation.	3	2	5
	b).	Describe the steps involved in merging and concatenating DataFrames.	3	2	5
		OR			
7.	**a).**	Explain outlier detection and filtering techniques	3	2	5
	b).	Discuss the benefits and challenges of data transformation.	3	2	5
		UNIT-4			
8.	**a).**	Describe measures of central tendency and dispersion with examples	4	2	5
	b).	Explain univariate, bivariate and multivariate analysis with use cases	4	2	5
		OR			
9.	**a).**	Explain the concept of kurtosis and its types	4	2	5
	b).	How is time series analysis performed in descriptive statistics?	4	2	5
		UNIT-5			
10.	**a).**	Outline the machine learning workflow for model development	5	2	5
	b).	Explain the process of selecting the best model using evaluation metrics	5	2	5
		OR			
11.	**a).**	Describe the steps in model creation, training and deployment	5	2	5
	b).	Explain EDA techniques applied on Wine Quality Data Analysis case study	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3107	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. I Semester MODEL QUESTION PAPER					
OBJECT ORIENTED ANALYSIS AND DESIGN					
For AIML					
Time: 3 Hrs.				**Max. Marks: 70 M**	
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a)**	Briefly explain the importance of modeling in OOAD.	1	2	2
	b)	Illustrate stereo types in UML.	1	2	2
	c)	What are the different types of relationships used in class diagrams?	2	1	2
	d)	Explain associations in class diagrams.	2	2	2
	e)	Illustrate interfaces in OO design?	3	2	2
	f)	Compare Object Diagrams and Class Diagrams.	3	2	2
	g)	What are Use Cases in UML?	4	1	2
	h)	What are swim lanes in activity diagrams?	4	1	2
	i)	Explain in brief the significance of state machines in behavioral modeling.	5	2	2
	j)	Illustrate components in deployment modeling?	5	3	2
				5 x 10 = 50 Marks	
		UNIT-1			
2.		Demonstrate the use of structural things in UML with examples.	1	3	10
		OR			
3.		How do you use modeling in Analysis and Design?	1	3	10
		UNIT-2			
4.	**a)**	Demonstrate different types of class relationships with examples.	2	3	5
	b)	Apply class diagrams to Student Information System.	2	3	5
		OR			
5.	**a)**	How do you use common mechanisms in UML?	2	3	5
	b)	Demonstrate the components and notation in class diagrams.	2	3	5
		UNIT-3			
6.		Apply Object Diagrams and Class diagrams for designing a Human Resource Management System.	3	3	10

		OR			
7.		Use UML package diagram to organize the modules of a large-scale enterprise system. Show how you group classes into packages and discuss the significance of visibility and dependency relationships between packages.	3	3	10
		UNIT-4			
8.	**a)**	Draw a Use Case Diagram for an Order Management System.	4	3	5
	b)	Demonstrate the flow of activities in Activity Diagrams with an example.	4	3	5
		OR			
9.	**a)**	Demonstrate the use of sequence diagrams in UML.	4	3	5
	b)	Apply the steps for identifying use cases for any problem of your choice.	4	3	5
		UNIT-5			
10.	**a)**	Demonstrate state chart diagrams with a suitable example.	5	3	5
	b)	Draw a deployment diagram for a Vacation Tracking Web Application.	5	3	5
		OR			
11.	**a)**	Demonstrate processes and threads in UML modeling.	5	3	5
	b)	Apply component diagram for a real-time system.	5	3	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3108
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		INTERNET OF THINGS			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define Internet of Things (IoT).	1	1	2
	b).	What is M2M communication?	1	1	2
	c).	Name any two communication technologies used in IoT.	2	1	2
	d).	What are the layers in a simplified IoT architecture?	2	1	2
	e).	Define RESTful API in the context of IoT.	3	1	2
	f).	What does CoAP stand for? Give its primary use.	3	1	2
	g).	What is the role of data aggregation in IoT?	4	1	2
	h).	What is real-time data analytics?	4	1	2
	i).	What is the need for encryption in IoT?	5	1	2
	j).	List any two-security threats in IoT networks.	5	1	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain the role of sensors and actuators in IoT.	1	2	5
	b).	Differentiate between HTTP and HTTPS in terms of security.	1	2	5
		OR			
3.	**a).**	Elaborate on the design principles and connectivity requirements of IoT devices.	1	2	10
		UNIT-2			
4.	**a).**	Illustrate the importance of data enrichment and consolidation.	2	2	5
	b).	Discuss the role of the middleware layer in IoT systems.	2	2	5
		OR			
5.	**a).**	Explain the role of gateways in IoT network design.	2	2	5
	b).	Compare traditional network architecture with IoT architecture.	2	2	5
		UNIT-3			
6.	**a).**	Compare MQTT and HTTP protocols for IoT systems.	3	2	5
	b).	Describe the client-server model used in CoAP.	3	2	5
		OR			

