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Roll No. .....

TIT–704

B. TECH. (CSE/IT) (SEVENTH SEMESTER)

END SEMESTER EXAMINATION, Nov.-Dec., 2021

CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Consider an Automated Teller Machine (ATM) in which users provide a Personal Identification Number (PIN) and a card for account access. Give examples of confidentiality, integrity and availability requirements associated with the system. In each case, indicate the degree of importance of the requirement. (CO1)

(b) Define the types of security attack in each of the following cases : (CO1)

(i) Alice gives a cheque of $12 to the shopkeeper to buy a toy. Later he finds that the cheque was cashed for $120.

(ii) A student breaks open into the university's office to get a copy of the exam paper which is yet to be held on the next day.

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(iii) Darth sends hundreds of e-mails every day to Bob using a phony return e-mail address.

(c) Describe security architecture. Explain its relevance and importance in achieving confidentiality, integrity, availability, authorization and authentication. (CO1)

2. (a) What are the design criteria for DES (At least *eight* points) ? (CO2)

(b) Write a program to perform encryption and decryption using general substitution cipher. (CO2)

(c) The motivation for the Feistel cipher structure, it was stated that, for a block of n bits, the number of different reversible mappings for the ideal block cipher is $2n!$ Justify. (CO2)

3. (a) Write all the steps required for secret key distribution for achieving confidentiality and authentication together with its model diagram. (CO3)

(b) Write pseudo code for RSA based encryption and signature for confidentiality and authentication and evaluate it, based upon specific inputs (numerical values). (CO4)

(c) Mention all the characteristics of a Hash function. Describe the applications of Hash function for assuring various security aspects in symmetric and asymmetric settings. (CO4)

4. (a) What are the security requirements for Kerberos to achieve authentication ? Mention all of them with their applications. (CO5)

(b) Write pseudo code for message exchange between client-server authentication within specifications of Kerberos 4. (CO5)

(c) Define the architecture of IPSEC and services provided by it. Make out a matrix for its services against AH, Encryption and authentication. (CO5)

5. (a) Describe TLS protocol suit and mention the security services provided by this in details. (CO6)

(b) In IEEE 802.11, open system authentication simply consists of two communications. An authentication is requested by the client, which contains the station ID (typically the MAC address) . This is followed by an authentication response from the AP/router containing a success or failure message. An example of when a failure may occur is if the client's MAC address is explicitly excluded in the AP/router configuration : (CO6)

(i) What are the benefits of this authentication scheme ?

(ii) What are the security vulnerabilities of this authentication scheme ?

(c) Describe 'IEEE 802.11 Protocol stack with its functions supported by various layers. (CO6)

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Paper Code: IBM 701

End Semester Examination 2021
(B. Tech CSE specialization in CC/DS)

VII *Semester*

Subject Name: **Blockchain**

Time: Three Hours MM: 100

Note:
(i) All questions are compulsory.
(ii) Answer any two sub questions among a, b & c in each main question.

Q1.) **(2X10=20 Marks) (CO1)**

a. What do you mean by Hyperledger fabric? Explain its components.
b. Create a Hyperledger fabric smart contract for CRUD operation to be performed on an Asset.
c. What is the difference between container and VM? Why containers are appealing to user? Explain

Q2. **(2X10=20 Marks) (CO2)**

a. Explain the architecture of Hyperledger fabric.
b. Create a Docker container image of a Node.js 'Hello-world' app.
c. How consensus is achieved in Hyperledger fabric? Explain.

Q3. **(2X10=20 Marks) (CO3)**

a. Compare promises consumer functions with callback function? Also explain the advantage of promises over callback.
b. How to create user defined modules in Node.js? Explain with example.
c. What do you mean by Endorsing peer? Explain their role.

Q4. **(2X10=20 Marks) (CO4)**

a. What do you mean by ordering service? Also explain Kafka Ordering service.
b. Create a java script program to show the basic implementation of block and blockchain.
c. What do you mean by channels in hyperledger fabric? Explain in detail.

Q5 **(2X10=20 Marks) (CO5)**

a. Explain the role of fabric peers in hyperledger fabric.
b. Design a hyperledger fabric network for Car Manufacturing business.
c. How the user identities stored in hyperledger fabric? Explain.

