

QPCODE:

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) EXAMINATION
V SEMESTER

MG5DSCCF300-DATABASE MANAGEMENT SYSTEM AND SECURITY
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hrs

Maximum Marks: 50 Marks

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer Type Questions

Answer any **10** questions

Each question carries **1** marks

- | | |
|---|---------------------|
| 1. Relate data inconsistency to data redundancy in file system data management. | [Understand] [CO:1] |
| 2. Identify which data independence deals with changes in physical storage | [Understand] [CO:1] |
| 3. Associate entities with real-world objects in an ER diagram. | [Understand] [CO:1] |
| 4. Classify the three levels of data abstraction according to their functions. | [Understand] [CO:1] |
| 5. Outline the main feature of sequential file organization. | [Analyse] [CO:2] |
| 6. Distinguish a candidate key from a non-key attribute. | [Analyse] [CO:2] |

- | | |
|--|------------------|
| 7. Simplify the purpose of normalization in one statement. | [Analyse] [CO:2] |
| 8. Compare Tuple Relational Calculus and Domain Relational Calculus. | [Analyse] [CO:2] |
| 9. Show the need for security mechanisms in a database. | [Apply] [CO:3] |
| 10. Predict the result of inserting an invalid foreign-key value. | [Apply] [CO:3] |
| 11. Compute the valid domain values for a given attribute. | [Apply] [CO:3] |
| 12. Classify integrity constraints used in databases. | [Apply] [CO:3] |

[1x10 = 10]

Part B

Short Essay Type Questions

Answer any **4** questions

Each question carries **5** marks

- | | |
|--|--------------------|
| 13. Explain the characteristics of the database approach with suitable examples. | [Understand][CO:1] |
| 14. Summarize the main features of ER, relational, and EER models. | [Understand][CO:1] |
| 15. Examine the role of keys in the relational data model. | [Analyse] [CO:2] |
| 16. Connect transitive dependency with 3NF and illustrate how decomposition removes the dependency. | [Analyse] [CO:2] |
| 17. Show how authentication and authorization can be applied to protect a student database containing personal and academic information. | [Apply] [CO:3] |

18. A database contains three security levels: Confidential, Secret, and Top Secret. Users have corresponding clearance levels. Classify which users can access each level of information under MAC. [Apply] [CO:3]

[5x4 = 20]

Part C

Essay Type Questions

Answer any 2 questions

Each question carries 10 marks

19. Describe database system architecture and explain the different levels of data abstraction, schema, instance, and data independence. [Understand][CO:1]
20. Analyze the following relation: [Analyse][CO:2]

COURSE(Course_ID, Course_Name, Faculty_ID, Faculty_Name, Department_ID, Department_Name)

Given appropriate functional dependencies, inspect the relation for normalization problems and illustrate its decomposition into 1NF, 2NF, and 3NF.

21. A database owner wants to give different privileges to the Manager, Accountant, and Clerk. Apply Discretionary Access Control (DAC) by specifying suitable privileges such as SELECT, INSERT, UPDATE, and DELETE. Explain how privileges can be granted and revoked. [Apply] [CO:3]

[10x2 = 20]

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) EXAMINATION OCTOBER 2026

FIFTH SEMESTER
MG5DSCCFS301- SECURITY ANALYSIS USING PYTHON

(2024 ADMISSION ONWARDS)

Duration: 1.5 Hrs

Maximum Marks: 50 Marks

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions

Each question carries **1** marks

1. Mention any two features of Python. [K] [CO:1]
2. Explain how a value is assigned to a variable in Python. [U] [CO:1]
3. Can a Python variable name start with a digit? Justify. [U] [CO:1]
4. Differentiate between a keyword and an identifier. [U] [CO:1]
5. List any four arithmetic operators in Python. [K] [CO:1]
6. Give an example of an assignment statement. [U] [CO:1]
7. Explain the method used to remove an element from a Python list. [U] [CO:1]

- | | |
|--|--------------------|
| 8. Explain the importance of indentation. | [U][CO:2] |
| 9. Explain the role of break in iteration. | [U][CO:2] |
| 10. Describe global scope in Python. | [U][CO:2] |
| 11. Analyse the purpose of the urllib package in Python. | [An][CO:3] |
| 12. Examine the role of a socket in establishing communication between two applications. | [An][CO:3] |
| | [1x10 = 10] |

Part B

Short Answer Questions

Answer any **4** questions

Each question carries **5** marks

- | | |
|--|-------------------|
| 13. Explain the concept of identifiers and keywords in Python with examples. | [U][CO:1] |
| 14. Differentiate between /, //, %, and ** operators with examples. | [U][CO:1] |
| 15. Describe conditional statements in Python and illustrate their use with suitable examples. | [U][CO:2] |
| 16. Differentiate between parameters and arguments with suitable examples. | [U][CO:2] |
| 17. Differentiate between TypeError, ValueError, IndexError, and KeyError with examples. | [U][CO:2] |
| 18. Differentiate between SOCK_STREAM and SOCK_DGRAM | [An][CO:3] |
| | [5x4 = 20] |

Part C

Essay Questions

Answer any 2 questions

Each question carries 10 marks

19. Define an expression and a statement. Explain the difference between [U][CO:1] expressions and statements with suitable examples.
20. Describe the process of creating a class and objects in Python. Illustrate the [U][CO:2] use of attributes and methods with a suitable example.
21. Examine the process of identifying live systems using a ping sweep and [An][CO:3] analyze factors that may affect its results.