7.	**a).**	Explain the publish/subscribe model with respect to MQTT.	3	2	5
	b).	Demonstrate how an IoT platform integrates sensors, gateways, and APIs to monitor energy usage.	3	3	5
		UNIT-4			
8.	**a).**	Discuss the differences between structured and unstructured data in IoT.	4	2	5
	b).	Analyze the challenges in preprocessing sensor data before analytics.	4	4	5
		OR			
9.	**a).**	Analyze the advantages and limitations of different types of analytics (descriptive, predictive, prescriptive) in IoT.	4	4	10
		UNIT-5			
10.	**a).**	Examine a real-world IoT attack (e.g., Mirai Botnet) and analyze how it exploited security weaknesses.	5	4	10
		OR			
11.	**a).**	Analyze a case study where IoT has been successfully implemented in industrial automation, highlighting the security and privacy controls in place.	5	4	10

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3201
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		REINFORCEMENT LEARNING			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define Reinforcement Learning	1	1	2
	b).	What is the Scope of Reinforcement Learning	1	1	2
	c).	Define Action value Methods	2	2	2
	d).	Describe how the incremental formula updates the estimated value.	2	2	2
	e).	Write the formula for return Gt in episodic tasks.	3	1	2
	f).	Differentiate between episodic and continuing tasks with examples.	3	2	2
	g).	Define Monte Carlo prediction.	4	1	2
	h).	Explain the purpose of importance sampling in off-policy prediction.	4	2	2
	i).	What is policy approximation	5	1	2
	j).	What problem does Samuel's checkers player solve?	5	2	2
					5 x 10 = 50 Marks
		UNIT-I			
2	a)	Solve An Extended Example of Tic-Tac-Toe Problem	1	3	5
	b)	List out the elements of Reinforcement Learning	1	2	5
		OR			
3	**a).**	Explain the Limitations and Scope of Reinforcement Learning	1	2	5
	b).	Explain Briefly the History of Reinforcement Learning	1	2	5
		UNIT-II			
4	**a)**	Explain the role of incremental updates in action-value methods for a k-armed bandit problem	2	2	5
	b)	How Upper-Confidence-Bound Action Selection is implemented	2	3	5
		OR			
5	**a)**	Describe the Upper Confidence Bound (UCB) action selection algorithm	2	2	5
	b)	What are gradient bandit algorithms? Explain how action preferences are updated and how they differ from action-value methods	2	3	5
		UNIT-III			

6	**a)**	Discuss about Asynchronous Dynamic Programming in detail	3	3	5
	b)	Explain Agent-Environment Interface	3	2	5
		OR			
7	**a)**	Explain the process of policy evaluation and policy iteration in dynamic programming.	3	2	5
	b)	Discuss about various Optimal Value Functions in detail	3	3	5
		UNIT-IV			
8	**a)**	Explain the difference between Monte Carlo prediction and Monte Carlo estimation of action values.	4	2	5
	b)	How Monte Carlo- Prediction is implemented	4	3	5
		OR			
9	**a)**	Explain the difference between first-visit and every-visit Monte Carlo prediction methods.	4	2	5
	b)	Compare Monte Carlo prediction and Temporal Difference (TD) prediction methods.	4	4	5
		UNIT-V			
10	**a)**	Illustrate The Policy Gradient Theorem.	5	2	5
	b)	Discuss TD-Gammon and its Applications	5	3	5
		OR			
11	**a)**	Explain Monte Carlo Policy Gradient	5	3	5
	b)	Explain how the REINFORCE algorithm works as a Monte Carlo policy gradient method	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3202
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		BIG DATA ANALYTICS			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Mention one reason for the importance of Big Data	1	1	2
	b).	How does Big Data help in healthcare?	1	1	2
	c).	Differentiate between local and pseudo-distributed Hadoop modes.	2	1	2
	d).	Define scaling out in Hadoop.	2	2	2
	e).	Write one difference between old and new Hadoop API	3	2	2
	f).	What is a RecordReader in Hadoop MapReduce?	3	2	2
	g).	What is the purpose of using Spark on YARN?	4	2	2
	h).	List any two differences between Hadoop and Spark.	4	2	2
	i).	Difference between local and distributed modes in Pig?	5	2	2
	j).	List two Hive data types.	5	2	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain the characteristics and importance of Big Data with suitable examples	1	2	5
	b).	Describe the concept of distributed file systems and explain the architecture and features of GFS.	1	2	5
		OR			
3.	**a).**	Describe the importance of Big Data in various domains.	1	2	5
	b).	Define wrapper classes in Java. Explain their use with examples.	1	3	5
		UNIT-2			
4.	**a).**	Describe the architecture and building blocks of the Hadoop Distributed File System (HDFS).	2	2	5
	b).	What are the major XML configuration files used in Hadoop? Explain their roles.	2	2	5
		OR			
5.	**a).**	Explain HDFS file read and write operations. Describe the role of Java interfaces in these processes.	2	3	5