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Other than MBA

Paper Code: IBM 722

End Semester Examination 2021

(B. Tech CSE Specialization in ML & AI)

7th Semester

Industry Applications – Artificial Intelligence

Time: Three Hours MM: 100

Note:

(i) All questions are compulsory.

(ii) Answer any two sub questions among a, b & c in each main question.

Q1. **(2X10=20 Marks) (CO1)**

a. Differentiate between supervised, unsupervised and reinforcement machine learning. Explain with example.

b. Explain at least five architectural and operational differences between decision tree and random forest algorithm.

c. What is EDA? Why is EDA an important part in the initial process of solving any AI/ML problem?

Q2. **(2X10=20 Marks) (CO2)**

a. Define the following terms: 1. Mean 2. Median 3. Mode 4. Standard deviation 5. Correlation

b. What is confusion matrix? Explain with an example all the evaluation metrics related to it.

c. Explain the different machine learning algorithms with an example for each.

Q3. **(2X10=20 Marks) (CO3)**

a. Explain the concept of AI. Differentiate between strong AI and weak AI.

b. What is the role of frameworks of scikit-learn, keras and tensorflow. Differentiate them by taking suitable example.

c. Define overfitting. Explain how overfitting can be countered in neural networks.

Q4. **(2X10=20 Marks) (CO4)**

a. How does face detection work? Explain how it can be implemented using OpenCV.

b. How do you define backpropagation algorithm? How route weights are optimized to reduce the error in the model?

c. Explain 6 AI technology areas play an important role in reinventing the industries and transforming our world?

Q5 **(2X10=20 Marks) (CO5)**

a. What is NLP? Explain the areas where NLP can be applied and what are the various components of NLP?

b. Explain the difference between syntactic, semantic and sentimental analysis in NLP.

c. What is TF-IDF and countvectorizer? Explain the need of both.

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Other than MBA
Paper Code: IBM-712

End Semester Examination 2021
(B-Tech-CSE (DS & AI))

VII *Semester*

Paper Name: Data Science Application

Time: Three Hours MM: 100

Note:
(i) All questions are compulsory.
(ii) Answer any two sub questions among a, b & c in each main question.

Q1 **(2X10=20 Marks) (CO1)**

a. Define Measurement levels in predictive analytics with SPSS modeler
b. Explain data exploration process in terms of predicting values.
c. State the differences between traditional statistical analysis and data mining.

Q2. **(2X10=20 Marks) (CO2)**

a. Justify Generated node and write the steps to create a select node with the help of Generated node.
b. Explain stream in SPSS Modeler and steps to create a stream.
c. Brief about source palette and its nodes in terms of file formats.

Q3. **(2X10=20 Marks) (CO3)**

a. Define Super node and its types, also define the process to create a SUPER node in SPSS modeler.
b. Describe data auditing and brief about the node that helps performing data auditing.
c. Elaborate CRISP-DM phases.

Q4. **(2X10=20 Marks) (CO4)**

a. Brief about actions for invalid values in SPSS modeler.
b. Represent field operations and record operations nodes present in SPSS modeler.
c. Explain Unit of analysis and mention the methods to perform Unit of Analysis.

Q5 **(2X10=20 Marks) (CO5)**

a. State Modeling methods with example.
b. Mention all possible methods to examine the relationship between two fields.
c. Write the steps to run a classification model also mention the uses of the classification modeling technique.

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Other than MBA
Paper Code: IBM-702

End Semester Examination 2021
(B-Tech-CSE (CC))

VII *Semester*

Paper Name: Future of Cloud Computing

Time: Three Hours MM: 100

Note:
(i) All questions are compulsory.
(ii) Answer any two sub questions among a, b & c in each main question.

Q1. **(2X10=20 Marks) (CO1)**

a. Expand the cloud adoption patterns for the government, banking and healthcare industries.
b. Explain cloud computing with its benefits including neat and clean diagram.
c. Explain cloud culture of change.

Q2. **(2X10=20 Marks) (CO2)**

a. Stamp drivers for digital transformations.
b. What has driven the development of AI including AI evolution factors?
c. Mention six key AI technologies across the value chain.

