Reg. No.									

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MANIPAL INSTITUTE OF TECHNOLOGY

SEVENTH SEMESTER B.TECH (IT) DEGREE MAKEUP EXAMINATIONS, DECEMBER – 2015
SUBJECT: MOBILE COMMUNICATIONS– ICT 401
(REVISED CREDIT SYSTEM)

TIME: 3 HOURS **30/12/2015** **MAX. MARKS: 50**

Instructions to candidates

- Answer any **FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. List all the entities of Mobile IP and describe the data transfer from a mobile node to a fixed node and vice versa with suitable illustrations.

1B. Prove that for a hexagonal geometry, the co-channel reuse ratio is given by $Q = \sqrt{3N}$, where $N=i^2+ij+j^2$.

1C. Distinguish between horizontally and vertically oriented space diversity antennas.

[5+3+2]

2A. Consider an MFSK scheme with f_c = 250 KHz, f_d = 25 KHz, and M = 8.

i) Make a frequency assignment for each of the eight possible 3-bit data combinations.

ii) Apply FHSS to this MFSK scheme with k = 2; that is, the system will hop among four different carrier frequencies. Digramatically represent the results of part (i) for 32 frequency assignments.

2B. Explain the IEEE 802.11 MAC management sublayer in terms of synchronization, power management and roaming.

2C. Define trunking efficiency and Grade of Service (GOS).

[5+3+2]

3A. Draw the LTE architecture. List down and explain the EPC elements in detail.

3B. Show the signal flow during Inter-BSC Intra-MSC handover in GSM and explain.

3C. Explain how delay spread is taking place in multipath propagation?

[5+3+2]

4A. A certain city has an average area of 1300 km^2 and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 km. The city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 KHz. Assume a GOS of 2 % is specified and the offered traffic per user is 0.03 Erlangs. Calculate the following:

i) Number of channels per cell

ii) Traffic intensity of each channel

iii) Maximum carried traffic

iv) Total number of users that can be served for 2 % GOS

v) Number of mobiles per unique channel

vi) Maximum number of users that can be served at one time by the system

4B. L2CAP provides three different types of logical channels that are transported via the ACL between master and slave. Discuss about the logical channels in detail.

4C. What are the consequences of choosing a large cell reuse pattern and small cell reuse pattern on the following parameters?

i) Spectrum utilization efficiency

ii) Carrier to interference ratio

iii) Number of calls per cell

iv) Number of channels available per cell

[5+3+2]

5A. Explain the system architecture of GPRS with neat illustration.

5B. Explain with illustration how A3, A5 and A8 algorithms guarantee security in GSM architecture?

5C. How MACA solves the problem of hidden and exposed terminal situation in mobile nodes?

[5+3+2]

6A. Explain in detail about the following concepts in LTE:

i) ICIC and FFR

ii) DSA

iii) COMP

iv) CA

6B. Draw the classification of wireless MAC protocol and explain the following:

i) Resource Auction Multiple Access

ii) Zhangs Proposal

iii) Packet Reservation Multiple Access

6C. In case of reservation schemes how collision avoided during data transmission and why is the probability of collision lower compared to classical Aloha?

[5+3+2]