

## **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**

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

**Ans: The 4 challenges that exist in Adhoc Networks are:**

- a) Battery Constraints
- b) Packet lose due to transmission errors
- c) Cause route changes, frequent network partitions and packet lose.
- d) Broadcast nature of the communication.

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

**Ans: The topology of a wireless ad hoc network can trade from time to time, since community nodes flow round from within the range to the outside, and new community nodes may join the community, simply as existing network nodes may additionally leave the community.**

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

**Ans:**

- Multipacket reception (MPR) is the capability of simultaneous decoding of more than one packet from multiple concurrent transmissions. Continuous investigations on increasing the reception capability are giving new scientific contributions.
- OLSR Reduces number of control packets by reducing duplicate transmissions : Reduces flooding by using only multipoint relay nodes to send information in the network
- OLSR Reduces size of control packets : Nodes advertise information only about links with neighbors who are in its multipoint relay selector set

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

**Ans: Mobile Cloud Computing:**

- Run an application such as Google's Gmail for mobile on a remote source rich server.
- Other mobile devices themselves too as resource providers of the cloud making up a mobile peer-to-peer network.

**Simple cloud computing:**

- Simple Cloud computing refers to both the application delivered as services over the internet and the hardware and systems software in the datacenters that provides those services.

**Mobile Computing:**

- A computing environment over physical mobility.
- The User of a mobile computing environment will be able to access data, information or other logical objects from any device in any network while on the move.

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

**Ans: MBaaS Stands for (Mobile backend as a service) It's a pre-built cloud hosted infrastructure that enables web and mobile applications to access backend APIs, storage, and various social networks seamlessly. It provides mobile application developers a way to connect their applications to backend cloud storage and processing.**

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

**Ans: LBS stands for ( Location Based Services ) . The services a modern LBS can provide to me are:**

- Can point me to the nearest restaurant.
- LBS can send me an SMS message advertising a sale at a nearby shopping mall.
- directory assistance
- fleet management
- asset tracking

**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**

**Ans: Date Time:**

Context awareness is the ability of a system or system component to gather information about its environment at any given time and adapt behaviors accordingly. Contextual or context-aware computing uses software and hardware to automatically collect and analyze data to guide responses.

**Emotion:**

Emotion recognition is part of affective computing, which aims to recognize how the person feels, such as happy, sad, anger, disgust, fear, surprise. Traditional works about emotion recognition mainly focus on the characteristic of the person itself, such as audio, text, facial expression, body posture. However, the feelings of people can easily be affected by the context information.

**User Preferences:**

Context-aware user preferences play an important role in adapting the behaviour of pervasive systems to satisfy the individual user in different contexts. Most of the pervasive system prototypes that have been developed, incorporate context-aware user preferences, capturing them in an appropriate form and using them to personalize the behaviour of the prototype.

**Orientation:**

People could be refined to number of people, age, and gender. The weather could include temperature and whether it rains or not. By providing such a structured space, it becomes easier to link contexts in the real world to adaptations in the system. Try as an example to do a full feature space for the menu and define appropriate adaptations. Even a checklist could be considered as a very simple example of a non-hierarchical feature space.

**Environment:**

Context-aware environments

In order to be more effective, virtual prototyping systems need to be able to understand changes in the context of the user and to deliver the right information at the right time on an as-needed basis[1]. This is the goal of context-aware virtual prototyping (Aziz, 2003)

**Browser:**

On a typical day a user wakes up at say 06:00; this context (of waking up) causes his mobile phone to download and execute wake-up content, through which the user can manage the dwelling's lighting, television and stereo, heater, and so on. As the user has breakfast, CAB provides more functionality to support the user's daily routine; depending on the user's preferences it presents

web content that includes the news of the day and weather forecast

Calendar (event):

Context-aware applications provide end-users with enhanced experiences by continuously sensing their environment and adapting their behaviour to match the current context of use. However, developing true context-aware applications remains notoriously difficult due to the unpredictable nature of context changes

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

**Ans:** According to the Bluetooth network specifications, one of the modules was set as Master and the alternative one as Slave, with look for a pair and connection status quo being set to automatically.

It is to be underlined that Bluetooth v4 became used in those tests due to the fact that it became the kingdom of the artwork Bluetooth generation available at the start of the studies project. Although at some stage in the intervening time the Bluetooth v5.0 specifications were made available for the market, test modules have been not to be had until recently.

ZigBee:

The remarkable advantage of this generation is that it makes use of Adaptive Frequency Hopping, a method that automatically selects the verbal exchange channel consistent with the detected degree of interference.

ZigBee, as opposed to Bluetooth, may speak on a specific channel, making it (at least in theory) sensitive to different communications in the same frequency band. For the evaluation of this interference

**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)

**Ans:** We use RFID technology at INU on a daily basis when present on the campus is by swiping our RFID cards on the sensor. It verifies our identity and validity and then proceeds us to main menu where we can see our registered subjects, results, timetable etc., We also use RFID cards for attendance purpose and the procedure is same.

This is a passive tag as it has:

- No Internet power source. ( Powered by the RFID Reader )
- Shorter read ranges
- Less Expensive

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

**Ans:** The Wearable computing devices can be employed in computing gaming so that

**Gaming experience of the gamers reaches the highest level. The gaming applications designed for wearable devices possess the capability 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)**

**Ans: The facilities and technologies must be present in order to call you own home a Smart Home are:**

- **Smart TVs connect to the internet to access content through applications, such as on-demand video and music. Some smart TVs also include voice or gesture recognition.**
- **Using smart locks and garage-door openers, users can grant or deny access to visitors. Smart locks can also detect when residents are near and unlock the doors for them.**
- **smart lighting systems, such as Hue from Philips Lighting Holding B.V., can detect when occupants are in the room and adjust lighting as needed**
- **Providing Wi-fi signals Connectivity throughout the home so that that it can be accessed by every smart devices.**
- **smart security cameras, residents can monitor their homes when they are away or on vacation.**