[10x2 = 20]

QP CODE:

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Name:.....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026
Fifth Semester
MG5DSECFS300 - REMOTE SENSING NETWORK
(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions

Each question carries **2** marks

1. Define Remote Sensing. [K] [CO1]
2. List the characteristics of Electromagnetic Radiation. [K] [CO1]
3. Identify the purpose of Meteorological Satellites. [U] [CO2]
4. Describe a Sensor. [U] [CO2]
5. Differentiate between Active and Passive Sensors. [U] [CO2]
6. Summarize the function of a Platform in Remote Sensing. [U] [CO2]
7. List any two application of Ground Observation Platforms. [K] [CO2]
8. Distinguish between Ground Truth and Ancillary Data. [An] [CO3]
9. Illustrate the need for data integration in Remote Sensing. [An] [CO3]
10. Outline the basic operations of Digital Image Processing. [An] [CO3]
11. Write any two applications of Remote Sensing in Agriculture. [A] [CO4]
12. Show how remote sensing is used in Land-Use Mapping. [A][CO4]

[2x10 = 20]

Part B

Short Answer Questions

Answer any **6** questions

Each question carries **5** marks

13. Explain about the interaction of Electromagnetic Radiation with atmosphere. [U] [CO1]
14. Differentiate between Space-borne and Airborne Observation Platforms. [U][CO2]
15. Discuss the advantages and limitations of Optical, Microwave and Thermal Sensors.[U] [CO2]
16. Examine the importance of integrating Remote Sensing data with GIS. [An] [CO3]
17. Explain the elements of Visual Image Interpretation. [U] [CO3]
18. Examine the limitations of Remote Sensing data analysis. [An] [CO3]
19. Illustrate the application of Remote Sensing in Ocean and Coastal Monitoring. [A] [CO4]
20. Write how Remote Sensing can be used to monitor Atmospheric Constituents. [A] [CO4]

[5x6 = 30]

Part C

Essay Questions

Answer any **2** questions

Each question carries **10** marks

21. Explain Electromagnetic Spectrum. Discuss the major divisions of Electromagnetic Spectrum. [U] [CO1]
22. Examine the process of Remote Sensing Data Analysis. [An] [CO3]
23. Illustrate the application of Remote Sensing in Geology with examples. [A] [CO4]

[10x2 = 20]

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**MAHATMA GANDHI UNIVERSITY, KOTTAYAM
FIFTH SEMESTER MGU-UGP (HONOURS) REGULAR
EXAMINATION**

**Fifth Semester
MG5DSECFS301- INTERNET OF THINGS
(2024 ADMISSION ONWARDS)**

Duration: 2Hours

Maximum Marks: 70

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)*

**Students should attempt at least one question from each course outcome to enhance their
overall outcome attainability.**

Part A

Very Short Answer Questions

Answer any 10 questions

Each question carries **2** marks

1. Explain the meaning of IOT. [U] / [1]
2. Classify the main components in the physical design of IoT. [U] / [1]
3. Describe any two IoT enabling technologies. [U] / [1]
4. Differentiate between physical design and logical design of IoT. [U] / [1]
5. List different layers of IoT networking. [K] / [1]
6. Examine the role of communication protocols in IoT. [An] / [2]

- | | |
|---|-------------|
| 7. Differentiate between M2M communication and IoT. | [An] / [2] |
| 8. Compare NETCONF and YANG to state their role in IoT system management. | [An] / [3] |
| 9. Evaluate the importance of robustness in an IoT system. | [E] / [4] |
| 10. Select any two factors that can affect the reliability of an IoT system. | [E] / [4] |
| 11. Evaluate the significance of addressing reliability in IoT-based applications. | [E] / [4] |
| 12. Select a suitable IoT management tool between Chef and Puppet for automating configuration management, and state one reason for your selection. | [E] / [4] |
| | [2x10 = 20] |

Part B

Short Answer Questions

Answer any 6 questions

Each question carries **5** marks

- | | |
|--|------------|
| 13. Explain the different layers of IoT architecture with their functions. | [U] / [1] |
| 14. Describe the major aspects of IoT data management and explain its importance in IoT applications. | [U] / [1] |
| 15. Illustrate the different layers of IoT networking with suitable examples. | [An] / [2] |
| 16. Illustrate the characteristics of C and its flavours used in embedded IoT programming. | [An] / [3] |
| 17. Differentiate between C, Keil C, Dynamic C and B# based on their characteristics and applications in embedded programming. | [An] / [3] |
| 18. Combine NETCONF and YANG and illustrate how they support IoT system management. | [An] / [3] |