Q3. **(2X10=20 Marks) (CO3)**

a. Explain 12 treacherous top threats with cloud computing.
b. Explain six cloud business enabler's values with proper definition and examples.
c. Describe empathy category with its sub types of Watson services.

Q4. **(2X10=20 Marks) (CO4)**

a. Why use NoSQL databases? State with its attributes.
b. Define data, explain NoSQL databases with example.
c. Individualize tools provided by IBM Cloud Continuous Delivery.

Q5. **(2X10=20 Marks) (CO5)**

a. Annotate DevOps with its life cycle including diagram and benefits.
b. Define authorization in cloud security.
c. Write the name of DevOps practices.

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TCS–703

B. Tech. (CSE) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021

COMPUTER NETWORKS–II

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

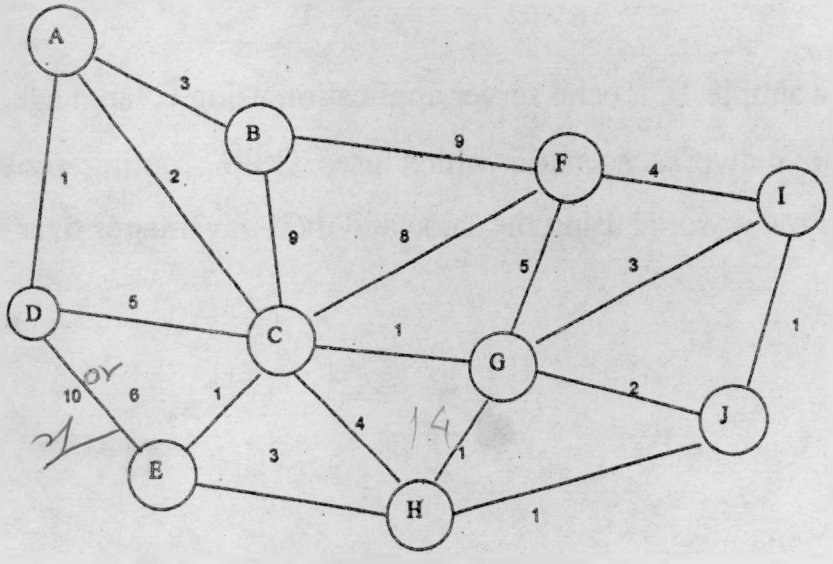
(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Consider the three node topology, the link cost are $c\ (x, y) = 4$, $c\ (y, z) = 5$, $c\ (z, x) = 2$, compute the distance tables after the initialization step and after each interation of a synchronous version of the distance-vector algorithm. (CO3)

(b) Consider the following network. With the indication link costs, use LS algorithm to compute the shortest path from 'A' to all network nodes. Show the result in the tabular format : (CO3)



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(c) Calculate the maximum frame rate a node on Ethernet (assume 10 Mbps link). (CO2)

2. (a) Explain all the fields present in "Ethernet Frame Structure". (CO2)

(b) Comparison of LS and DV with robustness as the criteria. (CO2)

(c) What is the remainder obtained by dividing $x^7 + x^5 + 1$ by the generator polynomial $x^3 + 1$? Explain correcting single bit error using single bit parity. (CO2)

3. (a) How is RTSP similar to HTTP ? Does RTSP have methods ? Can HTTP be used to request a stream ? (CO2)

(b) Discuss RTP packet header fields. (CO1)

(c) What is the role of a SIP registrar ? How is the role of an SIP registrar different from that of a home agent in mobile IP ? (CO1)

4. (a) What is Network Management and what is the role of SNMP in it ? (CO1)

(b) Gatekeeper functions in H.323 network. (CO1)

(c) What are the seven messages type used in SNMP ? (CO1)

5. (a) What is Socket and what does it consist of ? Explain raise condition. (CO1)

(b) Design a simple TCP echo server application using C language. (CO3)

(c) Design a networks scenario which uses OSPF routing protocol and explain how it works using the same and their advantages over RIP. (CO4)

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Roll No. .....

TCS–731

B. TECH. (CSE) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021

DIGITAL FORENSICS

Time : Three Hours

Maximum Marks : 100

Note : (i) Answer all the *five* questions. Each question carries a total of 20 marks.

