

M.Sc. Examination, 2019
Semester-II
Computer Science
Course : MCSC-25
(Wireless Networks)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any four** questions

1. a) A 3G tri-band capable UE can complete scanning of an entire 3G band in 1250 ms, find all 3G cells on a carrier in 640 ms, synchronize and get PLMN Id of a 3G cell in 80 ms, successfully camps on a 3G cell in 1280 ms. After camping on a cell, a successful registration takes 3 seconds, an unsuccessful registration takes 1 second. An UE goes out of coverage of its registered PLMN in an area where there are 4 PLMN coverages on 9 3G carriers across 2 bands. Only one of these PLMNs allow roaming for UE. Find the shortest and longest time required for the UE to regain normal service and the respective scenarios.
b) In which power-on scenario, an UE selects a PLMN on its own without displaying list of available PLMNs to the user even if network selection mode – manual?
c) What is meant by GPRS class-B operation for UE? 6+2+2=10
 2. A UE powers-off in PLMN1 and later gets powered-on in a 3G cell of PLMN2 during roaming. Briefly explain the necessary steps and interactions between UE and network nodes of PLMN2 to decide if CS-domain roaming should be allowed to the UE or not.
b) Briefly explain how an incoming CS call is notified to a roaming UE in 2G/3G network. 5+5=10
 3. a) Briefly explain the GPRS architecture on 3G systems.
b) Briefly explain functioning of LLC sublayer in GPRS over GSM.
c) Why LLC sublayer not present in GPRS over 3G networks? 4+3+3=10
 4. a) Why is TCP not sufficient to provide end-to-end reliability in wireless data networks?
b) Briefly describe the GPRS QoS structure over 3G network.
c) Briefly describe the GPRS PDP context activation procedure. 2+4+4=10
 5. a) Justify, why LTE is called an all-IP system.
b) Briefly explain two major differences between 3G and LTE RAN and CN architectures each, and the consequent network optimizations.
c) Briefly describe the UE attach procedure in LTE. 2+4+4=10
 6. a) Briefly explain the OFDMA concept.
b) What is meant by resource block in LTE?
c) If a DL transport channel requires guaranteed bit rate of 256 kbps with rate $1/2$ channel coding, calculate the number of resource blocks required if 16-QAM is used as modulation scheme. Justify your answer.
d) If an eNB uses a carrier with 5 MHz bandwidth, how many simultaneous downlink channels as in (c) can it support? Justify. 3+2+3+2=10
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