19. Evaluate the major reliability issues in IoT systems and explain their impact on the performance of IoT applications. [E] / [4]

20. Evaluate the working of home automation system. [E] / [4]

[5x6 = 30]

Part C

Essay Questions

Answer any 2 questions

Each question carries **10** marks

21. Classify the major IoT enabling technologies and describe their role in developing IoT applications. [U] / [1]

22. Illustrate IoT networking and system management in detail. [An] / [2]

23. Evaluate the robustness and reliability requirements of IoT systems. [E] / [4]

[10x2 = 20]

QP CODE

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION
FIFTH SEMESTER
MG5DSECFS302 - EMBEDDED SYSTEMS
(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I)
and Appreciation(Ap)*

Students should attempt at least one question from each course outcome to enhance their
overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions

Each question carries **2** marks

1. Identify the meaning of an embedded system. [U] / [CO1]
2. Distinguish between standalone and networked embedded systems. [U] / [CO1]
3. Differentiate between CISC and RISC processors. [U] / [CO1]
4. Describe what a System-on-Chip (SoC) is. [U] / [CO1]
5. Compare USB Type-C and Micro-USB in terms of connectivity and usage. [U] / [CO2]
6. Identify any two applications of USART. [U] / [CO2]
7. Discuss the applications of I²C in embedded systems. [U] / [CO2]
8. Analyse how two operating system functions contribute to the efficient management of computer resources. [An] / [CO3]
9. Examine the role of a timer in managing process execution in an operating system. [An] / [CO3]
10. Explain the primary differences between the *Ready*, *Running*, and *Blocked* states of a task in an RTOS kernel. What specific event causes a task to transition from *Running* to *Blocked*? [U] / [CO3]

- | | |
|---|--------------|
| 11. Show how a telephone answering machine records a caller's message. | [An] / [CO3] |
| 12. A 100 KB data file is reduced by 20% after compression. Calculate its new size. | [A] / [CO4] |

[2x10 = 20]

Part B

Short Answer Questions

Answer any **6** questions

Each question carries **5** marks

- | | |
|--|--------------|
| 13. Discuss the differences between general purpose processors and DSP processors with examples. | [U] / [CO1] |
| 14. Discuss the role of debugging and testing tools in embedded systems. | [U] / [CO1] |
| 15. Describe the role of a Wireless Access Point (WAP) in a Wi-Fi network. Explain how it connects wireless devices to a network. | [U] / [CO2] |
| 16. Classify the common types of Bluetooth devices based on their applications and explain each category with examples. | [U] / [CO2] |
| 17. Explain the concept of timer functions in an operating system. | [U] / [CO3] |
| 18. Illustrate with a brief explanation how a message queue facilitates data passing between an Interrupt Service Routine (ISR) and a processing task. | [An] / [CO3] |
| 19. Use an ECU to show how sensor information is converted into an engine control action. | [A] / [CO4] |
| 20. A device produces a large amount of data but has limited memory. Use data compression to show how the problem can be reduced. | [A] / [CO4] |

[5x6 = 30]

Part C

Essay Questions

Answer any **2** questions

Each question carries **10** marks

- | | |
|---|-------------|
| 21. Describe the software life cycle and embedded life cycle, and summarize the role of modeling in embedded systems. | [U] / [CO1] |
| 22. Discuss the purpose of an RTOS (Real-Time Operating System) kernel? | [U] / [CO3] |
| 23. Use embedded-system concepts to show the main operations of a digital camera from capturing an image to storing the photograph. | [A] / [CO4] |

[10x2 = 20]

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
FIFTH SEMESTER EXAMINATION
MG5DSECFS303 - Mobile Application Development- Android
(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Interest (I), Appreciation (Ap), and Skill (S)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions.

Each question carries **2** marks

1. Define Android and mention its primary use. [K][CO1]
2. Describe an Android Activity. [U][CO1]
3. Describe the role of a Progress Bar in an Android application. [U][CO2]
4. An application requires a button displaying an image instead of text. Which UI component would be used? Justify the choice. [A][CO2]
5. Explain the concept of an Intent Filter. [U][CO3]
6. Identify any two Activity life cycle methods applicable when an Android application is opened and closed. [A][CO3]
7. Describe multimedia in Android. [U][CO3]
8. Explain the use of a Service in Android. [U][CO3]
9. Explain the purpose of an SQLite database in Android applications. [U][CO4]
10. Explain the purpose of a Cursor. [U][CO4]
11. Illustrate the procedure for implementing SMS telephony in an Android application. [A][CO4]
12. Explain the purpose of database transactions. [U][CO4]

(2x10=20)

Part B

Short Answer Questions

Answer any **6** questions.