	b).	Describe how Hadoop handles scaling out and fault tolerance.	2	2	5
		UNIT-3			
6.	**a).**	Explain the steps in writing a MapReduce program using a weather dataset.	3	3	5
	b).	Describe the anatomy of a MapReduce job run. Include all major phases.	3	2	5
		OR			
7.	**a).**	What is Hadoop Streaming? How is it used to write MapReduce programs in other languages?	3	2	5
	b).	Discuss how failures are handled in the MapReduce framework.	3	2	5
		UNIT-4			
8.	**a).**	Describe Spark architecture and describe its core components with a diagram.	4	2	5
	b).	Explain RDD in Spark. Describe its creation and basic transformations and actions with examples.	4	3	5
		OR			
9.	**a).**	Apply Spark on YARN cluster manager for deploying a distributed data processing task.	4	3	5
	b).	Write the procedure to configure Spark cluster using Standalone mode.	4	3	5
		UNIT-5			
10.	**a).**	Write and explain basic Pig Latin scripts for loading, filtering, and grouping data.	5	2	5
	b).	Create Hive tables and demonstrate how to insert, update, and query data using HiveQL.	5	3	5
		OR			
11.	**a).**	Write a HiveQL query to create a database, a table, and perform SELECT queries with filters and conditions	5	3	5
	b).	Describe the role and functioning of Zookeeper in distributed coordination with HBase.	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

					Course Code: B23AM3203
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		DATA VISUALIZATION			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	State any two Gestalt principles related to visual perception.	1	1	2
	b).	Explain the relationship between visualization and other fields.	1	1	2
	c).	What is a visualization reference model?	2	1	2
	d).	Mention one key consideration in the design of visualization applications.	2	1	2
	e).	List two classification categories of visualization systems.	3	1	2
	f).	Name the types of data visualized in one, two, and multi-dimensional visualizations.	3	1	2
	g).	Mention two types of graphs used in visualization.	4	1	2
	h).	What is metaphorical visualization?	4	1	2
	i).	Name two types of data structures used in data visualization.	5	1	2
	j).	What is volumetric data visualization?	5	1	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain the importance of visual perception in data visualization.	1	2	5
	b).	Describe the visualization process and Explain its key stages.	1	2	5
		OR			
3.	**a).**	Discuss how Gestalt principles influence the design of visual representations.	1	2	5
	b).	Explain the challenges posed by information overload in visualization and discuss ways to overcome these challenges.	1	2	5
		UNIT-2			
4.	**a).**	Explain the components of the visualization reference model in detail	2	2	5
	b).	Analyze the process and importance of creating visual representations in data visualization.	2	4	5
		OR			
5.	**a).**	Explain how visual mapping affects the interpretation of data in visualization.	2	2	5
	b).	Evaluate the role of visual analytics in decision making with suitable	2	4	5

		examples.			
		UNIT-3			
6.	**a).**	Explain the classification of visualization systems with examples.	3	2	5
	b).	Illustrate the methods for visualizing multi-dimensional data effectively.	3	3	5
		OR			
7.	**a).**	Explain the challenges in visualizing text and text documents.	3	2	5
	b).	Discuss the impact of misleading visualization techniques on data interpretation.	3	3	5
		UNIT-4			
8.	**a).**	Explain visualization techniques used for trees and graphs.	4	2	5
	b).	Describe methods to visualize clusters and networks effectively.	4	3	5
		OR			
9.	**a).**	Explain the concept of metaphorical visualization and its advantages.	4	2	5
	b).	Discuss the effectiveness of group visualization techniques in representing complex data.	4	3	5
		UNIT-5			
10.	**a).**	Explain techniques used for visualization of vector fields and simulations.	5	2	5
	b).	Illustrate collaborative visualization and its benefits in data analysis.	5	3	5
		OR			
11.	**a).**	Explain the significance of geographic information systems (GIS) in data visualization.	5	2	5
	b).	Compare different data structures used in visualization and their impact on performance.	5	4	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3204	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. II Semester MODEL QUESTION PAPER					
CRYPTOGRAPHY & NETWORK SECURITY					
For AIML					
Time: 3 Hrs.				**Max. Marks: 70 M**	
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	Define cryptography and mention any two of its goals.	1	1	2
	b).	What is Steganography? Mention how it differs from cryptography.	1	2	2
	c).	Define Euler's Phi function with an example.	2	1	2
	d).	List any two differences between symmetric and asymmetric key cryptography.	2	2	2
	e).	What is the purpose of the Diffie-Hellman key exchange protocol?	3	2	2
	f).	how does a Fiestal Structure ensure both confusion and diffusion.	3	2	2
	g).	Define message authentication code (MAC).	4	1	2
	h).	What is a digital signature? Give one use case.	4	2	2
	i).	Mention two applications of IP Security (IPSec).	5	1	2
	j).	List any two threats to email communication.	5	1	2
				5 x 10 = 50 Marks	
		UNIT-1			
2.	**a).**	Explain the principles of security and types of attacks.	1	2	5
	b).	Describe the substitution and transposition techniques.	1	2	5
		OR			
3.	**a).**	Explain the network security model with a diagram.	1	2	5
	b).	Illustrate steganography with real time example.	1	2	5
		UNIT-2			
4.	**a).**	Explain Fermat's Little Theorem and Euler's Theorem.	2	2	5
	b).	Explain Chinese Remainder Theorem and Find x, if possible, such that $2x \equiv 5 \pmod 7$, and $3x \equiv 4 \pmod 8$.	2	3	5
		OR			
5.	**a).**	Explain GF(2^n) fields and their significance in cryptography.	2	2	5
	b).	Apply modular exponentiation in an example problem.	2	2	5