(ii) Read the questions carefully. Some questions have choices which are given along with marks distribution.

1. (a) Analyze the current state of IT laws and cyber crimes in India and the world. What are the measures which should be taken to reform the landscape of IT laws and cyber crimes across the world ?

3+3+4 = 10 (CO6)

(b) Illustrate the digital forensic investigation model. Discuss each of the steps involved while investigating a digital forensic case. 5+5=10 (CO5)

2. (a) What are the different methods of password cracking used by forensic investigators ? Discuss the advantages and disadvantages of these methods. 5+5=10 (CO4)

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(b) "Memory forensics in rapidly evolving to become the heart of a digital investigation process." Examine and elaborate on the statement from the perspective of a forensic investigator. 10 (CO2)

3. Write short notes on any *five* of the following : 5×4=20(CO4)

(i) Browser forensics

(ii) Multimedia forensics

(iii) Cloud forensics

(iv) IoT forensics

(v) Virtual Machine forensics

(vi) Live forensics

(vii)Database forensics

(viii)Network forensics

4. (a) Analyze the advantages and disadvantages of adopting digital forensics as a field of investigation. 5+2=10(CO1)

(b) Write brief notes on any *two* of the following : 2×5=10(CO3)

(i) Digital Watermarking

(ii) Digital Fingerprinting

(iii) Buffer Overflow

(iv) Code Injection

5. (a) Evaluate the significance of any *two* of the following and write short notes : 2×5=10(CO3)

(i) Types of investigation software

(ii) Data hiding techniques

(iii) Anti-forensics

(iv) Encryption and decryption methods

(b) Assume that you are the forensic investigator for *one* of the following cases. Depending upon the choice of your case, list out the formal steps for investigating the crime from a digital forensic investigators perspective : 10 (CO5)

(i) Online financial fraud

(ii) Blackmailing

(iii) Stealing of credentials for misuse

(iv) Credit card fraud

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Roll No. .....

TCS–722

B. TECH. (CSE) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021

DATA WAREHOUSING AND DATA MINING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) What is data warehouse ? What are the goals that a data warehouse is meant to be achieved ? (CO1)

   (b) How is the Ralph Kimball's approach to building a data warehouse different from William H. Inmons' approach to building data warehouse ? Explain. (CO1)

   (c) Is it a good idea for enterprises to maintain independent data marts ? Explain your answer with reasons. (CO1)

2. (a) Explain the difference between entity relationship modeling and dimensional modeling. (CO2)

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(b) What is Support Vector Machine ? What are support vectors ? Name *two* advantages and limitations of SVM. What is a confusion matrix ? Explain recall, precision and F-measure. (CO2)

(c) What are the *three* phases of construction of a decision tree ? Describe the importance of each of the phase. (CO2)

3. (a) With suitable example explain Star schema and Snowflake schema for multidimensional databases. (CO3, CO4)

(b) Given the following set of transactions in market basket analysis, find frequent item set using apriori algorithm, consider min_sup = 2 :

(CO3, CO4)

Transaction ID	Items Bought
02	Mil, Bread, Cookies, Juice
02	Milk, Juice
03	Milk, Eggs
04	Bread, Cookies
05	Juice, Eggs
06	Bread, Eggs

(c) Explain the 3-tier data warehouse architecture and its various components. (CO3, CO4)

4. (a) Explain entity relationship modeling and dimensional modeling.

(CO4, CO5)

(b) What is ROLAP, MOLAP and HOLAP ? How is MOLAP different from ROLAP ? (CO4, CO5)

(c) Apply agglomerative hierarchical clustering on given data and draw dendrogram : (CO4, CO5)

	A	B	C	D	E
A	0				
B	15	0			
C	3	7	0		
D	6	5	9	0	
E	11	10	2	8	0

5. (a) Distinguish the features between OLTP and OLAP. (CO5)

(b) Consider that the data mining task is to cluster the following eight points A1, A2, A3, B1, B2, B3, Cl and C2 with (x, y) representing location into three clusters. A1 (2, 10) , A2 (2, 5), A3 (8, 4), B1 (5, 8), B2 (7,5), B3 (6, 4), C1 (1, 2), C2 (4, 9).

