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M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Science

MACHINE LEARNING

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. What is Machine learning?   (CO1, K1)

   (a) The selective acquisition of knowledge through the use of computer programs

   (b) The selective acquisition of knowledge through the use of manual programs

   (c) The autonomous acquisition of knowledge through the use of computer programs

   (d) The autonomous acquisition of knowledge through the use of manual programs

2. K-Nearest Neighbors (KNN) is classified as what type of machine learning algorithm?   (CO1, K1)

   (a) Instance-based learning

   (b) Parametric learning

   (c) Non-parametric learning

   (d) Model-based learning

3. Which of the following is not a supervised machine learning algorithm? (C02, K1)

   (a) K-means

   (b) Naïve Bayes

   (c) SVM for classification problems

   (d) Decision tree

4. What is the key difference between supervised and unsupervised learning? (CO2, K1)

   (a) Supervised learning requires labeled data, while unsupervised learning does not

   (b) Supervised learning predicts labels, while unsupervised learning discovers patterns

   (c) Supervised learning is used for classification, while unsupervised learning is used for regression

   (d) Supervised learning is always more accurate than unsupervised learning

5. Which type of machine learning algorithm falls under the category of "unsupervised learning"? (CO3, K1)

   (a) Linear Regression

   (b) K-means Clustering

   (c) Decision Trees

   (d) Random Forest

6. What elements describe the Candidate-Elimination algorithm? (CO3, K1)

   (a) depends on the dataset

   (b) just a set of candidate hypotheses

   (c) just a set of instances

   (d) set of instances, set of candidate hypotheses

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7. What is the objective of backpropagation algorithm? (CO4, K1)

   (a) to develop learning algorithm for multilayer feedforward neural network

   (b) to develop learning algorithm for single layer feedforward neural network

   (c) to develop learning algorithm for multilayer feedforward neural network, so that network can be trained to capture the mapping implicitly

   (d) none of the mentioned

8. Which of the following statements is not true about neural networks? (CO4, K1)

   (a) They are class of very powerful machine learning classifiers

   (b) Neural networks are a class of computationally inexpensive algorithms

   (c) These are capable of fitting almost any hypotheses

   (d) NN has lots of interconnected nodes which are organized in layers

9. What is perceptron? (CO5, K1)

   (a) a single layer feed-forward neural network with pre-processing

   (b) an auto-associative neural network

   (c) a double layer auto-associative neural network

   (d) a neural network that contains feedback

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10. In which of the following case the Naïve Bayes' algorithm does not work well? (CO5, K1)

   (a) When Faster prediction is required

   (b) When the Naïve assumption holds true

   (c) When there is the case of Zero Frequency

   (d) When there is a multiclass prediction

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Examine in detail about machine learning process with an example. (CO1, K4)

   Or

   (b) Explain how can we measure or quantify the strength of an inductive bias. (CO1, K5)

12. (a) Explain about various Bayesian classifier. (CO2, K5)

   Or

   (b) Discuss the fundamentals of Bayes theorem with an example. (CO2, K6)

13. (a) Build the structure of a decision tree. (CO3, K4)

   Or

   (b) Explain K-nearest Neighbor algorithm with suitable example. (CO3, K5)

14. (a) Summarize and explain various types of artificial neural network. (CO4, K2)

   Or

   (b) Discuss the steps involved in Back propagation algorithm. (CO4, K6)

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15. (a) How does the sequential covering algorithm operate and what are its steps? Provide an example of the sequential covering algorithm and identify one of its types. (CO5, K1)

Or

(b) Illustrate the process of learning first-order rules and how does it work. Provide an example of the learning process and its steps. (CO5, K2)

Part C $(5 \times 8 = 40)$

Answer **all** questions not more than 1,000 words each.

16. (a) Elaborate how you would use decision tree learning to optimize the marketing strategy of a product based on the customer's demographics, behavior, and feedback. (CO1, K6)

Or

(b) Explain in detail about machine learning. Discuss about learning and machine learning. Choose various types of machine learning. (CO1, K5)

17. (a) Recall the steps involved in EM algorithm.(CO2, K1)

Or

(b) Explain about Naïve Bayes algorithm for continuous attributes with examples. (CO2, K5)

18. (a) Examine the Instance-based learning methods and compose the three properties that is share by the Instance based methods. (CO3, K4)

Or

(b) Discuss how to handle missing values, continuous features in decision tree algorithm. (CO3, K6)