		UNIT-3			
6.	**a).**	Explain the structure and working of AES algorithm .	3	2	5
	b).	Perform encryption and decryption using the RSA algorithm for the following: p=3; q=11; e=7; M=5 .	3	2	5
		OR			
7.	**a).**	Explain Diffie-Hellman Key Exchange protocol and Suppose Alice and Bob agreed on p as 7 and g as 5. Find the value of secret keys?.	3	3	5
	b).	Explain the working of Elliptic Curve Cryptography (ECC).	3	2	5
		UNIT-4			
8.	**a).**	Describe SHA algorithm and its properties.	4	2	5
	b).	Explain the working of HMAC with a block diagram.	4	2	5
		OR			
9.	**a).**	Describe digital signature algorithm in verifying message integrity.	4	2	5
	b).	Explain RSA-PSS Digital Signature with steps.	4	2	5
		UNIT-5			
10.	**a).**	Explain SSL and TLS protocols and their roles in secure communication.	5	2	5
	b).	Describe IPSec components: ESP and AH protocols.	5	2	5
		OR			
11.	**a).**	Explain S/MIME for securing email communication.	5	2	5
	b).	Explain the structure and working of PGP in email security.	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3205	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		SOFTWARE ENGINEERING			
		(For AIML)			
Time: 3 Hrs.				**Max. Marks: 70 M**	
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	How is computer systems engineering different from software engineering?	1	2	2
	b).	Are the terms SDLC and software development process synonymous? Explain your answer.	1	2	2
	c).	List any four desirable characteristics of a good software specification (SRS) document	2	1	2
	d).	What is a stereotype in UML explain with an example?	2	2	2
	e).	What are the advantages of component-based user interface development?	3	1	2
	f).	Distinguish between user-centric interface design and interface design by users.	3	2	2
	g).	What is regression testing and how it is performed?	4	2	2
	h).	What is cyclomatic complexity of a program?	4	1	2
	i).	Define any two commonly used project size estimation metrics	5	1	2
	j).	Define software reverse engineering.	5	1	2
				5 x 10 = 50 Marks	
		UNIT-1			
2.	**a).**	Explain what is meant by the control flow structure of a program. Describe some techniques for designing a clear and effective control flow in a program with an example.	1	3	10
		OR			
3.	**a).**	Briefly explain agile software development model. Give an example of a project for which agile model would be suitable and one project for which agile model would not be appropriate.	1	3	10
		UNIT-2			
4.	**a.)**	Draw a class diagram using UML syntax to represent the following. An engineering college offers B.Tech degrees in three branches. Each branch can admit 30 students each year. For a student to complete the	2	3	5

		degree, he/she has to clear all the 30 core courses and at least 10 of the elective courses.			
	b.)	What is the difference between a use case and a scenario? Identify all scenarios for the withdraw cash use case of a standard bank ATM	2	3	5
		OR			
5.	**a).**	What is the difference between functional and non-functional requirements of a system? Identify at least two functional requirements and one non-functional requirement of a bank automated teller machine (ATM) system.	2	3	5
	b).	Develop an use case model for a standard bank ATM.	2	3	5
		UNIT-3			
6.		Explain balancing a DFD with an example.	3	2	10
		OR			
7.	**a).**	What is a design review? Mention the list of items that can be used as a checklist for carrying out the review	3	2	5
	b).	Explain top-down decomposition in the context of function-oriented design with suitable example	3	2	5
		UNIT-4			
8.		How do software reliability and quality approaches impact the overall performance of a software system?	4	2	10
		OR			
9.		Explain types of white box testing in detail	4	2	10
		UNIT-5			
10.		Explain the basic concept of the COCOMO model and how it is used for estimating effort, time, or cost in software projects	5	2	10
		OR			
11.		Describe two software maintenance process models, such as the quick-fix model and the iterative enhancement model. Summarize their key features and typical use cases.	5	2	10