The distance function is Euclidean distance. Suppose initially we assign Al, B1 and C1 as the center of each cluster respectively. Use the K means algorithm to show the three cluster centers after the first round of execution and the final three clusters. (CO5)

(c) Write an algorithm for Bayesian classification. Illustrate the algorithm with a relevant example. (CO5)

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TCS–756

B. TECH. (CSE) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021

HUMAN COMPUTER INTERACTION

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Describe any *five* usability goals of Microsoft Edge Browser. (CO1, CO2)

   (b) List and explain various fields involved in Human Computer Interaction. (CO1, CO2)

   (c) Explain about GUI interface design. (CO1, CO2)

2. (a) What are the various difficulties with poor design ? (CO1, CO3)

   (b) Define good screen design. What are the problems with poor design given the factors ? (CO1, CO3)

   (c) What are the various functions of Menu ? Discuss different types of menus. (CO1, CO3)

3. (a) Discuss psychological and physical user responses to poor design. (CO2, CO3)

   (b) Distinguish between short-term and long-term memory. State requirements to perform cognitive walkthrough of a system. (CO2, CO3)

   (c) Highlight the features of direct manipulation interface. (CO2, CO3)

4. (a) What is a screen ? What is the purpose of a screen ? (CO1, CO2, CO4)

   (b) Do you think that prototyping will solve all problems associated with user interface design ? Give reason for your answer. (CO1, CO2, CO4)

   (c) Define principles, standards, guidelines and rules. (CO1, CO2, CO4)

5. (a) Explain any *five* important human characteristics in Design. (CO3, CO5)

   (b) Give the guidelines for presenting error message on web. (CO3, CO5)

   (c) Write about various device-based controls. (CO3, CO5)

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Roll No. .....

TCS–704

B. Tech. (CSE) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021

ADVANCED COMPUTER ARCHITECTURE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Discuss the Instruction Set Architecture of a processor and illustrate its dimensions with format. (CO1, CO3)

(b) Assume a 20 cm diameter wafer has a cost of 15, contains 100 dies and has 0.031 defects/cm^2. (CO1, CO3)

(i) If the number of dies per wafer is increased by 10% and the defects per area unit increases by 15%, find the die area and yield.

(ii) Assume a fabrication process improves the yield from 0.92 to 0.95. Find the defects per area unit for each version of the technology given a die area of 200 mm^2.

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(c) State Amdahl's law. Let a program have a portion f_E of its code enhanced to run 4 times faster (so $f_1 = 4$) , to yield a system speedup 3.3 times faster (so S = 3.3) . What is the fraction enhanced (f_E) ?

(CO1, CO3)

2. (a) Elaborate the Cache Coherence problem in multi-core systems. Illustrate the main cache write policy used in detail. (CO2)

(b) For a cache with direct mapping and block size of 4 KB consider the size of main memory to be 16 GB and 10 bits in the tag.

Find : (CO2)

(i) Size of cache memory

(ii) Tag directory size

(c) Analyze and discuss the mapping of main memory with virtual memory addressing. Also summarize the fast address translation techniques.

(CO2)

3. (a) List different mechanisms of instructions pipelining. Explain any *one* in detail. (CO2, CO6)

(b) Consider the following reservation table for 3-stage pipeline :

(CO2, CO6)

	1	2	3	4	5	6	7	8
S1	X					X		X
S2		X		X				
S3			X		X		X	

(i) What are the forbidden latencies and initial collision vector ?

(ii) Draw the state transition diagram.

(iii) List all simple cycles and Greedy cycles.

(iv) Determine MAL.

(v) Determine the pipeline throughput.

(c) Compare and contrast different pipeline hazards. Briefly describe each *one* of them in detail. (CO2, CO6)

4. (a) Assume a non-pipelined processor with a clock rate of 2.5 gigahertz and average cycles per instruction of 4.The same processor is upgraded to a pipelined processor with five stages but due to the internal pipeline delay, the clock speed is reduced to 2 gigahertz. Assume there are no stalls in the pipeline. Find out the speed up achieved in this pipelined processor. (CO4, CO5)

(b) Enlisting the limitation of pipelining, explain the concept of branch prediction. Discuss how it helps in controlling hazards. (CO4, CO5)

(c) The performance of the processor can be improved based on hit rate, miss rate, latency, efficiency and cost through cache optimization. Justify and discuss the cache optimization techniques. (CO4,CO5)

5. (a) What is the taxonomy of parallel architectures ? Support your answers with suitable example and diagram. (CO5, CO6)

(b) Compare and summarize the difference between the centralized shared memory and distributed shared memory architectures. Also mention the suitable examples of both architectures. (CO5, CO6)

(c) Differentiate between Shared memory and Message passing with suitable example. (CO5, CO6)

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Roll No. .....

