

## **Important Instructions:**

- 1) Open this MS-Word document and start writing answers below each respective question given on page 2.**
- 2) Answers the question in the same sequence in which they appear.**
- 3) Provide to the point and concrete answers.**
- 4) First read the questions and understand what is required of you before writing the answer.**
- 5) Attempt the paper yourself and do not copy from your friends or the Internet. Students with exactly similar answers or copy paste from the Internet will not get any marks for their assignment.**
- 6) You can contact me for help if you have any doubt in the above instructions or the assignment questions.**
- 7) All questions must be attempted.**
- 8) Do not forget to write your name, university ID, class and section information.**
- 9) Rename you answer file with your university ID# before uploading to SIC.**
- 10) When you are finished with writing your answers and are ready to submit your answer, convert it to PDF (no MS Word) and upload it to SIC unzipped, before the deadline mentioned on SIC.**
- 11) Do not make any changes to the format provided.**
- 12) Failure in following the above instructions might result in deduction of marks.**

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**Final Exam, Course: - Mobile Computing**

**Deadline: - Mentioned on SIC**

**Marks: - 50**

**Program: - BS (CS), BS-SE**

**Dated: 24 June 2020**

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**Class and Section: BSSE (Sec-A)**

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- Q1: Provide the names of 4 challenges that exist in Adhoc Networks. (4)**
- Q2: How the nodes in the Adhoc Network know about the changing network topology. (2)**
- Q3: Why is it important to minimize flooding of control packets in Adhoc Networks and how MPR achieves it? (4)**
- Q4: Explain briefly how Mobile Cloud Computing is different than simple mobile computing and simple cloud computing? (4)**
- Q5: Explain the term MBAas in your own words? (4)**
- Q6: Imaging you visit a completely new city. What kind of services a modern LBS can provide you at your location automatically? (6)**
- Q7: Use your imagination as to how the following context can be used by a context aware application in mobile computing environment? (8)**

**Date/Time**

**Environment**

**Emotional state**

**Focus of attention**

**Orientation**

**User preferences**

**Calendar (events)**

**Browsing history**

**Q8: Explain why energy efficiency is important in technologies like Bluetooth and ZigBEE? (4)**

**Q9: Explain briefly how you use RFID technology at INU on a daily basis when present on the campus? Do you use an active or passive tag? (4)**

**Q10: Explain how Wearable Computing can be employed in computer gaming? (5)**

**Q11: What kind of facilities and technologies must be present in order to call you own home a Smart Home? (5)**

**Ans 1):** Following are the challenges that are faced in ad hoc networks:

- **Scalability:** Scalability in ad hoc networks can be broadly defined as whether the network is able to provide an acceptable level of service to packets even in the presence of a large number of nodes in the network.
- **Energy-efficiency:** Since ad hoc networks do not assume the availability of a fixed infrastructure, it follows that individual nodes may have to rely on portable, limited power sources. The idea of energy-efficiency therefore becomes an important problem in ad hoc networks.
- **Quality of Service (QoS):** The ability of fixed, wireless networks to satisfy quality of service (QoS) requirements is another open problem.
- **Security:** A similar multi-layer issue is that of security in ad hoc networks. Since nodes use the shared radio medium in a potentially insecure environment, they are susceptible to denial of service (Dos) attacks that are harder to track down than in wired networks.

**Ans 2):** Wireless ad hoc networks are self-organizing. Without fixed infrastructures and central administration, wireless ad hoc networks must be capable of establishing cooperation between nodes on their own. Network nodes must also be able to adapt to changes in the network, such as the network topology.

**Ans 3):** Reducing flooding can help us determine methods for reducing the waste of bandwidth and power consumption while ensuring a stable transmission of information, and quickly responding to network.

The objective of the MPR technique is to reduce the number of redundant retransmissions, while ensuring reliable delivery of broadcast messages. In a MPR-based OLSR (Optimized Link State Routing) wireless ad hoc network, every node needs to issue periodic Hello message to update the 1-hop neighbors set and 2-hop neighbors set tables. Every node must dynamically select a neighbor node as MPR node at a time. After this selection is completed, messages are broadcasted, and control messages as well as traffic data that all packets should transmit through MPR nodes are identified.

**Ans 4):** Cloud computing relates to the specific design of new technologies and services that allow data to be sent over distributed networks, through wireless connections, to a remote secure location that is usually maintained by a vendor. While Mobile computing relates to the emergence of new devices and interfaces. Smartphones and tablets are mobile devices that can do a lot of what traditional desktop and laptop computers do. Mobile cloud computing is a new platform combining the mobile devices and cloud computing to create a new infrastructure, whereby cloud performs the heavy lifting of computing-intensive tasks and storing massive amounts of data. In this new architecture, data processing and data storage happen outside of mobile devices.

**Ans 5):** Mobile backend as a service (MBaaS) utilizes the term “mobile”, some MBaaS platforms can be used to support both mobile applications as well as web apps. In general, the purpose of an MBaaS platform is to provide developers with a means to connect their frontend application with backend cloud storage and APIs exposed by a backend application. The intended outcome is that it frees developers from thinking about, worrying about, managing, or performing any tasks related to servers. An MBaaS platform will typically provide a number of

basic operations, such as user management, push notification support, and social network APIs for social login, posting, etc.

**Ans 6):** LBS can provide you with near-by entertainment, dine-in, shopping places etc. Some of the most common LBS applications include local news, directions, points of interest, directory assistance, fleet management, emergency, asset tracking, location-sensitive building, and local advertisement.

**Ans 7): Context-Aware Application:** Context-aware computing is a mobile computing paradigm in which applications can discover and take advantage of contextual information such as user location, time of day, neighboring users and devices, and user activity.

- ✓ **Date/Time:** by pushing notification/reminder of a daily used application.
- ✓ **Environment:** by showing notification or news related weather.
- ✓ **Emotional state:** by showing help and support.
- ✓ **Focus of attention:** featuring thing by mostly used(contacts, apps etc)
- ✓ **Orientation:** by guiding and helping the user to use.
- ✓ **User preferences:** by keeping tracks of user's preferences.
- ✓ **Calendar (events):** by showing reminders of an upcoming event.
- ✓ **Browsing history:** by showing news and ads related to search history.

**Ans 8):** Energy efficiency is important for sensory devices with limited energy sources, which are connected by means of wireless sensor networks (WSN). The reason can be the production of unnecessary communication or periodic transmission of data from sensory IoT devices at very short intervals.

**Ans 9):** While using RFID technology, my card works as an passive tag as the card itself does not beholds an power supply and it has to reply on the readers power supply to activate the tag present on the card to read the information.

**Ans 10):** Wearing computing can be employed in computer gaming by using VR headsets, Knuckle Strap, VR Remote controller, Tactical Gaming Vests and many others. All of these helps you to feel the gaming environment on a much better level, some of them even allows you to enter the virtual reality of the gaming world.

**Ans 11):** The technologies that should be present in a home to call it a smart home are as follows:

- Smart Home hubs and Controllers.
- Smart Lighting.
- Smart Door Locks and Security Systems.
- Smart Home Surveillance Cameras.
- Smart Kitchen appliances.
- Smart Heating and Cooling devices.
- Smart Health and Fitness devices.