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3206	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. II Semester MODEL QUESTION PAPER					
SOCIAL NETWORK ANALYSIS					
Professional Elective II					
For AIML					
Time: 3 Hrs.					**Max. Marks: 70 M**
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define the Semantic Web in one sentence.	1	1	2
	b).	Explain “macro-structure” in social network analysis?	1	2	2
	c).	Explain the term "smushing" in the context of reasoning with identity.	2	2	2
	d).	Name any two ontology languages used for knowledge representation on the Semantic Web.	2	1	2
	e).	Explain the term “community” in a social network.	3	2	2
	f).	What is meant by “mutual awareness” in social community formation?	3	1	2
	g).	Define context-awareness in mobile computing.	4	1	2
	h).	List two privacy issues related to user data distribution in social platforms.	4	1	2
	i).	What is matrix representation in social networks?	5	1	2
	j).	List any two Web 2.0 services used for social network visualization.	5	1	2
5 x 10 = 50 Marks					
		UNIT-1			
2.	**a).**	Illustrate the global structure of networks with a suitable diagram or example.	1	2	5
	b)	Explain any two key measures used in social network analysis.	1	2	5
		OR			
3.	**a).**	Demonstrate the role of standardization in the development of the Semantic Web.	1	2	5
	b).	Explain the emergence of the Social Web and its impact on online interactions.	1	2	5
		UNIT-2			
4.	**a).**	Explain the role of ontology in Semantic Web-based knowledge representation.	2	2	5
	b)	Compare RDF and OWL with examples.	2	2	5

		OR			
5.	**a).**	Explain the major ontology languages and their features, giving examples of how they are applied in the Semantic Web.	2	2	10
		UNIT-3			
6.	**a).**	Apply vertex similarity measures to detect and form communities within a social network.	3	3	5
	b).	Explain how mutual awareness contributes to community discovery in social networks.	3	2	5
		OR			
7.	**a).**	Apply spectral algorithm principles to find communities in a network with weighted edges.	3	3	5
	b).	Explain the concept of modularity and how it helps in evaluating community quality.	3	2	5
		UNIT-4			
8.	**a).**	Apply ethical principles to address the challenges in managing and inferring user data?"	4	3	5
	b).	Explain the concept of Reality Mining and how it can be used to understand human behavior in social communities.	4	2	5
		OR			
9.	**a).**	Illustrate with examples how trust network analysis can be used to monitor digital communities for abusive behaviour or misinformation.	4	2	10
		UNIT-5			
10.	**a).**	Explain the concept of centrality in social network analysis and how it helps in understanding social structures.	5	2	5
	b)	Apply graph theory to analyze relationships in a social network	5	3	5
		OR			
11.	**a).**	Compare the difference between node-edge diagrams and matrix representations.	5	2	5
	b).	Apply both node-link and matrix + node-link diagrams to a social media data sample.	5	3	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

		Course Code: B23AM3207			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		SOFT COMPUTING			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	What is soft computing?	1	1	2
	b).	Explain the role of dendrites in a biological neuron.	1	2	2
	c).	Define backpropagation.	2	1	2
	d).	What do you understand by adaptive learning in ADALINE?	2	2	2
	e).	Why is defuzzification required in fuzzy systems?	3	2	2
	f).	What is membership function?	3	1	2
	g).	What is Mamdani fuzzy inference system?	4	1	2
	h).	Why is decomposition of rules used in fuzzy systems?	4	2	2
	i).	What is coding in genetic algorithms?	5	1	2
	j).	Explain the concept of genetic fuzzy rule-based system.	5	2	2
					5 x 10 = 50 Marks
		UNIT-I			
2	a)	Discuss the basic model of artificial neural network with mathematical representation.	1	2	5
	b)	Design a McCulloch-Pitts neuron model to implement OR gate with proper weights and threshold.	1	3	5
		OR			
3	**a).**	Explain Hebbian learning rule with an example.	1	2	5
	b).	Illustrate how learning rate affects weight adjustment in Hebb network.	1	3	5
		UNIT-II			
4	**a)**	Describe the architecture of backpropagation network with neat diagram.	2	2	5
	b)	Design a perceptron to implement the OR gate with weights, threshold, and outputs for all inputs.	2	3	5
		OR			
5	**a)**	Differentiate between perceptron and ADALINE.	2	2	5
	b)	Design a perceptron to implement the OR gate with weights, threshold, and outputs for all inputs.	2	3	5

