Roll No. .....

67194-N

MCA 4th Semester 2 yr. Course Examination – December, 2024

CYBER SECURITY & BLOCKCHAIN TECHNOLOGY (i)

Paper : 21MCA24DA1

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all by selecting ***one*** question from each Unit and Question No. **1** which is ***compulsory***.

1. ***Compulsory*** question :

(a) Define cyber terrorism ?

(b) How cyber security elements work ?

(c) What does a packet filter do ?

(d) How web application security is determined ?

(e) What is attack vector analysis ?

(f) Define salami slicing ?

(g) How smart contract works ?

(h) Discuss the creation of sidechain in blockchain.

UNIT – I

2. (a) Who are cyber criminals ? Explain different categories of cyber criminals.

   (b) What is network sniffer ? How does a sniffer work ? How does a packet sniffer can be detected ? Discuss the packet sniffer mitigation.

3. (a) What is banner grabbing ? Discuss different types of it. How banner grabbing can be prevented ?

   (b) Compare various port and service tools with each other with their functioning.

UNIT – II

4. (a) What is NAT ? Discuss its different types. Write down the steps to specify the working of NAT.

   (b) What is password manager ? How does it work ? List some of popular password managers.

5. (a) What is web vulnerability ? How it can be exploited ? Discuss the tools used to scan web vulnerabilities.

   (b) What is password cracking ? Discuss the factors on which password cracking depend. Also explain password cracking mechanism in brief.

UNIT – III

6. (a) What is data contamination ? How it can be controlled ? Explain.

   (b) What important role SQL injection plays as cyber crime investigation approach ? Explain the working of SQL injection.

7. (a) What is Spyware ? Discuss its different categories. How spyware is different from virus ?

   (b) Define Digital forensics. Write down the steps of digital forensics.

UNIT – IV

8. (a) Why digital signature are required ? Explain Memory hard algorithm in brief.

   (b) What is Ethereum ? How it is constructed ? Discuss.

9. (a) How optimization can be achieved using Merkle Patricia Tree ? Discuss.

   (b) Discuss the use of blockchain in IoT.

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MCA 4th Semester 2 yr. Course Examination – December, 2024

IOT & SENSOR NETWORKS

Paper : 21MCA24C2

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all by selecting ***one*** question from each Unit and Question No. **1** which is ***compulsory***.

1. (a) Define the term "sensor node" in the context of WSNs. $2 \times 8 = 16$

(b) How does geographic routing differ from traditional routing in WSNs ?

(c) Differentiate IoT privacy and security ?

(d) What is the primary purpose of deploying Wireless Sensor Networks ?

(e) How does the "sink node" differ from regular sensor nodes in a WSN ?

(f) What is layered attacker model ?

(g) What is Nimbits ?

(h) What are vulnerabilities in an IoT environment ?

UNIT – I

2. (a) What is IoT ? How did it evolve ? What are the key components of an IoT/M2M system and how they work together ? Illustrate. 8

(b) How is IP addressing handled in the Internet of Things (IoT) ? What challenges does IoT pose for traditional IP addressing schemes ? Explain. 8

3. (a) What is the modified OSI model for IoT/M2M system ? Discuss the functions and requirements of each layer. 8

(b) What is LoWPAN ? What are the key features of LoWPAN ? How does it enable communication among low-power devices in the context of the Internet of Things (IoT) ? Explain. 8

UNIT – II

4. (a) What is Arduino ? What are the capabilities of Arduino IDE ? How it is used for developing IoT projects ? Discuss. 8

(b) What do you mean by IoT security tomography ? How is it significant ? Illustrate its relevance. 8

5. (a) How does the cloud computing paradigm enhance data collection and storage capabilities, especially in the context of large-scale IoT deployments ? Explain. 8

(b) How does Nimbits contribute to cloud-based data collection, storage, and computing services for IoT applications ? Explain. 8

UNIT – III

6. What are Wireless Sensor Networks ? What are the key components and communication principles that form the foundation of Wireless Sensor Networks ? What are the major challenges faced by Wireless Sensor Networks ? Explain. 16

7. (a) What role do sensors, microcontrollers, and communication modules play in the design of a sensor node ? How are they interconnected to achieve specific sensing and communication tasks ? Explain. 8

(b) What are the design principles employed in architecting WSNs for optimal performance, scalability, and adaptability to dynamic environmental conditions ? Illustrate. 8

UNIT – IV

8. (a) What are the key considerations in the design of the physical layer and transceivers for Wireless Sensor Networks, particularly in terms of energy efficiency and communication range ? Explain. 8

(b) How do contention-based and contention-free MAC protocols address the challenges of channel access and energy conservation in WSNs ? Explain. 8

9. (a) How does efficient address management contribute to network scalability and resource optimization ? Explain. 8

(b) What role do addressing schemes play in the efficient routing and data forwarding within Wireless Sensor Networks ? Explain. 8

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MCA 4th Semester 2 yr. Course Examination – December, 2024

MACHINE LEARNING OF PYTHON PROGRAMMING (I)

Paper : 21MCA24DB1

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all by selecting ***one*** question from each Unit and Question No. **1** which is ***compulsory***. All question carry equal marks.

