

## **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.**

---

---

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

**Deadline: - 6:00 pm**

**Marks: - 50**

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

**Dated: 24 June 2020**

---

**Student Name: Mian Farooq Azam**

**Student ID#: 13348**

**Class and Section: Semester-6 Section-A**

---

**Q1: Provide the names of 4 challenges that exist in Adhoc Networks.**

**(4)**

**Answer:**

Challenges in Ad hoc Network:

1. Infrastructure-less design:
  - Infrastructure Ad hoc network is used to detect faults and add difficulty in fault and perform its management..
2. Dynamic topology:
  - Dynamic topology is used to change the path and also helpful in packet loss.
3. Scalability:
  - Scalability is still an unsolved challenge which includes different operation like interoperability, routing, configuration management, addressing.
4. Energy limits:
  - If the system have limits processing power so the ad hoc energy limits are used to perform as a router on each and every node.

**Q2: How the nodes in the Adhoc Network know about the changing network topology. (2)**

**Answer :**

- New nodes announce their existence and listen to broadcast announcements by their neighbors.
- Each node learns about other people nearby and how to reach them, and may announce that it can also reach them.

**Q3: Why is it important to minimize flooding of control packets in Adhoc Networks and how MPR achieves it? (4)**

**Answer:**

Importance:

- Reduce control packet size:
  - It gives information about only those links which are neighbors with it and also select multipoint relay selector set.
- If we reduce the duplicate transmission so the number of control packets are also reduced. If we want to reduce flooding we use a few node relay points to send information.

Multipoint Relay minimizes:

- MPR are used to minimize the flooding of broadcast packets in the network by minimizing the number of duplicate re-transmission of data in the same location.

**Q4: Explain briefly how Mobile Cloud Computing is different than simple mobile computing and simple cloud computing? (4)**

**Answer:**

Mobile Cloud Computing:

- Mobile cloud computing is combination of mobile and cloud computing to make the a lot of computational resources to mobile and laptops users, network operators and also the company which provides computing. The main goals of Mobile cloud computing is to enables execution of rich mobile applications.
- Mobile cloud computing = Mobile computing + Cloud computing.

Cloud Computing:

- It is used to store and access data through internet instead of storing on computer hard disk. Storage of data in hard drive it is called local computing.

Mobile Computing:

- Mobile computing is a technology which are used for transmission of data, voice, video and audio by using wireless devices like mobile phones, laptops having no co-action with any types of physical links.

**Q5: Explain the term MBaaS in your own words? (4)**

**Answer:**

MBaaS:

- Mobile Back-end as a server provide for both web as well as mobile app developer which provide the platform for the developer to store their data and also connect their applications and data to Back-end cloud server for processing. MBaaS provide some common functionality like user management, social networking integration,

notification, API endpoint, cloud storage, Database management and much more features that mobile users have to demand in their daily life.

**Q6: Imagining you visit a completely new city. What kind of services a modern LBS can provide you at your location automatically? (6)**

**Answer:**

Location based services (LBS):

- LBS are provide services offered through a mobile phone and take into account devices geographical location. LBS provide information and entertainment.it mainly depend on the user of mobile phone and also it location. The techniques which we are provide to a user which identify the location automatically.
- Now to locate our location automatically so we used Global Positioning System (GPS) Because it is a satellite based locator or navigation based technique mean the GPS cover all over the world by making three satellite with 120° and communicate with each. So if we visit a completely new city we used GPS LBS system for location automation. Which navigate the location to the user and user can feel relax and have no problem to find the location by asking or used any other source.

**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:** By pushing reminders of a daily used application

**Environment:** By showing notification or news related weather

**Emotional state:** Showing help and support

**Focus of attention:** Featuring those things which are mostly used

**Orientation:** By guiding and helping others how to used the product

**User preferences:** Keeping track of user preferences

**Calendar (events):** Showing reminders of upcoming project

**Browsing history:** Showing ads related to search history

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

**Answer:**

The ability of devices to connect quickly to each other, the energy of devices are higher in the initial stage because of full battery charge. It was found that the ZigBee 26 channel was not interrupted by other communications, while Bluetooth, with the frequency hopping approach, might face a stuck condition, thus delaying the first step of the communication process. For ZigBee only channel 26 is used. Bluetooth, because of its specific protocol, cannot avoid interference by default. We can conclude that ZigBee technology can provide valuable support for large scale energy saving sensor networks. So the energy efficiency is important in technologies to perform the better performance.

**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)**

**Answer:**

- RFID works on AIDC (Automatic identification and Data Capture) techniques. AIDC method automatically identifies the objects and collect data about them. So in our university this technology is good than cards swap because this method just identify the object and mark its presence.
- In university we use ACTIVE RFID tag because active tag has both microchip and antenna which have more power and capabilities.

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

**Answer:**

There is an exceptional opportunity for contemporary game developers to create apps designed particularly for wearable devices that yield highly sophisticated gaming experience for users. it's known that the gaming applications designed for wearable devices possess the aptitude to integrate built-in elements from the devices like gyroscopic motion sensing and gesture tracking to serve an interactive game experience.

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

**Answer:**

- Smart home hubs and controllers
- Smart lightning
- Smart door locks and security systems
- Smart home surveillance camera
- Smart kitchen appliances
- Smart heating and cooling devices
- Smart health and fitness devices