		UNIT-III			
6	**a)**	Explain methods of membership value assignments in fuzzy logic.	3	2	5
	b)	Given fuzzy sets A={0.3/x,0.6/y,0.9/z} and B={0.5/x,0.4/y,0.7/z}, calculate A ∪ B and A ∩ B.	3	3	5
		OR			
7	**a)**	What are Lambda-cuts? Explain their significance in fuzzy sets.	3	2	5
	b)	Apply defuzzification using centroid method for membership function μ(x)= {0.2/2, 0.5/4, 0.7/6, 0.9/8}. Show steps.	3	3	5
		UNIT-IV			
8	**a)**	Explain decomposition and aggregation of rules in fuzzy systems.	4	2	5
	b)	Formulate a fuzzy rule base with three rules to control washing machine speed based on load and dirtiness.	4	3	5
		OR			
9	**a)**	What is a fuzzy inference system? Explain its components.	4	2	5
	b)	Explain with example how Sugeno fuzzy model can be used for rainfall prediction.	4	3	5
		UNIT-V			
10	**a)**	Describe the process of selection in genetic algorithms with examples.	5	2	5
	b)	Design a simple genetic algorithm flow to maximize f(x)=x+3 where x is 4-bit encoded.	5	3	5
		OR			
11	**a)**	Explain coding methods in GA with examples.	5	2	5
	b)	Calculate fitness for chromosomes representing x=3 and x=5 for the function f(x)=x^2 + 2x + 1.	5	3	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3209	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		COMPUTER VISION			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	What is the difference between RGB and HSV color spaces?	1	1	2
	b).	Compare image scaling and cropping?	1	2	2
	c).	Given an image pixel intensity array in red channel: R = [45,150,200,210,90,110] Create a 3-bin histogram (ranges: 0–85, 86–170, 171–255) and count the number of pixels in each bin.	2	3	2
	d).	Compare max pooling and average pooling in Convolutional Neural Networks	2	2	2
	e).	List two commonly used open-source datasets for transfer learning	3	1	2
	f).	What problem does transfer learning help address in small dataset scenarios?	3	1	2
	g).	Apply the YOLO model to a street image scenario and explain which objects it might detect	4	3	2
	h).	Determine whether U-Net or Mask R-CNN is more appropriate for analysing medical scan images	4	3	2
	i).	State one key challenge in evaluating GAN performance.	5	1	2
	j).	Given a set of object images, choose a method to count them using computer vision techniques	5	3	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Describe the applications of computer vision in healthcare, agriculture, and surveillance systems.	1	2	5
	b).	Illustrate the fundamental morphological operations in image processing like erosion, dilation, opening, and closing	1	2	5
		OR			
3.	**a).**	Explain in detail about histogram equalization and contrast enhancement in images	1	2	5
	b).	Demonstrate image translation and rotation using basic transformation matrices.	1	3	5

<table>
<tr><td></td><td></td><td>UNIT-2</td><td></td><td></td><td></td></tr>
<tr><td>4.</td><td>a).</td><td>Describe how color histograms and GLCM are used to extract features from an image. Provide one use case for each.</td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Describe how decision tree classifier can be used for image classification with help of an example</td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>5.</td><td>a).</td><td>Illustrate the architecture and functionality of Convolutional Neural Networks (CNNs).</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Calculate the accuracy, precision, recall, F1 score from the following confusion matrix
<table>
<tr><th></th><th>Predicted A</th><th>Predicted B</th><th>Predicted C</th><th>Actual Total</th></tr>
<tr><td>Actual A</td><td>40</td><td>2</td><td>3</td><td>45</td></tr>
<tr><td>Actual B</td><td>4</td><td>30</td><td>6</td><td>40</td></tr>
<tr><td>Actual C</td><td>2</td><td>3</td><td>35</td><td>40</td></tr>
<tr><td>Predicted Total</td><td>46</td><td>35</td><td>44</td><td>125</td></tr>
</table></td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-3</td><td></td><td></td><td></td></tr>
<tr><td>6.</td><td>a).</td><td>Illustrate Efficient architecture and explain the efficiency-improving techniques used in EfficientNet.</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Explain the factors that are to be considered to select the appropriate level of transfer learning for a new classification task.</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>7.</td><td>a).</td><td>Compare MobileNet and EfficientNet in terms of design strategies, efficiency, and application domains.</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Demonstrate the significance of transfer learning in training deep learning models with suitable example</td><td>3</td><td>3</td><td>5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-4</td><td></td><td></td><td></td></tr>
<tr><td>8.</td><td>a).</td><td>Explain why YOLO might be preferred over R-CNN given a real-time video surveillance scenario</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Compare and contrast Instance Segmentation, Semantic Segmentation and Panoptic segmentation</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>9.</td><td>a).</td><td>Demonstrate how the SSD (Single Shot Detector) model can be used for object detection by predicting object classes and locations in a single pass through the network.</td><td>4</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Explain the step-by-step process involved in instance segmentation using Mask R-CNN</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-5</td><td></td><td></td><td>5</td></tr>
<tr><td>10.</td><td>a).</td><td>Explain the architecture of a GAN and describe the adversarial training</td><td>5</td><td>2</td><td>5</td></tr>
</table>

		process.			
	b).	Illustarte object size estimation using bounding boxes and camera calibration.	5	2	5
		OR			
11.	**a).**	Describe visual embeddings are learned and used in image retrieval.	5	2	5
	b).	Explain pose estimation and the role of keypoint detection in the process.	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

