ROLL NO. _____

Code: DE66 Subject: WIRELESS & MOBILE COMMUNICATIONS

DipIETE – ET

Time: 3 Hours **JUNE 2013** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The WPAN technology used in

(A) USB **(B)** RS-232
(C) GPS **(D)** Bluetooth

b. The radio wave propagation effects are

(A) Reflection **(B)** Scattering
(C) Distortion **(D)** Both **(A)** and **(B)**

c. The coherence bandwidth is given by

(A) $\frac{1}{2\pi\tau_d}$ **(B)** $\frac{2\pi}{\tau_d}$

(C) $\frac{\tau_d}{2\pi}$ **(D)** $2\pi\tau_d$

d. _____ has high throughput

(A) ALOHA **(B)** Slotted ALOHA
(C) CSMA **(D)** Both **(A)** & **(B)**

e. In spread spectrum transmission technique, data occupy relatively

(A) A larger bandwidth **(B)** A smaller bandwidth
(C) Constant bandwidth **(D)** None of these

f. The operational spectrum of HiperLAN2 is

(A) 1 GHz **(B)** 1.5 Ghz
(C) 2.4 Ghz **(D)** 5 GHz

g. Frequency reuse factor in cellular system (q) is

(A) $q = D/R^2$ **(B)** $q = D/R+1$

(C) $q = \sqrt{3N}$ **(D)** $q = D^2/R$

h. DSDV routing protocol is used in

(A) Bluetooth **(B)** WLAN
(C) MANET **(D)** WSN

i. Wireless access card use _____ protocol to resolve shared access of the channel

(A) CSMA/CD **(B)** CDMA/CA
(C) CSMA **(D)** DAMA

j. Microcells are deployed in a network due to

(A) Increasing cellular capacity **(B)** Economics
(C) Improving signal reception **(D)** Reducing handoffs and reliving traffic

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Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. With the help of neat diagram explain the cellular system infrastructure. **(8)**

b. With a neat diagram explain the wireless communication system. **(8)**

Q.3 a. Distinguish between
(i) Fast fading and slow fading
(ii) Delay spread and coherence bandwidth **(8)**

b. Explain with example the concept of an interleaver. **(8)**

Q.4 a. Explain cell splitting and cell- sectoring in cellular concept. **(8)**

b. Define co-channel and adjacent channel interference. **(4)**

c. If 40 MHz of total spectrum is allocated for a duplex wireless cellular system and each simplex channel has 25 Hz RF bandwidth, find
(i) the number of duplex channels
(ii) the total number of channels per cell site. If N = 3, cell re-use is used **(4)**

Q.5 a. Draw and explain the structures of forward and reverse channels in a TDMA/TDD and TDMA/FDD system. **(10)**

b. Compare Fixed channel allocation and Dynamic channel Allocation. **(6)**

Q.6 a. Draw and explain GEO satellite beam footprint. **(6)**

b. In the satellite system, there is some degree of free space loss. Besides this loss, does it have any other source of loss? Explain **(10)**

Q.7 a. What is GSM? Explain its frequency bands and channels used. Also discuss its frame structure. **(8)**

b. Draw and explain universal mobile telecommunication system (UNTS) architecture. **(8)**

Q.8 a. Discuss the factors involved in a routing of MANET and also the routing goals. **(10)**

b. Draw and explain general architecture of a fixed sensor node. **(6)**

Q.9 Write short notes on any **TWO:** **(8×2)**

(i) Home RF Technology
(ii) UWB system characteristic
(iii) Smart Antennas features