

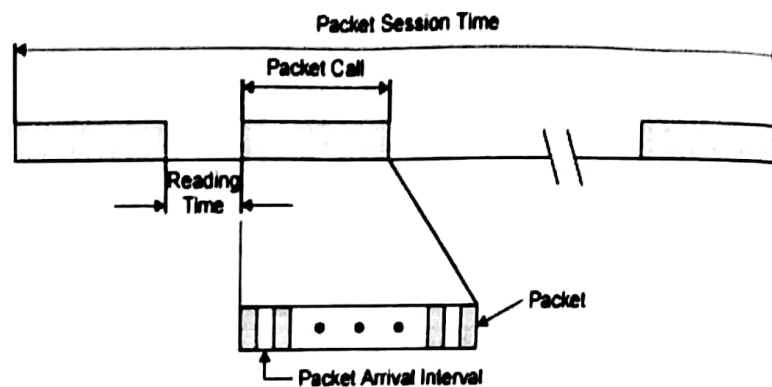
(3 hours)

(Marks:80)

- (1) Question 1 is compulsory.
- (2) Solve any three from remaining five.
- (3) Draw neat sketches wherever require.
- (4) Assume suitable data if required.

Solve any four

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| (a) Explain E-UTRAN with suitable diagram | 5 |
| (b) What are the three phases of wireless network design? Explain | 5 |
| (c) What is 'hidden node' and 'exposed node' problem in WLAN? | 5 |
| (d) What are the basic middleware functions for WSN? Explain. | 5 |
| (e) With a suitable example explain category 1 and category 2 of sensor network | 5 |
| (a) Explain middleware architecture of WSN | 10 |
| (b) Explain HSDPA emphasizing its primary objectives and how it achieves performance improvement? | 10 |
| (a) Give the detailed radio access network overview. Explain in detail functions of Node B and RNC also draw UTRAN logical architecture | 10 |
| (b) List out the factors affecting size of the cellular network and the frequency planning. Discuss these factors in detail. | 10 |
| (a) Why TCP and UDP protocols are unsuitable for implementation in WSN. | 10 |
| (b) Using the following data for a GSM network, estimate the voice and data traffic per subscriber. If there are 40 BTS sites, calculate voice and data traffic per cell. | 10 |
- Subscriber usage per month: 150 minutes
 - Days per month: 24
 - Busy hours per day: 6
 - Allocated spectrum: 4.8MHz
 - Frequency reuse plan: 4/12
 - RF channel width: 200 kHz(full rate)
 - Present no. of subscriber in the zone: 50,000
 - Subscriber growth per year: 5%
 - Network roll out period: 4 years
 - Number of packet calls per session (NPCS): 5
 - Number of packets within a packet call (NPP): 25
 - Reading time between packet calls (T_r): 120s
 - Packet size (NBP): 480 bytes
 - Time interval between two packets inside a packet call (T_{int}): 0.01s
 - Total packet service holding time during one hour (T_{tot}): 3000s
 - Busy hour packet sessions per subscriber: 0.15
 - Penetration of data subscribers: 25%
 - Data rate of each subscriber: 48 kbps
 - Packet transmission time: 10 s



5. (a) Why network management design is critical issue in WSN? Explain.
(b) What is localization of WSN nodes? Explain with examples centralized and distributed schemes in localization.
6. (a) Explain Bluetooth security features and security levels with proper diagram
(b) Write short note on (any two):
 - (1) WIMAX
 - (2) RFID
 - (3) ZigBee
 - (4) LTE