Each question carries **5** marks

13. Explain the differences between JDK and SDK. [U][CO1]
14. Describe the types of Android layouts. [U][CO1]
15. Differentiate between a CheckBox and a RadioButton. [An][CO2]
16. Differentiate between an ImageView and an ImageButton. [An][CO2]
17. Explain Android Services and describe their types. [U][CO3]
18. Design an Android application to perform SMS and Wi-Fi operations. [C][CO4]
19. Compare the methods of sending and receiving SMS in Android. [An][CO4]
20. Propose a transaction-based method for maintaining consistency during database operations. [C][CO4]

(5x6=30)

Part C

Essay Questions

Answer any **2** questions.

Each question carries **10** marks

21. Explain the Android Architecture with a neat diagram. [U][CO1]
22. Compare ListView, GridView, and Spinner based on their functionality and suitable applications. [An][CO2]
23. Illustrate the life cycle of an Android Activity and explain the sequence of its stages when an Activity is started, paused, resumed, and stopped. [A][CO3]

(10x2=20)

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026

Fifth Semester

MG5DSECFS304 - SOFT COMPUTING TECHNIQUES

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Interest (I), Appreciation (Ap), and Skill (S)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions.

Each question carries **2** marks

1. Differentiate between soft computing and hard computing. [U] [CO1]
2. State any two advantages of soft computing. [K] [CO1]
3. List the basic building blocks of a neural network. [K] [CO1]
4. Distinguish between single-layer and multilayer feedforward networks. [U] [CO1]
5. Explain the basic concept of a perceptron model. [U] [CO2]
6. Explain the roles of the input layer and output layer in a neural network. [U] [CO2]
7. Describe backpropagation learning. [U] [CO2]
8. Illustrate the use of a crisp set with a suitable example and state one of its properties.
[A] [CO3]
9. Explain the concept of a fuzzy set and membership function. [U] [CO3]
10. Differentiate between any two basic operations on fuzzy sets. [An] [CO3]
11. Distinguish between crisp logic and fuzzy logic. [U] [CO4]
12. Illustrate the use of defuzzification in a fuzzy inference system. [A] [CO4]

(2 × 10 = 20)

Part B

Short Answer Questions

Answer any **6** questions.

Each question carries **5** marks

13. Explain the architecture fundamentals of neural networks. [U] [CO1]
14. Compare single-layer feedforward networks and recurrent network. [U] [CO1]
15. Explain the perceptron model and multilayer perceptron model. [U] [CO2]
16. Illustrate the role of the input, hidden, and output layers in a backpropagation network.
[A] [CO2]
17. Explain the properties and basic operations of crisp sets. [U] [CO3]
18. Analyse fuzzy sets and membership functions using suitable examples. [An] [CO3]
19. Analyse the limitations of classical logic in representing uncertainty. [An] [CO4]
20. Demonstrate the application of fuzzy inference in a suitable real-world problem. [A] [CO4]

(5 × 6 = 30)

Part C

Essay Questions

Answer any **2** questions.

Each question carries **10** marks

21. Discuss the artificial neuron model, activation functions such as sigmoid and ReLU, different neural network architectures, and the flow of information in neural networks.
[U] [CO1]
22. Explain fuzzy sets and membership functions in detail. [U] [CO3]
23. Compare fuzzy logic and crisp logic with respect to their representation of uncertainty.
[An] [CO4]

(10 × 2 = 20)

QP CODE:

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026

Fifth Semester

MG5DSECFS305 - Biometric Security

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Interest (I), Appreciation (Ap), and Skill (S)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any 10 questions.

Each question carries 2 marks

1. Define biometrics. [K] [CO1]
2. Distinguish between biometric techniques and traditional techniques. [U] [CO1]
3. Differentiate between verification and identification. [U] [CO1]
4. Explain False Acceptance Rate (FAR) and its significance in biometric security. [U] [CO1]
5. Analyse any two characteristics that make fingerprints suitable for biometric identification. [An] [CO2]
6. Describe the basic purpose of facial recognition. [U] [CO2]
7. Illustrate how iris recognition can be used for biometric identification. [A] [CO2]
8. Explain the concept of retina vascular pattern recognition in biometrics. [U] [CO3]
9. Examine any two characteristics used in hand scanning for biometric identification. [An] [CO3]
10. Discuss DNA biometrics. [U] [CO3]
11. Illustrate how keystroke dynamics can be used for user authentication. [A] [CO4]

12. Mention any two characteristics of voice biometrics. [U] [CO4]

(2 × 10 = 20)

Part B

Short Answer Questions

Answer any **6** questions.

Each question carries **5** marks

13. Discuss Biometric Matching. [U] [CO1]

14. Differentiate False match rate and false nonmatch rate. [U] [CO1]

15. Discuss the components of finger scan technology. [U][CO2]

16. Analyse the different stages involved in facial scan technology. [An] [CO2]

17. Analyse the strength and weakness of Retina vascular Technology. [An][CO3].

18. Illustrate how the characteristics of Hand Scan Technology can be applied in a biometric authentication system. [A][CO3]

19. Evaluate the effectiveness of keystroke dynamics as a biometric authentication technique. [E][CO4]

20. Explain the deployment of Voice Scan Technology in biometric systems. [U][CO4]

(5 × 6 = 30)

Part C

Essay Questions

Answer any **2** questions.