Course Code: B23AM3210

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A) **R23**

III B.Tech. II Semester MODEL QUESTION PAPER

OPERATING SYSTEMS

For AIML

Time: 3 Hrs. **Max. Marks: 70 M**

Answer Question No.1 compulsorily

Answer **ONE Question** from **EACH UNIT**

Assume suitable data if necessary

10 x 2 = 20 Marks

			CO	KL	M
1.	**a).**	List the services of Operating System?	1	1	2
	b).	Differentiate System call and System Program.	1	2	2
	c).	Explain different states of a process.	2	1	2
	d).	Explain waiting time and turnaround time	2	2	2
	e).	List the two basic operations of a Semaphore?	3	1	2
	f).	Explain race condition with an example.	3	1	2
	g).	Explain about Page Fault.	4	2	2
	h).	Differentiate Internal and external fragmentation.	4	2	2
	i).	List different File Attributes	5	1	2
	j).	List the different types of directory in OS	5	1	2

5 x 10 = 50 Marks

		UNIT-1			
2.	**a).**	Explain Operating System Structures?	1	2	5
	b).	List different types of system calls.	1	2	5
		OR			
3.	**a).**	Explain the different functions and services provided by an operating system.	1	2	10
		UNIT-2			
4.	**a).**	What is a thread ? Discuss about Threading Issues.	2	2	5
	b).	Explain in detail Inter Process Communication?	2	2	5
		OR			
5.	**a).**	Evaluate preemptive and non-preemptive SJFCPU Scheduling algorithm for given Problem.	2	3	10

Process	P1	P2	P3	P4
Process Time	8	4	9	5
Arrival Time	0	1	2	3

		UNIT-3			
6.	**a).**	Explain about Deadlock Detection?	3	2	5
	b).	Explain how semaphores are used while solving reader and writers problem.	3	2	5
		OR			
7.	**a).**	Explain Banker's Algorithm with an Example?	3	2	10
		UNIT-4			
8.	**a).**	What is virtual memory ? Discuss the benefits of virtual memory Techniques .	4	2	5
	b).	Differentiate Paging and segmentation	4	3	5
		OR			
9.	**a).**	Consider the following reference string 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Assume there are three frames. Apply LRU replacement algorithm to there reference string above and find out how many page faults are produced.	4	3	5
	b).	Explain the following disk scheduling algorithm with proper diagram a)FCFS b)LOOK c)C-SCAN.	4	2	5
		UNIT-5			
10.	**a).**	Explain file allocation methods in detail.	5	2	5
	b).	Explain the need and Goals of protection.	5	2	5
		OR			
11.	**a).**	Design a simple directory structure for a library management system	5	2	5
	b).	Explain about access matrix and implementation of access matrix.	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

				Course Code: B23AM3211	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		ROBOTIC PROCESS AUTOMATION			
		For AIML			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Compare RPA with general automation with one key difference.	1	2	2
	b).	Explain any two benefits of using RPA.	1	2	2
	c).	Compare the usage of 'If-Else' and 'Switch' activities in RPA control flow.	2	2	2
	d).	Explain the purpose of importing namespaces in an RPA project.	2	2	2
	e).	Explain the role of partial selectors in improving automation reliability.	3	2	2
	f).	Show how to extract a single piece of data from a PDF using RPA.	3	2	2
	g).	Explain any two strategies used to handle exceptions in RPA.	4	2	2
	h).	Explain the purpose of assistant bots in Robotic Process Automation.	4	2	2
	i).	Explain how a robot is connected to the server in RPA.	5	2	2
	j).	Classify the various components required to deploy and maintain a bot.	5	2	2
					5 x 10 = 50 Marks
		UNIT-1	**CO**	**KL**	**M**
2.	**a).**	Explain RPA and compare its benefits with traditional automation techniques.	1	2	5
	b).	Describe how the benefits of RPA can be utilized in a business case study.	1	2	5
		OR			
3.	**a).**	Outline the key components of an RPA system.	1	2	5
	b).	Compare RPA with traditional automation methods.	1	2	5
		UNIT-2			
4.		Explain the different types of activities available in RPA tools like UiPath.	2	2	10
		OR			
5.	**a).**	Develop an RPA workflow using different control flow statements to handle decision-making.	2	3	5
	b).	Develop a flowchart showing how the components of an RPA system interact.	2	3	5

		UNIT-3			
6.	**a).**	Explain the concept of data scraping in RPA.	3	2	5
	b).	Explain how selectors are used to identify UI elements in RPA.	3	2	5
		OR			
7.	**a).**	Compare image-based automation and keyboard-based automation in RPA.	3	2	5
	b).	Utilize anchors to automate data extraction from a PDF document.	3	3	5
		UNIT-4			
8.	**a)**	Illustrate different types of triggers available in RPA for handling user events.	4	2	10
		OR			
9.	**a).**	Summarize common strategies for troubleshooting issues in RPA.	4	2	5
	b).	Explain the workflow that incorporates exception handling mechanisms to manage errors effectively.	4	2	5
		UNIT-5			
10.	**a)**	Describe how servers are used to manage and deploy bots in an RPA environment.	5	2	10
		OR			
11.	**a).**	Describe the steps to publish a workflow in UiPath.	5	2	5
	b).	Demonstrate a strategy for managing and deploying updates in an RPA project.	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks