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19. (a) Design Back propagation using Multi-Layer Perception, which has three, layers like the input layer has 4 neurons, the hidden layer has 2 neurons and the output layer has a single neuron. Train the MLP by updating the weights and biases in the network. (CO4, K6)

Or

(b) Draw the structure of artificial single neuron based on biological neuron. Construct and explain Artificial Neural network structure. (CO4, K6)

20. (a) Explain the concept of a genetic algorithm and describe its steps with an example. Mention a prototypical genetic algorithm and its features. (CO5, K5)

Or

(b) Explain about the genetic programming with example. Label the genetic programming and draw the program tree representation in genetic programming. (CO5, K5)

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M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Science

COMPILER DESIGN

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.
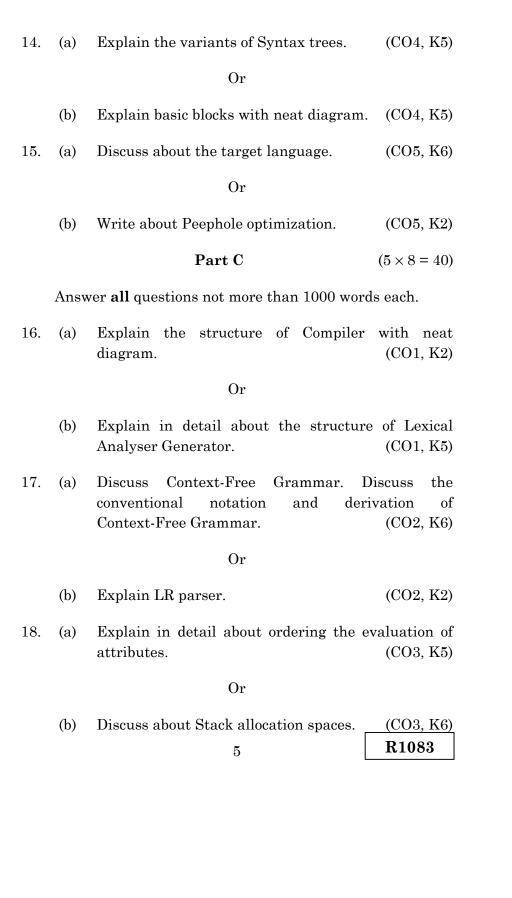
1. In which of the following phase of compiler is Lexical Analyzer?   (CO1, K3)

    (a) Second

    (b) Third

    (c) First

    (d) All of the mentioned

2. Which of the following pairs of regular expressions are equivalent?   (CO1, K3)

    (a) 1 (01)* and (10)*1

    (b) x (xx)* and (xx)*x

    (c) x^+ and $x^+ x^{(*+)}$

    (d) All of the mentioned

3. A grammar for a programming language is a formal description of ——————. (CO2, K5)

   (a) Syntax   (b) Semantics

   (c) Structure   (d) Library

4. Which of these is also known as look-head LR parser? (CO2, K1)

   (a) SLR

   (b) LR

   (c) LLR

   (d) None of the mentioned

5. If the programming languages uses static scoping and call by need parameter passing mechanism, the values printed will be? (CO3, K6)

   (a) 115, 220   (b) 25, 220

   (c) 25, 15   (d) 115, 105

6. The method which merges the bodies of two loop is? (CO3, K5)

   (a) Loop rolling

   (b) Loop jamming

   (c) Constant folding

   (d) None

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7. Which of the following is a top-down parser? (CO4, K1)

   (a) Recursive descent parser

   (b) Operator precedence parser

   (c) An LR (k) parser

   (d) An LALR (k) parser

8. The lexical analyzer takes ——————— as input and produces a stream of ——————— as output. (CO4, K2)

   (a) Source program, tokens

   (b) Token, source program

   (c) Either (a) and (b)

   (d) None

9. Which of the following is a machine independent optimization? (CO5, K1)

   (a) Constant folding

   (b) Copy propagation

   (c) Peephole optimization

   (d) Loop jamming

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10. Which of the following is NOT performed during compilation? (CO5, K1)

   (a) Dynamic memory allocation

   (b) Type checking

   (c) Symbol table management

   (d) Inline expansion

<center>**Part B**   (5 × 5 = 25)</center>

Answer **all** questions not more than 500 words each.