TCS–706

B. TECH. (COMPUTER SCIENCE AND ENGINEERING)

(SEVENTH SEMESTER)

END SEMESTER EXAMINATION, Nov.-Dec., 2021

ARTIFICIAL INTELLIGENCE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Give instances for each of the four categories in which AI is categorised. What is heuristic search and how does it work ? (CO1)

(b) Describe the features of Task Environments in detail. What exactly is PEAS ? (CO1)

(c) Explain the different sorts of agents using PEAS descriptions. Explain how did you convert them into learning agents. (CO1)

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P. T. O.

2. (a) Define a formula that is well-formed (wff). How do you define a state space search problem ? Use an example to illustrate your point. (CO2)

   (b) What are semantic nets and how do they work ? What exactly are frames ? What distinguishes them from semantic nets ? (CO2)

   (c) A* search is a term used to describe a type of search. Using an example, describe the different steps of A* search. (CO2)

3. (a) What is the best way to express knowledge ? What do propositional logic's components entail ? (CO3)

   (b) Define the first-order logic's syntactic constituents. Demonstrate how first-order logic may be used to express knowledge. (CO3)

   (c) Describe the steps that make up the knowledge engineering process. Give a specific example. (CO4)

4. (a) What exactly is parsing ? What is the significance of it ? Distinguish between top- down and bottom-up parsing, as well as deterministic and non-deterministic parsing. (CO4)

   (b) What are RTNs and ATNs (Recursive Transition Networks and Augmented Transition Networks, respectively) ? (CO5)

   (c) Define the generation of Natural Language. What role does semantic analysis play in NLP ? (CO5)

5. (a) What are Expert Systems and how do they work ? Mention a few of ES's most important uses. Create a diagram of an expert system's components. (CO5)

(b) Define Prolog Program. Explain, what is recursion in Prolog with suitable example.. (CO6)

(c) Enumerate classical "Water Jug Problem". Describe the state space for this problem and give the solution. (CO6)

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Roll No. .....

TIT–701

B. Tech. (IT) (SEVENTH SEMESTER)

END SEMESTER EXAMINATION, Nov.-Dec., 2021

MOBILE COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Describe WLAN-based architecture. How does a WLAN function ? (CO1)

(b) Explain the characteristics of wireless channel with its transmission impediments. (CO1)

(c) Specify advantages of static channel allocation over dynamic channel allocation strategies. (CO1)

2. (a) Compare and contrast IEEE802.1 1 and Bluetooth technologies. (CO2)

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(b) What is the task of MAC layer ? Name some protocols with brief description for the purpose of service provision at this layer. (CO2)

(c) What are the problems faced when using TCP for the mobile networks ? (CO2)

3. (a) What are issues in data management ? Describe data replication for mobile computer. (CO3)

(b) Explain working principles of peer-to-peer reconciliation and rumor replicated file system. (CO3)

(c) What is Coda ? Why is coda promising and potentially very important ? (CO3)

4. (a) Discuss life cycle of mobile agent-based computing with suitable diagram. (CO4)

(b) What is security and fault tolerance issues ? Describe briefly. (CO4)

(c) What are the advantages and disadvantages of Mobile Agent ? Discuss some suitable applications of mobile agent briefly. (CO4)

5. (a) What is MANET ? Why is it not possible to use circuit switching in Adhoc networks ? (CO5)

(b) What are the advantages and disadvantages of reactive and proactive protocols ? (CO5)

(c) Explain some disadvantages of AODV routing protocol. (CO5)

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Roll No. .....