Course Code: B23AM3212

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A) **R23**

III B.Tech. II Semester MODEL QUESTION PAPER

RECOMMENDER SYSTEMS

For AIML

Time: 3 Hrs. **Max. Marks: 70 M**

Answer Question No.1 compulsorily

Answer **ONE Question** from **EACH UNIT**

Assume suitable data if necessary

10 x 2 = 20 Marks

			CO	KL	M
1.	**a).**	Define covariance in the context of data matrices.	1	1	2
	b).	What is a utility matrix in recommender systems.	1	1	2
	c).	Explain the working principle of item-based nearest neighbour collaborative filtering.	2	2	2
	d).	Compare model-based and memory-based collaborative filtering techniques.	2	2	2
	e).	Explain the role of user profiles in content-based filtering.	3	2	2
	f).	Illustrate how tags can be used to extract item features.	3	2	2
	g).	List any two limitations of hybridization strategies in recommender systems.	4	1	2
	h).	Define feature augmentation in monolithic hybridization.	4	1	2
	i).	Explain the purpose of evaluation in recommender systems.	5	2	2
	j).	Explain the importance of using historical datasets for evaluation.	5	2	2

5 x 10 = 50 Marks

		UNIT-1			
2.	**a).**	Calculate the covariance matrix for the given dataset. **User** / **Feature X** / **Feature Y** 1 / 4 / 2 2 / 2 / 0 3 / 0 / -1 4 / 2 / 1 5 / 6 / 4	1	3	5
	b).	Explain the practical challenges encountered in implementing recommender systems.	1	2	5
		OR			
3.	**a).**	Construct a user-item rating matrix five three users and six items. Then, perform matrix transposition and interpret the meaning of the transposed matrix.	1	3	4

<table>
<tr><td></td><td>b).</td><td>Describe any four real world applications of recommender systems</td><td>1</td><td>2</td><td>6</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-2</td><td></td><td></td><td></td></tr>
<tr><td>4.</td><td>a).</td><td>Consider the following ratings table between five users and six items. Compute the values of unspecified ratings of user 2 using user- based collaborative filtering algorithms. Use the Pearson correlation with mean-centering. Assume a peer group of size 2.
<table>
<tr><td colspan="2"></td><td colspan="6">Item Id</td></tr>
<tr><td rowspan="6">User Id</td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>1</td><td>5</td><td>6</td><td>7</td><td>4</td><td>3</td><td>?</td></tr>
<tr><td>2</td><td>4</td><td>?</td><td>3</td><td>?</td><td>5</td><td>4</td></tr>
<tr><td>3</td><td>?</td><td>3</td><td>4</td><td>1</td><td>1</td><td>?</td></tr>
<tr><td>4</td><td>7</td><td>4</td><td>3</td><td>6</td><td>?</td><td>4</td></tr>
<tr><td>5</td><td>1</td><td>?</td><td>3</td><td>2</td><td>2</td><td>5</td></tr>
</table></td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Compare user-based and item-based collaborative filtering approaches.</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>5.</td><td>a).</td><td>Demonstrate how a matrix factorization model (e.g., SVD) can be used for collaborative filtering.</td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Describe any two types of attacks that can affect collaborative filtering systems, with examples.</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-3</td><td></td><td></td><td></td></tr>
<tr><td>6.</td><td>a).</td><td>Construct an item profile for a movie recommendation system using attributes such as genre, director, and keywords. Demonstrate how it can be used to match a user profile.</td><td>3</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Describe the basic components of a content-based recommender system.</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>7.</td><td>a).</td><td>Demonstrate how classification algorithms like Naive Bayes or Decision Trees can be used to classify user preferences and make personalized recommendations.</td><td>3</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Compare and contrast similarity-based retrieval and classification-based methods in content-based recommenders.</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-4</td><td></td><td></td><td></td></tr>
<tr><td>8.</td><td>a).</td><td>Explain constraint-based recommender systems with examples.</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Describe the structure and functioning of a case-based recommender system.</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>9.</td><td>a).</td><td>Illustrate the different opportunities for hybridization in recommender systems. Why is hybridization essential?</td><td>4</td><td>2</td><td>5</td></tr>
<tr><td></td><td>b).</td><td>Summarize the monolithic hybridization strategies in recommender systems.</td><td>4</td><td>2</td><td>5</td></tr>
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</table>

		UNIT-5			
10.	**a).**	Explain different types of evaluation metrics used for recommender systems.	5	2	5
	b).	Compare offline evaluation and online evaluation in recommender systems.	5	2	5
		OR			
11.	**a).**	Explain the role of offline evaluation using historical datasets in RS performance measurement.	5	2	5
	b).	Describe the role of communities in recommender systems and personalized web search?	5	2	5

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 10 marks