11. (a) What is ambiguity? Explain with example.
                                    (CO1, K1)

<center>Or</center>

   (b) Discuss the structure of Lex Program.   (CO1, K2)

12. (a) Distinguish between Lexical analysis and Syntax analysis. (CO2, K2)

<center>Or</center>

   (b) Explain Parse tree and its derivations.   (CO2, K5)

13. (a) Discuss about the dependency graphs.   (CO3, K6)

<center>Or</center>

   (b) Explain Storage organizations.   (CO3, K2)

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14. (a) Explain the variants of Syntax trees. (CO4, K5)

Or

(b) Explain basic blocks with neat diagram. (CO4, K5)

15. (a) Discuss about the target language. (CO5, K6)

Or

(b) Write about Peephole optimization. (CO5, K2)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Explain the structure of Compiler with neat diagram. (CO1, K2)

Or

(b) Explain in detail about the structure of Lexical Analyser Generator. (CO1, K5)

17. (a) Discuss Context-Free Grammar. Discuss the conventional notation and derivation of Context-Free Grammar. (CO2, K6)

Or

(b) Explain LR parser. (CO2, K2)

18. (a) Explain in detail about ordering the evaluation of attributes. (CO3, K5)

Or

(b) Discuss about Stack allocation spaces. (CO3, K6)

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19. (a) Explain about various code optimization. (CO4, K5)

Or

(b) Explain in detailed about three address code. (CO4, K5)

20. (a) What are issues in the design of code generation? Explain it. (CO5, K1)

Or

(b) Explain in detailed about basic blocks and flow graphs. (CO5, K2)

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M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Science

FUNCTIONAL PROGRAMMING USING PYTHON

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Python supports the creation of anonymous functions at runtime, using a construct called ——————— (CO1, K5)

   (a) lambda   (b) pi

   (c) anonymous   (d) none of the mentioned

2. What will be the output of the following Python code? (CO1, K1)

   (i) y=6

   (ii) lambda x : x * y

   (iii) printz(8)

   (a) 48   (b) 14

   (c) 64   (d) None of the mentioned

3. Which type of Programming does Python support?

(CO2, K1)

(a) Object-oriented programming

(b) Structured programming

(c) Functional programming

(d) All of the mentioned

4. Python case sensitive when dealing with identifiers?

(CO2, K4)

(a) no

(b) yes

(c) machine dependent

(d) none of the mentioned

5. All keywords in Python are in ——————— (CO3, K2)

(a) Capitalized

(b) lower case

(c) UPPER CASE

(d) None of the mentioned

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6. What will be the value of the following Python expression? (CO3, K1)

4+3%5

(a) 7   (b) 2

(c) 4   (d) 1

7. Which keyword is used for function in Python language? (CO4, K1)

(a) Function   (b) Def

(c) Fun   (d) Define

8. Which of the following character is used to give single-line comments in Python? (CO4, K6)

(a) //   (b) #

(c) !   (d) /*

9. What does pip stand for python? (CO5, K6)

(a) Pip Installs Python

(b) Pip Installs Packages

(c) Preferred Installer Program

(d) All of the mentioned

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10. Which of the following functions is a built-in function in python? (CO5, K5)

   (a) factorial()   (b) print()

   (c) seed()   (d) sqrt()

Part B $(5 \times 5 = 25)$

Answer **all** questions not more than 500 words each.

11. (a) Explain Characteristics of functional programming.
                                    (CO1, K5)

                   Or

   (b) Examine sorted function in detail.   (CO1, K4)

12. (a) Explain Defensive copying.   (CO2, K5)

                   Or

   (b) Briefly explain in problems with immutable objects.
                                    (CO2, K5)

13. (a) Explain recursion limits in detail.   (CO3, K5)

                   Or

   (b) Discuss about memorization in detail.   (CO3, K6)

14. (a) Validate Anonymous function with example.
                                    (CO4, K6)

                   Or

   (b) Explain composing in detail.   (CO4, K5)

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15. (a) Illustrate using closure classes in detail. (CO5, K2)

Or

(b) Explain Closure inspection in detail. (CO5, K5)

Part C $(5 \times 8 = 40)$

Answer **all** questions not more than 1000 words each.

16. (a) Briefly explain programming paradigms with suitable example. (CO1, K5)

Or

(b) Explain Function as parameters in detail. (CO1, K5)

17. (a) Explain in detail about Mutability in python. (CO2, K5)

Or

(b) Discuss about changing immutable objects. (CO2, K6)

18. (a) Examine about Flattening lists. (CO3, K4)

Or

(b) Explain about less recursive solution. (CO3, K5)

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19. (a) Explain Map in detail with suitable example.