Each question carries **10** marks

21. Discuss competing finger scan technology. [U][CO1]

22. Discuss Strength and weakness of iris scan Technology. [U][CO3]

23. Analyse the characteristics, strengths, and weaknesses of Voice Scan Technology. [An][CO4]

(10 × 2 = 20)

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026

Fifth Semester

MG5DSECFS306 - MOBILE AND WIRELESS SECURITY

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Interest (I), Appreciation (Ap), and Skill (S)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any 10 questions.

Each question carries 2 marks

1. Identify two commonly used wireless hardware devices. [U] [CO1]
2. Relate wireless network protocols to their roles in wireless communication. [U] [CO1]
3. Identify two important limitations of WEP security. [U] [CO1]
4. Explain the importance of encryption in protecting information in wireless communication. [U] [CO2]
5. Describe the importance of non-repudiation in network security. [U] [CO2]
6. Select an appropriate security mechanism for protecting confidential wireless communication. [A] [CO2]
7. Explain the purpose of a Virtual Private Network (VPN) in network security. [U] [CO2]
8. Examine the basic features of IEEE 802.11b. [An][CO3]
9. Analyse the main parameters of WLAN configuration. [An][CO3]
10. Examine the purpose of a WEP decryption script. [An][CO3]
11. Examine the role of Global Mobile Satellite Systems in mobile communication. [An][CO4]
12. Compare wireless enterprise networks with wired networks based on two advantages. [An][CO4]

(2 × 10 = 20)

Part B

Short Answer Questions

Answer any **6** questions.

Each question carries **5** marks

13. Describe the characteristics of different wireless network protocols. [U] [CO1]
14. Explain the differences between wireless threats and wireless attacks with suitable examples. [U][CO1]
15. Explain suitable physical hardware security measures for protecting a wireless network. [U][CO2]
16. Organize identification, authentication, and authorization according to their roles in network security. [A][CO2]
17. Implement suitable mitigation and protection measures for attacks and vulnerabilities as part of the security analysis process. [A][CO2]
18. Differentiate between the physical layer and media access frame format of IEEE 802.11. [An][CO3]
19. Compare different types of WEP attacks. [An][CO3]
20. Categorize the main components of Bluetooth protocols according to their functions. [An][CO4]

(5 × 6 = 30)

Part C

Essay Questions

Answer any **2** questions.

Each question carries **10** marks

21. Describe airborne viruses and explain their effects on wireless devices and networks. [U][CO1]
22. Organize the different security solutions into standards and policy solutions, network solutions, and software solutions. [A][CO2]
23. Examine the structure and operation of wireless enterprise networks. [An][CO4]

(10 × 2 = 20)

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) MODEL QUESTION PAPER

FIFTH SEMESTER

DSE - MG5DSECFS307- CRITICAL INFRASTRUCTURE SECURITY AND FORENSICS

(2024 ADMISSION ONWARDS)

Duration: 2 hours

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)
Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions
Answer any 10 questions
Each question carries 2 marks

1. Identify two functions of SCADA systems in monitoring critical infrastructure operations.

[Understand (U)] / [CO1]
2. Explain the relationship between Critical Infrastructure Protection and Cyber Crime.

[Understand (U)] / [CO1]
3. Differentiate between critical infrastructure vulnerabilities and Internet infrastructure vulnerabilities.

[Understand (U)] / [CO1]
4. Identify two common cyber vulnerabilities in critical infrastructure systems.

[Understand (U)] / [CO1]
5. Differentiate between natural threats and intentional threats to critical infrastructure with one example each

[Analyse (An)] / [CO2]
6. Compare the use of a risk matrix with probability modeling

[Analyse (An)] / [CO2]
7. Differentiate between subjective judgment and objective data in risk analysis.

[Analyse (An)] / [CO2]
8. Outline two key security objectives for critical infrastructure

[Analyse (An)] / [CO2]
9. Inspect the role of law enforcement agencies in coordinating with private sector operators during infrastructure incidents.

[Analyse (An)] / [CO3]
10. Differentiate between proactive preparedness measures and reactive response strategies in national security.

[Analyse (An)] / [CO3]
11. Evaluate the effectiveness of redundancy (backup systems) as a mitigation strategy for physical threats.

[Evaluate(E)] / [CO4]
12. Explain why physical security is considered a foundational element in protecting critical assets.

[Understand (U)] / [CO4]

[2x10 = 20]

Part B

Short Answer Questions
Answer any 6 questions
Each question carries 5 marks

13. Explain the major types of attacks that can affect Internet Infrastructure.

[Understand (U)] / [CO1]
14. Explain the scientific and technological nature of critical infrastructure

[Understand (U)] / [CO1]
15. Summarize the importance of Critical Infrastructure Protection in protecting essential services from cyber threats.

