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**Question Paper Code: U6C02**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Fifth Semester

Computer Science and Business Systems

21UCB602 INFORMATION SECURITY

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following is used to protect a network by filtering incoming and outgoing traffic? CO1 - U  
(a) Antivirus software    (b) Firewall                      (c) Encryption                      (d) Backup
2. Which cryptographic approach involves combining multiple encryption algorithms to enhance security? CO1 - U  
(a) One-Time Pad    (b) Product Cryptosystem  
(c) Public Key Infrastructure                                      (d) Stream Cipher
3. Which phase of the security lifecycle involves identifying and assessing potential risks to an organization's assets? CO1 - U  
(a) Implementation    (b) Risk Assessment    (c) Monitoring                      (d) Response
4. Which term describes the process of evaluating and verifying that security controls are correctly implemented and effective? CO1 - U  
(a) Threat Modeling  
(b) Risk Management  
(c) They will behave according to security policies and protocols.  
(d) They do not require any form of authentication.

5. What are the key elements of a secure system design? CO1 - U
- (a) Access control, encryption, firewalls, and intrusion detection systems
  - (b) Load balancers, authentication, network segmentation, and data backups
  - (c) Database management, server hardening, malware protection, and incident response plans
  - (d) All of the above
6. Which of the following is a metric used to evaluate system performance? CO1 - U
- (a) User satisfaction
  - (b) System complexity
  - (c) Developer productivity
  - (d) Code readability
7. Which of the following is not a characteristic of a logic-based system? CO1 - U
- (a) Formal rules for reasoning
  - (b) Use of inference rules
  - (c) Uncertainty handling mechanisms
  - (d) Representation of knowledge in a declarative manner
8. Which of the following is NOT a limitation of intrusion detection systems? CO1 - U
- (a) False positives
  - (b) False negatives
  - (c) Limited coverage of network traffic
  - (d) Inability to prevent attacks
9. What is the primary purpose of access control in operating system security? CO1 - U
- (a) To ensure data confidentiality
  - (b) To prevent unauthorized access to resources
  - (c) To detect and remove malware infections
  - (d) To maintain system uptime and availability
10. Which of the following is an example of a security policy that can be enforced by an operating system? CO1 - U
- (a) Password complexity requirements
  - (b) Antivirus software installation
  - (c) Regular system backups
  - (d) Network traffic monitoring

PART – B (5 x 2= 10 Marks)

11. Convert the plain text " STUDENTS OF CSBS into Cipher text with the key of length=9 CO2 App
12. List down the phases while coming through security life cycle? CO1 - U
13. Apply how can access control mechanisms help address the confinement problem. CO2 App
14. Analyze steps would take to ensure the program security of the e-commerce website. CO3 Ana
15. Write down the 5 steps of Enterprise information security architecture. CO1U

PART – C (5 x 16= 80 Marks)

16. (a) (i) How to use the to encrypt the message "HELLO STUDENTS" with a shift of 3 CO2 App (4)  
(ii) How to use the Caesar cipher to encrypt the message "COMPUTER SCIENCE AND BUSINESS SYSTEMS" with a shift of 7 (4)  
(iii) Given the key "PLAYFAIREXAMPLE apply PLAY FAIR CIPHER text using Plain Text – GOOD MORNING (8)  
Or
- (b) Given the key "CRYPTO" apply PLAY FAIR CIPHER text using Plain Text - Please save me CO2 App (16)
17. (a) Explain CIA triad and characteristics of information in order to achieve security? CO1 - U (16)  
Or
- (b) Discuss in detail about Security lifecycle. CO1 - U (16)
18. (a) How can formal methods be applied to verify the security of the financial institution's online banking system? CO1 - U (16)  
What are the benefits and limitations of using formal methods in this context?  
Or
- (b) How can the financial institution build the new system with high assurance in information security? CO1 - U (16)  
What are the benefits and limitations of different assurance methods in this context?

19. (a) A company uses a cloud-based storage system to store sensitive customer data, including credit card information. One day, an employee receives an email that appears to be from the company's IT department, requesting that they enter their login credentials to verify their account. The employee enters their credentials without realizing that the email was a phishing attempt. CO2 App (16)
- Apply type of malicious behavior occurred in this scenario, the potential consequences of this action?
- Or
- (b) You are a security analyst for a large organization. The organization's IT department recently upgraded the operating system on all of the organization's computers, and you have been tasked with ensuring the security of the new operating system. One of the organization's employees reports that their computer has been infected with malware. You discover that the malware was able to exploit a vulnerability in the operating system. CO2 App (16)
- Apply steps would you take to prevent similar incidents from occurring in the future and improve the security of the organization's operating systems?
20. (a) What are the key components of a database security architecture and how do they work together to protect a database system? (database security) CO1 -U (16)
- Or
- (b) How would you explain operating system security in terms of information security? CO1 -U (16)