(CO4, K5)

Or

(b) Illustrate about using closure in place of lambda.

(CO4, K2)

20. (a) Explain advantages of functions in detail. (CO5, K5)

Or

(b) Briefly explain about advantages of functions.

(CO5, K5)

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M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Science

WIRELESS SENSOR NETWORKS

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. What is wireless communication?   (CO1, K1)

    (a) Sending data from one location to with the use of physical medium

    (b) Sending data from one location to another without the use of physical medium

    (c) Sending data from one location to another without the use of virtual medium

    (d) None of the mentioned

2. Which of the following is a type of wireless communication?   (CO1, K1)

    (a) LAN

    (b) WAN

    (c) PAN

    (d) All of the mentioned

3. Which of the following specifies a set of media access control (MAC) and physical layer specifications for implementing WLANs? (CO2, K1)

   (a) IEEE 802.11   (b) IEEE 802.16

   (c) IEEE 802.15   (d) IEEE 802.3

4. Which of the following measures spectrum efficiency of a wireless system? (CO2, K1)

   (a) Spectral capacity (b) Channel capacity

   (c) Carrier capacity   (d) Radio capacity

5. Which of the following is not a characteristic of 3G network? (CO3, K1)

   (a) Communication over VoIP

   (b) Unparalleled network capacity

   (c) Multi-megabit Internet access

   (d) LIE based network

6. Which of the following is not a standard of WLAN? (CO3, K1)

   (a) HIPER-LAN   (b) HIPERLAN/2

   (c) IEEE 802.11b   (d) AMPS

7. Which of the following is the 802.11 High Rate Standard? (CO4, K1)

   (a) IEEE 802.15   (b) IEEE 802.15.4

   (c) IEEE 802.11g   (d) IEEE 802.11b

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8. What type of handovers is supported by LTE? (CO4, K1)

   (a) Hard handover only

   (b) Soft handover only

   (c) Hard and soft handover

   (d) Hard, soft and softest handover

9. Which of the following 3G standard is used in Japan? (CO5, K1)

   (a) Cdma2000   (b) TD-SCDMA

   (c) UMTS   (d) UTRA

10. Which of the following is not an application of third generation network? (CO5, K1)

   (a) Global Positioning System (GPS)

   (b) Video conferencing

   (c) Mobile TV

   (d) Downloading rate upto 1 Gbps

Part B $(5 \times 5 = 25)$

Answer **all** questions not more than 500 words each.

11. (a) Discuss the design considerations of physical layer in detail. (CO1, K6)

                    Or

   (b) Explain any two MAC layer protocols in Wireless Sensor Networks with relevant examples. (CO1, K5)

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12. (a) Summarize the challenges and the required mechanisms of a wireless sensor network. (CO2, K2)

Or

(b) Examine the main components and functions of LTE network architecture and protocol in WSNs.
(CO2, K4)

13. (a) Explain about Data Centric Routing in brief.
(CO3, K5)

Or

(b) Present an outline of SPINS, security protocol for sensor networks. (CO3, K2)

14. (a) Assume you are working on a web-based application that uses multiple threads to perform parallel tasks. How would you ensure that your application has a reliable execution environment? What are some challenges or risks that you might face in this scenario? (CO4, K1)

Or

(b) Elaborate the design principles and architecture of Magenetos and how do they differ from conventional WSN operating systems. (CO4, K6)

15. (a) Justify how wireless sensor networks help in solving real world problems. Give two examples.
(CO5, K5)

Or

(b) What are the criteria for evaluating the performance of wireless sensor networks? Give two examples of performance metrics and their definitions. (CO5, K1)

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Part C $(5 \times 8 = 40)$

Answer **all** questions not more than 1000 words each.

16. (a) Discuss the connection management followed in Bluetooth technology and explain the frame format in Bluetooth technology. (CO1, K6)

Or

(b) Illustrate the Spread spectrum technologies in detail. (CO1, K2)

17. (a) Explain the security and privacy features of High-Speed Downlink Packet Access that prevent data leakage or tampering in WSN. (CO2, K5)

Or

(b) Suppose you are a 3G user who wants to switch to a 4G network. How do you perform the handover process and what are the challenges and benefits of the transition? Explain in detail. (CO2, K5)

18. (a) Illustrate in detail about efficient routing protocols with flooding mechanisms for Wireless Sensor Networks. (CO3, K2)

Or

(b) Explain how location-based routing can be combine with other techniques such as randomization, diversification, or aggregation to enhance security and privacy. (CO3, K5)