[Understand (U)] / [CO1]
16. Examine how Monte Carlo simulations enhance quantitative risk analysis.

[Analyse (An)] / [CO2]
17. Predict how emerging technologies (IoT, AI, smart grids) may reshape future infrastructure development

[Analyse (An)] / [CO3]
18. Categorize terrorist threats into biological, chemical, radiological, cyber, and physical domains, giving one example for each.

[Analyse (An)] / [CO3]
19. A critical infrastructure facility has identified several potential physical threats. Assess the factors that should be considered when conducting a threat assessment

[Evaluate(E)] / [CO4]
20. Rank different prevention measures (surveillance, barriers, access control) in terms of their effectiveness, and support your ranking with examples

[Evaluate(E)] / [CO4]

[5x6 = 30]

Part C

Essay Questions

Answer any **2** questions

Each question carries **10** marks

- | | |
|--|------------------------|
| 21. Examine how the risk management framework can improve security and resilience in critical infrastructure. | [Analyse (An)] / [CO2] |
| 22. Inspect the role of law enforcement agencies in detecting and preventing cyber and physical threats to infrastructure. | [Analyse (An)] / [CO3] |
| 23. Evaluate the potential impact of physical threats such as unauthorized access, vandalism, and deliberate attacks on critical assets. | [Evaluate (E)] / [CO4] |

[10x2 = 20]

QPCODE:

Reg. No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

**FIFTH SEMESTER MGU-UGP (HONOURS) REGULAR
EXAMINATION
Fifth Semester**

MG5DSECFS308 SECURITY THREATS AND VULNERABILITIES

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I)
and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions

Each question carries **2** marks

1. Explain the term insider? [U] / [1]
2. Identify four major physical threats to information systems. [U] / [1]
3. Define "social engineering" in the context of e-mail security and mass mailer viruses. [K] / [1]
4. List the four major areas of client-side security. [K] / [2]
5. Classify the three basic methods of user identification/authentication. [A] / [2]
6. Identify any two authentication services used on the Internet. [U] / [2]
7. Classify IDSs based on their sources of audit information. [A] / [3]
8. Name two examples of network-based intrusion detection systems. [K] / [3]
9. Classify cyber attacks into passive attack, active attack, internal misuse, and external misuse. [A] / [3]
10. Compare external auditors and internal auditors with respect to their roles. [U] / [4]

11. Select any two detective techniques that can be used to identify information leakage. [E] / [4]
12. Evaluate the difference between Rights Management and Rights Enforcement. [E] / [4]

[10x2 = 20]

Part B

Short Answer Questions

Answer any **6** questions

Each question carries **5** marks

13. Compare infrastructure mode and ad hoc mode in wireless networks with suitable examples. [U] / [1]
14. Examine buffer overflow vulnerabilities, their effects, and countermeasures. [An] / [2]
15. Describe the process of developing and distributing a virus signature. [U] / [2]
16. Classify NIDS detection methods into anomaly-based and misuse-based detection. [A] / [3]
17. Define security awareness and identify the major benefits of security-aware employees. [K] / [3]
18. Evaluate the four major Web-hosting categories: shared servers, dedicated servers, colocation, and managed services. [E] / [4]
19. Compare Dedicated mode, System High mode, and Multilevel mode with respect to users, access control, and security requirements. [An]/[4]
20. Classify the DoD security levels into Top Secret, Secret, Confidential, and Unclassified, and explain the access rights associated with each level. [A] / [4]

[6x5 = 30]

Part C

Essay Questions

Answer any **2** questions

Each question carries **10** marks.

21. Classify hacking toolkits based on their procedural and functional classifications. Explain the purpose of each category with suitable examples. [U] / [1]
22. Differentiate between tamper-evident, tamper-resistant, and tamper-reactive security mechanisms used in HSMs, with suitable examples. [An] / [2]
23. Classify different types of security incidents and explain the appropriate response for each type. [A] / [3]

[2x10 = 20]

QPCODE:

Reg.No :

Name :

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM
FIFTH SEMESTER MGU-UGP (HONOURS) REGULAR EXAMINATION**

**Fifth Semester
MG5DSECFS309 - CYBER SECURITY AUDIT AND COMPLIANCE**

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)*

**Students should attempt at least one question from each course outcome to enhance their
overall outcome attainability.**

