ROLL NO. _____

Code: AE76 Subject: WIRELESS AND MOBILE COMMUNICATIONS

AMIETE – ET

Time: 3 Hours **DECEMBER 2014** **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. Frequency Reuse factor is given by

(A) $\sqrt{3N}$ R **(B)** N$\sqrt{R}$
(C) $\sqrt{3N}$ **(D)** N/R

b. What is change in received signal powers (in dB) in mobile radio propagation condition at two different points when the second point is at twice the distance of the first point

(A) 12 dB **(B)** 21 dB
(C) 0 **(D)** None of these

c. Which of the following conserves bandwidth?

(A) TDMA **(B)** FDMA
(C) CDMA **(D)** Frequency Reuse

d. Determine the distance from the nearest co-channel cell for a cell having a radius of 0.6km and a co-channel reuse factor of 12.

(A) 1 km **(B)** 2.7 km
(C) 7.2km **(D)** None of these

e. Determine the number of cells in clusters for the shift parameters, i = 2 and j = 4.

(A) 28 **(B)** 82
(C) 14 **(D)** 41

f. Which of the following is most advanced modulation technique?

(A) FM **(B)** PSK
(C) AM **(D)** QPSK

g. Cell splitting is done to

(A) Accommodate more traffic **(B)** Accommodate more area
(C) Save Power **(D)** Increase the frequency reuse

h. Assume a receiver is located 20 km from a 100w transmitter in free space. The carrier frequency is 1000 MHz, G_t = 1 and G_r = 3. Find the power at the receiver

(A) -93.69 dBm **(B)** -69.93 dBm
(C) -36.99 dBm **(D)** None of these

i. EDGE is a

(A) 2G Technology **(B)** 3G Technology
(C) 2.5G Technology **(D)** 1.5G Technology

j. A mobile subscriber travels at a uniform speed of 100km/h. Compute the time between fades if the mobile uses a cell phone operating at 900 MHz

(A) 6 mS **(B)** 6 µS
(C) 6 nS **(D)** None of these

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

Q.2 a. Differentiate between the indoor and outdoor propagation models. Name one model from each category. **(6)**

b. Explain and differentiate Wireless MAN, LAN and PAN **(10)**

Q.3 a. For a Rayleigh fading signal, compute the positive going level crossing rate of $\rho = 1$, when the maximum Doppler frequency is 20Hz. What is the maximum velocity of the mobile for this Doppler frequency if the carrier frequency is 900 MHz. **(8)**

b. Explain with diagram consequences of Doppler Effect on wireless communication. **(8)**

Q.4 What is multiple access? Describe TDMA frame structure in detail. **(16)**

Q.5 a. Describe GPS system and its limitation. **(6)**

b. Discuss the Hand-off strategies used in cellular communication system. **(10)**

Q.6 a. What are the different methods available for improving coverage & capacity of a cellular system? Explain any one in detail. **(10)**

b. If a normal GSM time slot consists of six trailing bits, 8.25 guard bits, 26 training bits and two traffic bursts of 58 bits of data. Find the frame efficiency. **(6)**

Q.7 a. Explain AMPS system and need for GSM. **(6)**

b. The capacity of cellular CDMA & CDMA power control. **(10)**

Q.8 a. Compare ad-hoc and infrastructure mode WLAN topologies. **(8)**

b. Enumerate various security risks associated with wireless communication. **(8)**

Q.9 a. Describe different routing techniques. **(8)**

b. Explain different characteristics of MANETs. **(8)**