TCS–701

B. Tech. (IT) (SEVENTH SEMESTER)
END SEMESTER EXAMINATION, Nov.-Dec., 2021
OBJECT ORIENTED ANALYSIS AND DESIGN

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Explain various concepts used in object oriented paradigm with suitable diagram wherever required in detail. (CO1)

(b) Draw a sequence diagram for withdrawing money from ATM. (CO3)

(c) A retail system will interact with customers who place and track orders. In turn, the system will validate the user for ship orders and bill the customer. If all orders are not ready, part of the order can be dispatched. Draw the Use Case diagram and consider the following things : (CO3)

- Identify the actors that interact with the element. Candidate actors include groups that require certain behavior to perform their tasks or that are needed directly or indirectly to perform the element's functions.

- Organize actors by identifying general and more specialized roles.
- For each actor, consider the primary ways in which that actor interacts with the element.
- Consider also interactions that change the state of the element or its environment or that involve a response to some event.
- Consider also the exceptional ways in which each actor interacts with the element.
- Organize these behaviors as use cases, applying include and extend relationships to factor common behavior and distinguish exceptional behavior.

2. (a) Explain Object Oriented Software Development : A Use Case Derive approach in detail with suitable diagram. (CO2)

   (b) What is OOAD ? What are the benefits of OOAD over traditional analysis and design process of software development ? (CO2)

   (c) Draw a Use Case diagram for booking an online movie ticket booking system having the following functionalities : (CO3)

   - A distinction is made between users and registered users. Only registered users can buy tickets. A user becomes a registered user by logging in. Unregistered users can register with a username that has not been taken by another user, an e-mail address and a freely chosen password.
   - Every user can search for movies, actors, directors and other persons and theatres.
   - For every movie and person there is a page showing their details. The movie details consists of a title, the year it was released in, a

description, the genre of this movie and a photo. Also there are lists for the persons who were involved in this film, a soundtrack and some other information. The details to a person are restricted to its name, birthday, place of birth and a photo and the details of a theatre are composed of an address, showrooms and performances. Registered users can comment and rate movies, store their favourite movies and theatres in a personal list and buy tickets.

3. (a) Define an axiom. Mention the design axioms applied to object oriented design process with a suitable example. (CO4)

(b) What is the difference between activity diagram and sequence diagram ? Explain with example. (CO3)

(c) A cellular network will interact with customers who place a call and receive a call. He/she can use scheduler to schedule the phone calls. There may be some exceptional behaviors of the users such as : a customer can also place conference call and can receive addition calls. Draw use case diagram and consider the following things : (CO4)

- Identify the actors that interact with the element.
- For each actor, consider the primary ways in which that actor interacts with the element.
- Consider interactions that change the state of the element or its environment or that involve a response to some event.

- Consider the exceptional ways in which each actor interacts with the element.
- Organize these behaviors as use cases, applying include and extend relationships to factor common behavior and distinguish exceptional behavior.

4. (a) Explain the Object Modeling Technique (OMT) presented by Jim Rumbaugh et al. (CO2)

   (b) Model with a class diagram the following System : Vending Machine. A vending machine sells small, packaged, ready to eat items (chocolate bars, cookies, candies, etc.). Each item has a price and a name. A customer can buy an item, using a smart card (issued by the vending machine company) to pay for it. No other payment forms (i.e. cash, credit card) are allowed. The smart card recorth on it the amount of money available. The functions supported by the system are : (CO4)

   - Sell an item (choose from a list of items, pay item, distribute item)
   - Recharge the machine
   - Set up the machine (define items sold and price of items)
   - Monitor the machine (number of items sold, number of items sold per type, total revenue)
   - Check the availability of an item

   The system can be used by a customer, a maintenance employee (who check the items and recharges items in the machines), an administrator (who sets up the machine). However, we don't need to keep track of which user bought something or to keep track of the id or other details

of his smart card. For example : We're not interested in saying that the customer Arushi bought 10 candies with the smart card # 1. We are interested in vending machine sold 10 candies, each with price ₹ 1.

(c) What do you mean by a test plan and a test case ? Explain various types of testing strategies. (CO5)

5. (a) List the methods of micro-development process of Booch Methodology. Explain each method. (CO2)

(b) What are persistent and non-persistent objects ? Differentiate between them with the help of example. (CO4)

(c) Explain UML history in detail. What are the commercial applications of UML ? (CO3)

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