**Part A
Very Short Answer Questions
Answer any 10 questions
Each question carries 2 marks**

1. Explain the significance of the 6-hour incident reporting timeline mandated by CERT-In directives. [Understand]/[CO2]
2. Differentiate between a cyber security audit and an automated vulnerability assessment. [Understand]/[CO1]
3. Describe the specific purpose of the 'Condition' element in the CCCER audit reporting model. [Understand]/[CO4]
4. Distinguish between Spoofing and Tampering threats as categorized under the STRIDE model. [Understand] / [CO3]
5. Summarize the primary purpose of defining Terms of Reference (ToR) in an audit engagement. [Understand] / [CO1]
6. Explain how Corrective and Preventive Action (CAPA) tracking facilitates audit remediation. [Understand] / [CO4]
7. Illustrate one practical use case of Computer Assisted Audit Techniques (CAATs) during data sampling. [Apply]/[CO3]
8. Distinguish between preventive and detective security controls with one brief example of each. [Understand]/ [CO2]
9. Explain the core concept of the Defense-in-Depth strategy in protecting enterprise IT assets. [Understand]/[CO1]

10. Describe the main objective of performing Root Cause Analysis (RCA) on identified security findings. [Understand] / [CO4]
11. Calculate the qualitative risk rating when Likelihood is Medium and Impact is High in a standard 3×3 risk matrix. [Apply] / [CO3]
12. Summarize why digital audit trail preservation is critical for post-audit verification and compliance. [Understand] / [CO4]
- [2 × 10 = 20]**

Part B
Short Answer Questions
Answer any 6 questions
Each question carries 5 marks

13. Illustrate the key compliance obligations of Data Fiduciaries under India's Digital Personal Data Protection (DPDP) Act. [Apply]/[CO2]
14. Distinguish between Internal, External, and Third-Party audits in terms of auditor independence, reporting hierarchy, and audit objectives. [Understand]/[CO1]
15. Implement the legal requirements for electronic record admissibility under Section 65B of the Indian Evidence / IT Act during an evidence collection process. [Apply]/[CO2]
16. Examine how combining Nmap TCP SYN scanning, service version detection, and OS fingerprinting improves the accuracy of a technical vulnerability audit compared to standard port scanning. [Analyse] / [CO3]
17. Draft a concise executive summary of high-risk audit findings tailored for presentation to the Board of Directors. [Skill] / [CO4]
18. Implement Role-Based Access Controls (RBAC) combined with Dual Authorization to enforce Segregation of Duties (SoD) in an enterprise payroll transaction workflow. [Apply]/[CO2]
19. Explain the differences between General IT Controls (GITC) and Application Controls, providing practical examples of each in enterprise risk reduction. [Understand] / [CO1]
20. Use HIPAA Security Rule audit safeguards (Administrative, Physical, and Technical) to assess an electronic Protected Health Information (ePHI) cloud repository. [Apply]/[CO2]
- [5 × 6 = 30]**

Part C
Essay Questions
Answer any 2 questions
Each question carries 10 marks

21. (a) Examine the threat profile of a three-tier online banking portal by categorizing vulnerabilities using the STRIDE threat model and evaluating their severity. [Analyse] / [CO3]
- (b) Implement a SIEM-based log auditing and correlation procedure aligned with CIS Benchmarks to detect and alert on unauthorized privilege escalation. [Apply]/[CO3]
22. (a) Construct a formal Cyber Security Audit Finding for an unpatched external-facing server vulnerability utilizing all five elements of the CCCER model. [Skill]/[CO4]
- (b) Explain the complete post-audit workflow encompassing Root Cause Analysis (RCA), remediation re-testing, corrective action tracking, and formal audit closure. [Understand] / [CO4]
23. (a) Employ the core control domains of the ISO/IEC 27001 ISMS standard to design an internal audit compliance verification checklist for an enterprise data center. [Apply]/[CO2]
- (b) Implement an operational policy framework to ensure mandatory compliance with CERT-In directives (6-hour incident reporting window and 180-day log retention). [Apply]/[CO2]
- [10 × 2 = 20]**

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Reg No:

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MAHATMA GANDHI UNIVERSITY ,KOTTAYAM

MGU-UGP(HONOURS)

FIFTH SEMESTER EXAMINATION

(2024 YEAR ADMISSION ONWARDS)

MG5DSECFS310- M-COMMERCE SECURITY

Duration:2hrs

Maximum Marks:70

PART A

Short Answer Type Questions

Answer any 10 questions

Each question carries 2 marks

1. Describe M-Commerce and mention any two of its features. [Understand][CO1]
2. Explain any two types of M-Commerce transactions. [Understand][CO1]
3. Describe NFC (Near Field Communication) and its role in mobile payments.
[Understand][CO1]
4. Explain the difference between authentication and authorization. [Understand][CO2]
5. Discuss Multi-Factor Authentication (MFA) and its importance in M-Commerce.
[Understand][CO2]
6. Explain Role-Based Access Control (RBAC) with a suitable example. [Understand][CO2]
7. Identify the components of the CIA Triad and describe their importance in M-Commerce security.
[Understand][CO3]
8. Explain the difference between symmetric cryptography and public-key cryptography.
[Understand][CO3]
9. Describe Elliptic Curve Cryptography (ECC) and explain its use in M-Commerce.
[Understand][CO3]
10. Compare phishing and social engineering attacks in M-Commerce. [Analyse][CO4]
11. Distinguish between secure and insecure communication channels in M-Commerce.
[Analyse][CO4]

12. Examine the security risks caused by injection attacks in M-Commerce applications.

[Analyse][CO4]

(10x2=20)

PART B

Short Essay Type Questions

Answer any 6 questions

Each question carries 5 marks

13. Explain the structure of M-Commerce and describe its major components.

[Understand][CO1]

14. Describe the different mobile payment technologies used in M-Commerce, including NFC, QR-code payments and biometric authentication.