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19. (a) Illustrate in what ways TinyOS and SenOS enhance the performance and functionality of wireless sensor networks. (CO4, K2)

Or

(b) Briefly, explain about the current trends and future directions of embedded for WSN research and development. (CO4, K5)

20. (a) Suppose you have successfully deployed a Wireless Sensor Networks in the zoo that can monitor the location, movement, and behavior of the animals, as well as the environmental conditions. How would you ensure the security and privacy of the data collected by the Wireless Sensor Networks? Justify your answer in detail. (CO5, K6)

Or

(b) Explain how WSNs be used to detect and track the movements and activities of enemy forces in a battlefield and provide real-time intelligence to the commanders. (CO5, K5)

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R1086

M.Sc. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Science

Elective — CLOUD COMPUTING

(CBCS – 2022 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Cloud computing is a concept that involves pooling physical resources and offering them as which sort of resource?   (CO1, K1)
   (a) cloud   (b) real
   (c) virtual   (d) none of the mentioned

2. Which of the following is the Cloud Platform provided by Amazon?   (CO1, K1)
   (a) AWS   (b) Cloudera
   (c) Azure   (d) All of the mentioned

3. Which of the following model consists of the service that you can access on a cloud computing platform?   (CO2, K1)
   (a) Deployment   (b) Service
   (c) Application   (d) None of the mentioned

4. Which of the following is the most important area of concern in cloud computing?   (CO2, K1)
   (a) Scalability   (b) Storage
   (c) Security   (d) All of the mentioned

5. Which of the following is the most refined and restrictive cloud service model? (CO3, K1)

    (a) PaaS   (b) IaaS

    (c) SaaS   (d) CaaS

6. Which of the following is not a property of cloud computing? (CO3, K1)

    (a) virtualization   (b) composability

    (c) scalability   (d) all of the mentioned

7. In which of the following service models the hardware is virtualized in the cloud? (CO4, K1)

    (a) NaaS   (b) FaaS

    (c) CaaS   (d) IaaS

8. Which of the following is required by Cloud Computing? (CO4, K1)

    (a) That the identity be authenticated

    (b) That the authentication be portable

    (c) That you establish an identity

    (d) All of the mentioned

9. ——————— as a utility is a dream that dates from the beginning of the computing industry itself. (CO5, K1)

    (a) Model   (b) Computing

    (c) Software   (d) All of the mentioned

10. ——————— has many of the characteristics of what is now being called cloud computing. (CO5, K1)

    (a) Internet   (b) Softwares

    (c) Web Service   (d) All of the mentioned

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Answer **all** questions not more than 500 words each.

11. (a) Explain the architecture of Cloud computing in detail.   (CO1, K4)

Or

(b) Explain the Cloud service development.   (CO1, K5)

12. (a) What is IaaS? Mention any two IaaS service providers.   (CO2, K5)

Or

(b) Explain classification of scientific applications in cloud.   (CO2, K6)

13. (a) Discuss briefly about cloud best practices. (CO3, K4)

Or

(b) Give impacts of Map Reduce and explain. (CO3, K5)

14. (a) How can you deploy a Python web application to the cloud using frameworks?   (CO4, K2)

Or

(b) Discuss the benefits of using Python for cloud computing.   (CO4, K6)

15. (a) Interpret the process of Confidentially, Availability and Integrity.   (CO5, K1)

Or

(b) Illustrate the mitigation strategies in Data Security.   (CO5, K2)

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Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Examine in detail the issues for enterprise applications on the cloud. (CO1, K6)

Or

(b) What are the layers and types of cloud computing? Explain in detail. (CO1, K5)

17. (a) Outline the various levels of virtualization with an example for each category. (CO2, K1)

Or

(b) What are technologies used in secured data storage? Explain in detail. (CO2, K5)

18. (a) Explain the architecture of federated cloud computing environment in detail. (CO3, K4)

Or

(b) Compare and Contrast the Key privacy issues in Cloud and explain the steps to overcome the issues with necessary examples. (CO3, K6)

19. (a) Discuss in detail, the applications of amazon web services (AWS). (CO4, K6)

Or

(b) How would you use the Google Cloud Storage service to stream large files to a web browser using the resumable upload feature? (CO4, K6)

20. (a) Explain the challenges in Identity and Access Management in detail. (CO5, K5)

Or

(b) Discuss the strategies in Cloud Identity Administration such as Single sign on and federated single sign on. (CO5, K5)

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