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B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Seventh Semester

18CSE380T - PERVASIVE COMPUTING

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

- i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
- ii. **Part - B and Part - C** should be answered in answer booklet.

Time: 3 Hours

Max. Marks: 100

PART - A (20 × 1 = 20 Marks)

Answer all Questions

Marks BL CO

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|---|--|---|---|---|
| 1. Pervasive computing is also known as: (A) Ubiquitous computing (C) Centralized computing | (B) Isolated computing (D) Standalone computing | 1 | 1 | 1 |
| 2. What technology is commonly used in modern displays for portable devices like PDAs? (A) OLED (Organic Light-Emitting Diode) (C) TFT (Thin-Film Transistor) | (B) CRT (Cathode Ray Tube) (D) LEP (Light-Emitting Polymer) | 1 | 2 | 1 |
| 3. Which operating system is known for its suitability for PDAs and is optimized for restricted features and lower memory and CPU usage? (A) Palm OS (C) QNX Neutrino | (B) Be OS (D) Embedded Linux | 1 | 3 | 1 |
| 4. What is the primary focus of synchronization and replication protocols in mobile computing? (A) Data encryption (C) Software updates | (B) Data exchange (D) Hardware synchronization | 1 | 2 | 2 |
| 5. What does WTLS provide in WAP phones to ensure security? (A) Data encryption (C) Hardware security module | (B) Client-server mutual authentication (D) Secure socket layer | 1 | 2 | 2 |
| 6. What is the effective key length of the Data Encryption Standard (DES)? (A) 64 bits (C) 128 bits | (B) 56 bits (D) 192 bits | 1 | 1 | 2 |
| 7. What is one key factor that influences device security in pervasive computing? (A) Unchangeable software (C) Memory protection | (B) Arbitrary software (D) Network speed | 1 | 1 | 3 |
| 8. Which authentication method can be used for securing the exchange between PCs and application providers' servers? (A) HTTP basic authentication (C) WAP encryption | (B) SSL client authentication (D) DMZ access control | 1 | 2 | 3 |
| 9. What length of encryption and signature was initially supported by WAP phones? (A) 128 bits (C) 1024 bits | (B) 768 bits (D) 2048 bits | 1 | 1 | 3 |
| 10. What is the successor to SSL that uses the latest encryption techniques? (A) TCP/IP (C) TLS | (B) HTTP (D) UDP | 1 | 1 | 4 |

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|---|---|---|---|
| 11. Which authentication method involves the use of Smart Cards to securely authenticate users with certificates? | 1 | 3 | 4 |
| (A) Basic access authentication | | | |
| (B) Digest access authentication | | | |
| (C) SSL/TLS client authentication | | | |
| (D) Form-based authentication | | | |
| 12. What is the primary purpose of the Wireless Datagram Protocol (WDP) in the WAP architecture? | 1 | 2 | 4 |
| (A) To encode binary messages | | | |
| (B) To provide data privacy | | | |
| (C) To support various bearer services | | | |
| (D) To handle error messages | | | |
| 13. How many WAP profiles can typically be stored in a mobile client? | 1 | 1 | 4 |
| (A) Unlimited | | | |
| (B) 1 to 2 | | | |
| (C) 3 to 4 | | | |
| (D) 5 to 6 | | | |
| 14. How do banks address the issue of trust when using WAP for banking operations? | 1 | 4 | 4 |
| (A) By using their own WAP gateways | | | |
| (B) By exposing ISDN numbers | | | |
| (C) By using advanced encryption | | | |
| (D) By implementing public key infrastructure | | | |
| 15. What is the format used for exchanging messages between the WAP gateway and the mobile device? | 1 | 2 | 5 |
| (A) Text format | | | |
| (B) XML format | | | |
| (C) Binary encoded format | | | |
| (D) HTML format | | | |
| 16. How does the integration of speech recognition technology impact the functionality and user experience of mobile phones and various devices | 1 | 4 | 5 |
| (A) It increases the size of the devices. | | | |
| (B) It has no impact on device size. | | | |
| (C) It reduces the size of the devices. | | | |
| (D) It makes devices more complex. | | | |
| 17. Identify the standards referred to in the provided content related to speech recognition | 1 | 3 | 6 |
| (A) HTML and JavaScript | | | |
| (B) Voice XML language and Java speech API | | | |
| (C) CSS and XML | | | |
| (D) WML and WAP | | | |
| 18. What is the role of a Personal Server (PS) in a Health BAN? | 1 | 4 | 6 |
| (A) Collecting sensing information from the environment | | | |
| (B) Providing medical treatment to patients | | | |
| (C) Collecting and transmitting sensed data to a medical server | | | |
| (D) Monitoring patient status | | | |
| 19. What is the key requirement for wearable sensors in healthcare? | 1 | 2 | 6 |
| (A) High complexity | | | |
| (B) Skin irritation | | | |
| (C) Low power consumption | | | |
| (D) Low data rate | | | |
| 20. What security concept is described by the Security by Contract scheme? | 1 | 1 | 6 |
| (A) Role-Based Access Control (RBAC) | | | |
| (B) Perimeter security | | | |
| (C) Access control matrices | | | |
| (D) Contract-based security | | | |

PART - B (5 × 4 = 20 Marks)

Answer any 5 Questions

Marks BL CO

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|--|---|---|---|
| 21. Analyze the primary characteristics of a pervasive computing infrastructure and assess their role in facilitating seamless integration with the environment. | 4 | 4 | 1 |
| 22. State working procedure of the Biometric devices used for access with block diagram | 4 | 2 | 1 |
| 23. Examine and evaluate WAP Push with a diagram. | 4 | 4 | 2 |
| 24. Analyze the development of cellular systems in the field of mobile communication | 4 | 3 | 3 |

| | | | |
|---|---|---|---|
| 25. Provide an illustrative WAP infrastructure diagram along with a sample WAP profile? | 4 | 3 | 4 |
| 26. Tabulate the existing projects and the sensors used for vital signal monitoring in the domain of healthcare | 4 | 3 | 5 |
| 27. Discuss about perimeter security and access control used in pervasive computing. | 4 | 2 | 6 |

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

| | | | |
|--|----|---|---|
| 28. (a) Examine the various device technologies utilized in the context of pervasive computing. | 12 | 3 | 1 |
| (OR) | | | |
| (b) Analyze the various types of operating systems utilized in the domain of pervasive computing. | | | |
| 29. (a) Explain in detail about the following in Pervasive Computing | 12 | 1 | 2 |
| • Device security | | | |
| • Server-side security | | | |
| (OR) | | | |
| (b) Explain in detail about the following protocols. | | | |
| • TCP/IP | | | |
| • SSL and TLS | | | |
| • HTTP | | | |
| • HTTPS | | | |
| 30. (a) How does WAP employ authentication mechanisms to critically evaluate and ensure the legitimacy of users and devices within a session? | 12 | 3 | 4 |
| (OR) | | | |
| (b) Elaborate on the methods and techniques used for speech recognition systems and its challenges. | | | |
| 31. (a) Provide an in-depth description of the constituent elements that compose Jini and UPnP middleware? | 12 | 2 | 5 |
| (OR) | | | |
| (b) Provide an example of a pervasive system that assists healthcare professionals in real-time decision-making or diagnostics. How does it improve patient outcomes? | | | |
| 32. (a) How can context-based security and ubiCOSM collectively address security challenges in the rapidly evolving landscape of IoT, considering factors such as user identity, device context, and data sensitivity? | 12 | 3 | 6 |
| (OR) | | | |
| (b) Illustrate about Privacy in Pervasive Networks with suitable example | | | |

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