1. ***Compulsory*** question : $8 \times 2 = 16$

(a) What are Kernel functions ?

(b) What are multiple plots ?

(c) What are Vectorized functions ?

(d) What is NumPy ? State its relevance.

(e) What do you mean by Pandas ?

(f) What are Fractals ?

(g) What is unsupervised learning ?

(h) What is Factor analysis ? State its significance.

UNIT – I

2. (a) What is machine learning ? How a learning system can be designed ? Discuss the concept of learning association in context of machine learning. 8

(b) What do you mean by logistic regression ? How does it work ? Illustrate its relevance by giving suitable example. 8

3. Differentiate the following :

(a) SVM and Decision Trees. 6

(b) Overfitting and Underfitting. 5

(c) Finite and Infinite Hypothesis 5

UNIT – II

4. What do you mean by reinforcement learning ? How is it different from supervised learning ? How does it work ? What is the relevance of Q-Learning in it ? Illustrate. 16

5. Explain the following :

(a) Dimensionality Reduction and its essence. 8

(b) Random forest trees and its relevance 8

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MCA 4th Semester (2 Yr. Course) Examination – December, 2024

ADVANCED SOFTWARE ENGINEERING

Paper : 21MCA24C1

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***four*** more questions selecting ***one*** question from each Unit. Question No. 1 is ***compulsory***.

1. Answer the following questions briefly : $8 \times 2 = 16$

(a) What is software design ?

(b) What are advantages of CBSE ?

(c) What COTS myths ?

(d) Explain working of scrum ?

(e) Explain sprint cycle in Agile.

(f) What is the role of Project owner and Scrum master ?

(g) Explain principles of DevOps.

(h) Describe A WS DevOps.

UNIT – I

2. (a) What is Agile software Engineering and Client/Server Software Engineering ? Describe their differences, uses and advantages with suitable examples. 10

   (b) Explain component based model and its principles and its uses. 6

3. Explain the following briefly with suitable examples.

   (a) Testing process for Web applications and its merits. 6

   (b) Aspect based software development and its uses. 10

UNIT – II

4. What is Scrum ? How it is useful and used? Explain its process, principles, values with suitable examples in detail. 16

5. Describe the following with examples. 16

   (a) Agile risk management and its advantages

   (b) Backlog management and its importance

   (c) Extreme programming (XP) and advantages

   (d) Agile principles and their working

UNIT – III

6. (a) Describe use and role of Agile for configuration management with examples. 8

   (b) Explain Scrum of Scrums and its uses, applications and advantages with examples. 8

7. Explain the following with suitable examples :

   (a) Agile control and its parameters 8

   (b) Atern principles and their uses. 8

UNIT – IV

8. Define pipeline and DevOps ? Explain their need, process and applications with examples in detail. 16

9. Explain the following briefly with examples :

   (a) DevOps and its architecture and applications. 8

   (b) DevOps automation and its tools. 8

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MCA 4th Semester 2 yr. Course Examination – December, 2024

WEB DEVELOPMENT USING .NET FRAMEWORK

Paper : 21MCA24C3

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all by selecting ***one*** question from each Unit and Question No. **1** which is ***compulsory***. All question carry equal marks.

1. (i) What is Interoperability ? How it is achieved in .NET framework ?

(ii) Why C# is called also known as free form language ?

(iii) Differentiate between Class level and Instance level variables with examples.

(iv) What do you mean by Overriding methods ?

(v) Explain any two components of IDE provided by .NET for developing Windows application.

(vi) Name any two methods associated to DataSet class in reference to ADO.NET.

(vii) What do you mean by dynamic compilation of pages by ASP.NET ?

(viii) Define hierarchical data bound controls used in ASP.NET

UNIT – I

2. (i) List any four important services offered by the Framework Base Classes to the users.

(ii) What is Enumeration ? How it is useful in C# programming ? Give two examples of enum type values.

3. (i) Elaborate the execution model followed by different components of .NET framework for developing Web applications.

(ii) Explain the following: String Builder class, Verbatim string and Immutable strings with one example for each.

UNIT – II

4. (i) Define Overloaded constructor. State rules for declaring and defining any two types of Overloaded constructor.

(ii) What is Multiple inheritance ? Explain the order of execution of Constructors available at different levels of Classes.

5. (i) How further inheritance can be prevented by using Sealed concept at class and method levels ?

(ii) Explain how Interfaces can be used to implement Multiple Inheritance by extending and implementing it.

UNIT – III

6. (i) What are Win Forms ? Explain how standard controls can be added to it.

(ii) Define validation. How user input can be validated in Window applications ?

7. (i) Pictorially represent the Dataset object model, mention one functionality associated with each component Dataset.

(ii) Explain how navigation between data records is achieved in ADO.NET.

UNIT – IV

8. (i) Explain the Page rendering phase of ASP.NET page life cycle with its importance.

(ii) Differentiate between authorization and authentication process in reference to ASP.NET.

9. (i) Elaborate the purpose of the following controls used in ASP.NET: Data Source and Grid view controls.

(ii) Define Web services, its components and functions (any four) performed by it in ASP.NET environment.
