

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: - Mentioned on SIC

Marks: - 50

Program: - BS (CS), BS-SE

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Class and Section: BSSE-8(Section-A)

- 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: Imagine 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?

AnswerNo 1:

The challenges which exists in Ad-hoc networks are:

- **Infrastructure less design**
- **Dynamic topology**
- **Scalability**
- **Energy constraints**

- 1) **Infrastructure less design:** Infrastructure less design means that we can add difficulty in fault detection and management.
- 2) **Dynamic topology:** Dynamic topology means that when the results in route changes and there will be loss of packets.
- 3) **Scalability:** Scalability is unsolved and it includes challenges such as addressing, routing, configuration management etc.
- 4) **Energy onstraints:** Energy constraint means that in which processing power is limited and Ad-hoc networks rely on each and every node being a router.

Answer No 2:

It contains a set of mobile nodes which is connected wirelessly. Manet nodes are freely moved because the configuration topology changes. Every node behave as a router and traffic can be forwarded to different specific node within the network.

Answer No 3:

It is necessary to reduce flooding of control packets in Adhoc networks because flooding may be expensive in terms of wasted bandwidth.

Whereas message have one destination to be sent to each host. In case of ping flood or denial of service attack it may be harmful for to the reliability of a network. The duplication of messages witin the networks will increase the load on the network. Multipoint Relay minimizes the flooding of broadcast packets within the network by reducing duplicate retransmission witin the same region

Answer .No 4: Mobile cloud computing: Mobile cloud computing is said to be the infrastructure where both data storage and data processing happens outside of the mobile device. Mobile cloud applications move the computing power and data storage away from mobile phones and from the cloud. Similarly with cloud computing there is no consensual definitions that what mobile computing is. It provides cloud based services to the users via internet and mobile devices. In Mobile cloud computing the previous mobile device is based on intensive computing data storage and mass information processing have been transferred to cloud.

Cloud computing is that which introduces the major functions of cloud computing system to store data on cloud servers, it uses cache memory technology in order to fetch the data.

Answer no 5:

Mbaas stands for Mobile backened as a service. It is said to to be a model for providing web app and mobile app developers with ready backened mobile resources and those resources will be stored in cloud storage and mobile application development process can be fast tracked in it. Mobile backened as s service provides and serve api's at the end and give the access to all the traffic analytics. Mbaas provides social media integration, data management database, file storage, Api's and infrastructure.

Answer No 6:

- It recommend social events in a city
- Request to a nearest business or service such as retail store, ATM, restaurant.
- Turn by turn navigation to any address.
- Assistive health caring systems
- Location based advertisement
- Mobile callers location can be sent as an emergency call using advanced mobile location.
- Real time Q&A revolves around restaurants, services, and other venues.

Question #7:

Answer:

Date/ Time: According to the context aware systems the date and time for the user should be provided by the system according to his current location and provide user an option to change date and time according to the area he is living in, date and time should be in the middle of the display. Where it is user centric approach. **Environment:** The environment is key factor in the context aware systems, the system should extract the information about different environments. For example, in a noisy place, night time or day time. how will the system behave in those different conditions? To adjust all conditions there is an option available in the phone like adjusting the brightness of the phone, setting the screen timer, setting screen density to warm or cold etc. **Emotional state:** According to the context aware systems, emotional state of user can affect mobile computing environment for example a loud alert (alarm)) is not ideal for all situations, the same way language can change, colors should be according to the user. **Focus of attention:** The system should give importance to the attention of user through context aware system they can provide some services like avoiding phone calls, unnecessary interruption during busy schedule or when the message arrives on the phone, the phone continuously shows the led bulb flashing for 30 seconds **Orientation:**

Orientation means the context aware system have capability to provide user device to adjust the screen according to the user. For example, auto rotation of the screen, if the user wants the full view, he can simply flip his mobile phone upside down for a better view. Smart watches like apple watch, turns on the screen when the wrist is lifted up to face. User preferences: The context aware system maintains the user preferences by providing the user with certain option such as setting up the color density of the screen, day and dark modes, changing wallpapers and themes. Calendar (events): The context aware system focuses on the system time zones globally, the user can personalize his schedule throughout the year and can keep the information regarding specific date. And when it's time, the calendar will show and notify the user about the specific even

Answer No 8: 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. The zigbee 26 channel was not interrupted by other communications while Bluetooth the

frequency hopping approach might face a stuck condition, thus delaying first step of the communication process.

For zigbee only channel 26 is used because of its specific protocol and cannot avoid interference by default. We can say that zigbee can provide valuable support for large scale energy saving sensor networks. That's why energy efficiency is important in technologies for the better performance.

Answer No 9: The RFID card that we use as student of student on daily basis, that is passive RFID because the tag power source is the energy which is transferred using RF.

It does not consist of battery tag.
It requires strong signal strength.

Its range is upto 3-5 m, and its works when it is swept on RFID reader.

Answer No 10: Wearable computing can be employed in computer gaming as Prio VR gaming.

Prio VR gaming consists of different equipments which include sensors mediating reality and virtual reality. User puts the equipments on the body to play different games. It is virtual platform in computer gaming.

Answer No 11: The facilities that is present in smart home are:

- Security
- Connectivity
- Health

1) Security: It means that to keep the home safe from intruders, check doors and locks etc.

2) Health: Health means to track health routine, measuring BMI, and analyze physical health etc.

3) Connectivity: Connectivity means to control devices, connection with neighbors and updates via email.

The technologies which facilitate a smart home:

Sensors: The sensors are motion sensors, heat sensors, PIR sensors temperature sensors, pressure sensor etc.

Cameras: The cameras which are used in homes are night vision camera, thermal camera, CCTV cameras etc.

Scanners: The scanners that are used in homes are body scanners, magnet scanners, steel scanners etc.