[Understand][CO1]

15. Describe the different authentication methods used in M-Commerce, including password-based authentication, Multi-Factor Authentication (MFA) and biometric authentication.

[Understand][CO2]

16. Differentiate between RBAC, ABAC and PBAC with suitable examples.

[Understand][CO2]

17. Explain the architecture and different models of mobile payment systems.

[Understand][CO3]

18. Describe the security requirements of mobile payment systems, including confidentiality, integrity, availability, authorization and non-repudiation.

[Understand][CO3]

19. Distinguish between phishing, malware, Man-in-the-Middle (MITM) attacks, social engineering and weak authentication based on their impact on M-Commerce transactions.

[Analyse][CO4]

20. Examine the major vulnerabilities in M-Commerce applications, including insecure data storage, injection attacks, insecure input validation, insecure communication channels and Insecure Direct Object References (IDOR).

[Analyse][CO4]

(6x5=30)

PART C

Essay Type Questions

Answer any 2 questions

Each question carries 10 marks

21. Explain the concept and structure of M-Commerce. Classify the different types of M-Commerce transactions and discuss the major security challenges associated with M-Commerce. [Understand][CO1]

22. Discuss the importance of authentication and authorization in M-Commerce. Describe password-based authentication, Multi-Factor Authentication (MFA), biometric authentication, RBAC, ABAC and PBAC. [Understand][CO2]

23. Describe the architecture of mobile payment systems and discuss their major security requirements, including confidentiality, integrity, availability, authorization and non-repudiation. Explain the role of symmetric cryptography, public-key cryptography and Elliptic Curve Cryptography (ECC) in securing mobile payments. [Understand][CO3]

(2x10=20)

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Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION
FIFTH SEMESTER
MG5SECCFS300 - CYBER WARFARE
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I)
and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very Short Answer Questions

Answer any **10** questions

Each question carries **1** marks

- | | |
|---|--------------|
| 1. Explain the significance of information as a military asset. | [U] / [CO1] |
| 2. Differentiate between the cyber domain and the physical domains of warfare. | [An] / [CO2] |
| 3. Evaluate the importance of information operations in warfare. | [E] / [CO3] |
| 4. Explain an intelligence operation. | [U] / [CO2] |
| 5. Compare the characteristics of Script Kiddies and Advanced Attackers. | [An] / [CO3] |
| 6. Describe the Collection phase of the Intelligence Cycle. | [U] / [CO2] |
| 7. Discuss the number of key principles of influence identified by Robert Cialdini. | [U] / [CO4] |
| 8. Write any two common social engineering techniques to a scenario where an attacker attempts to obtain a user's password. | [A] / [CO4] |
| 9. Illustrate the purpose of drive encryption | [A] / [CO4] |
| 10. Examine the role of Defence in Depth in protecting a network from cyber attacks. | [An] / [CO4] |

- | | |
|--|--------------------|
| 11. Evaluate the importance of International cyber law in controlling cyber warfare | [E] / [CO3] |
| 12. Illustrate how a cyber range can be used to train professionals in responding to a cyber attack. | [A] / [CO4] |
| | [1x10 = 10] |

Part B

Short Answer Questions

Answer any **4** questions

Each question carries **5** marks

- | | |
|--|-------------------|
| 13. Examine the planning and direction phase of the intelligence cycle. | [An] / [CO2] |
| 14. Explain the process of Collection and Processing and Exploitation in Intelligence Cycle. | [U] / [CO2] |
| 15. Evaluate the characteristics of Advanced Persistent Threats (APTs) and major stages of the Cyber Kill Chain. | [E] / [CO3] |
| 16. Illustrate how drive encryption and file encryption can be implemented to protect sensitive data in an organization. Give suitable Examples. | [A] / [CO4] |
| 17. Discuss the possible security risk when an employee shares VPN credentials with an attacker. | [U] / [CO1] |
| 18. Outline the main objectives of Advanced Persistent Threat. | [An] / [CO2] |
| | [5x4 = 20] |

Part C

Essay Questions

Answer any **2** questions

Each question carries **10** marks

- | | |
|--|--------------------|
| 19. Evaluate the evolving cyber threat model from Script Kiddies to Advanced Attackers. | [E] / [CO3] |
| 20. Illustrate the six principles of influence and explain their importance in social engineering. | [A] / [CO4] |
| 21. Predict the integration of Cyber War and kinetic Warfare in future conflicts | [A] / [CO2] |
| | [10x2 = 20] |