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Question Paper Code	13295
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024**

Fifth Semester

**Computer Science and Engineering (AIML)  
20AMPC502 - IOT AND EDGE COMPUTING**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (MCQ) (20 × 1 = 20 Marks)**

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. Which of the following is an example of hardware used in edge computing architectures? (a) Smart sensors (b) Mainframe computers (c) Hypervisors (d) Centralized data centers	1	K1	CO1
2. Which communication model is commonly used in Machine-to-Machine (M2M) communication? (a) Client-server (b) Publish-subscribe (c) Peer-to-peer (d) Master-slave	1	K2	CO1
3. What kind of processing unit is commonly used in Edge hardware for real-time analytics? (a) CPU (b) GPU (c) FPGA (d) ASIC	1	K1	CO1
4. SCADA is primarily used in _____ (a) Consumer IoT devices like smart home systems (b) Industrial process automation (c) Social media networking (d) Cloud computing services	1	K1	CO2
5. In IoT architecture, what is the main responsibility of an architect? (a) Designing only the hardware components of the system (b) Creating the overall structure of the IoT solution, including hardware, software, and communication protocols (c) Monitoring network performance only (d) Providing cloud storage solutions	1	K1	CO2
6. Beckstrom's Law states that the value of a network is: (a) Proportional to the number of devices (b) Dependent on the amount of shared information (c) The net benefit provided to each user (d) Based on the network's revenue potential	1	K1	CO2
7. What is the primary goal of telemedicine in palliative care? (a) Increasing hospital revenue (b) Reducing in-person consultations (c) Improving the quality of life for patients with serious illnesses (d) Accelerating recovery from acute conditions	1	K1	CO3
8. _____ is a common requirement for implementing a telemedicine system. (a) A physical clinic location (b) High-speed internet connectivity for patients and providers (c) In-house technical team in each hospital (d) Availability of advanced surgical equipment	1	K2	CO3
9. In the retrospective analysis of a telemedicine use case, which of the following is evaluated? (a) The profit margins of hospitals (b) The frequency of surgeries performed (c) The effectiveness of remote consultations and patient satisfaction (d) The number of medical staff recruited	1	K1	CO3
10. Which component is responsible for the main processing on a Raspberry Pi board? (a) The RAM (b) The microSD card (c) The CPU (d) The USB ports	1	K1	CO4

11. Which programming language is most commonly used for Raspberry Pi projects? 1 K1 CO4  
 (a) Java (b) Python (c) C++ (d) Ruby
12. Which software package is most commonly used to set up a web server on a Raspberry Pi? 1 K1 CO4  
 (a) Apache (b) nginx (c) Tomcat (d) IIS
13. LoRaWAN stands for: 1 K1 CO5  
 (a) Low Range Wide Area Network (b) Long Range Wide Area Network  
 (c) Local Range Wireless Access Network (d) Long Range Wireless Area Network
14. Zigbee is mainly used for: 1 K1 CO5  
 (a) Short-range, low-power communication (b) High-speed file transfer  
 (c) Long-range communication (d) Satellite communication
15. What architecture does MQTT follow? 1 K1 CO5  
 (a) Client-server (b) Publisher-broker-subscriber (c) Peer-to-peer (d) Multicast
16. Google Cloud Platform (GCP) is primarily used for: 1 K2 CO5  
 (a) Video streaming (b) Cloud computing and data services  
 (c) Messaging services (d) Network infrastructure only
17. Which protocol is often used in IoT devices for secure communication? 1 K1 CO6  
 (a) HTTP (b) MQTT (c) FTP (d) Telnet
18. Which physical security feature is crucial for hardware used in edge computing? 1 K1 CO6  
 (a) Biometric sensors (b) Passive infrared sensors  
 (c) Tamper-resistant packaging (d) Optical sensors
19. What role do blockchains play in IoT networks? 1 K1 CO6  
 (a) Increase the processing load on the device  
 (b) Centralize data storage  
 (c) Decentralize and secure ledger for transactions  
 (d) Replace cloud computing entirely
20. What is the primary function of cryptocurrencies in IoT ecosystems? 1 K1 CO6  
 (a) Increase IoT device processing power  
 (b) Facilitate peer-to-peer payments in IoT networks  
 (c) Store large amounts of IoT data  
 (d) Provide AI capabilities to IoT devices

**PART - B (10 × 2 = 20 Marks)**

Answer ALL Questions

21. Define edge computing. 2 K1 CO1
22. Compare the communication models in edge and fog computing. 2 K2 CO1
23. Identify the key layers of IoT architecture. 2 K3 CO2
24. What is Metcalfe's law, and how does it apply to network value in IoT? 2 K1 CO2
25. List the major software requirements for telemedicine platforms in palliative care. 2 K1 CO3
26. What are the key performance indicators for measuring the success of a telemedicine palliative care program? 2 K1 CO3
27. Mention the function of the GPIO pins on Raspberry Pi board. 2 K2 CO4
28. Write a Python code snippet to capture an image using the Pi Camera. 2 K2 CO4
29. Outline the advantages of using LoRaWAN in IoT applications. 2 K2 CO5
30. What encryption algorithms are commonly used in IoT and edge security? 2 K1 CO6

**PART - C (6 × 10 = 60 Marks)**

Answer ALL Questions

31. a) Explain the concept of Edge Computing in the context of IoT. How does it differ from traditional cloud computing, and the advantages of edge computing? 10 K2 CO1

**OR**

- b) Illustrate the architectural design of a typical Edge Computing node and various hardware components typically used in Edge Computing. 10 K2 CO1
32. a) Describe the IoT architecture and its essential layers in detail. What role does each layer play in a connected ecosystem? 10 K2 CO2
- OR**
- b) Explain the impact of Metcalfe's Law on the expansion of IoT networks. How does it influence the design and scalability of IoT architectures? 10 K2 CO2
33. a) Outline the technical and infrastructural requirements for successfully deploying telemedicine in palliative care. 10 K2 CO3
- OR**
- b) Summarize the importance of network infrastructure and cloud technologies in telemedicine implementation. 10 K2 CO3
34. a) Demonstrate the process of installing and configuring an operating system on a Raspberry Pi. 10 K3 CO4
- OR**
- b) Develop a Python program to read data from a DHT sensor and display the temperature and humidity values. 10 K3 CO4
35. a) Illustrate the Zigbee protocol architecture and explain its application in wireless sensor networks. 10 K2 CO5
- OR**
- b) Sketch the architecture of MQTT and elaborate the role of brokers in message distribution. 10 K2 CO5
36. a) Analyze the role of edge computing in enhancing the efficiency and performance of industrial IoT applications. 10 K4 CO6
- OR**
- b) Explore the importance of cryptography in securing communications between IoT devices and edge computing systems. 10 K4 CO6