

## AMIETE - ET (NEW SCHEME)

Time: 3 Hours

DECEMBER 2011

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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 simplest of formula for path loss of land propagation is \_\_\_\_\_

(A)  $L_p = Ad^{-\alpha}$

(B)  $L_p = A^d \alpha$

(C)  $L_p = Ad^\alpha$

(D)  $L_p = A\alpha^d$

Where A and  $\alpha$  are propagation constants and d is the distance between the transmitter and the receiver.b. In Doppler effect the frequency  $f_r$  of the received signal is given by \_\_\_\_\_  
( $f_c$  is the frequency of source carrier and  $f_d$  is Doppler frequency)

(A)  $f_r = f_c \times f_d$

(B)  $f_r = f_c - f_d$

(C)  $f_r = f_c \times f_d + f_c - f_d$

(D)  $f_d = f_r = f_c$

c. Free space is an ideal propagation medium at arbitrary large distance d from the source, the received power is given by

(A)  $P_r = \frac{A_e G_t P_t}{4\pi d^2}$

(B)  $P_r = P_t / 4\pi d^2$

(C)  $P_r = \frac{4\pi G_t P_t}{A_e d^2}$

(D)  $P_r = \frac{G_t}{4\pi d^2 P_t}$

d. The coherence bandwidth  $B_c$  between two fading signals envelopes  $f_1$  and  $f_2$  as a function of delay spread  $T_d$  is \_\_\_\_\_

(A)  $B_c = \frac{1}{2\pi T_d}$

(B)  $B_c = \frac{1}{T_d}$

(C)  $B_c = 2\pi T_d$

(D)  $B_c = \frac{2\pi}{T_d}$

**Code: AE76 Subject: WIRELESS AND MOBILE COMMUNICATIONS**

e. In a cellular system two cells using same channel is known as the 'reuse distance' is represented by D, R (radius of the cell) and N (no of cells in a cluster) which is given by \_\_\_\_\_

- (A)  $D=3NR$  (B)  $D = (\sqrt{3N})R$   
 (C)  $D=R$  (D)  $D= \sqrt{R}(3N)$

f. The relation between power and electric field is \_\_\_\_\_

- (A)  $\frac{|E|^2}{377\Omega}$  watt / m<sup>2</sup> (B)  $\frac{|H|^2}{\eta}$  watt / m<sup>2</sup>  
 (C)  $\frac{|H|^2}{120\pi}$  watt / m<sup>2</sup> (D)  $\frac{|E|^2}{|H|^2}$  watt / m<sup>2</sup>

g. Line of sight propagation is defined as \_\_\_\_\_

- (A) the distance between transmitter and receiver  
 (B) the distance between transmitter and ground reflection  
 (C) direct ray + ground reflected ray  
 (D) obstructed path in the transmitter and receiver distance.

h. Channel coding allows exchange of signal \_\_\_\_\_ and \_\_\_\_\_ without performance degradation of radio communication in wireless systems.

- (A) Power and bandwidth (B) power and amplitude  
 (C) power and frequency (D) bit error and power

i. The channel rate of IS-95 \_\_\_\_\_

- (A) 3.258 Mbps (B) 6.25 Mbps  
 (C) 1.228 Mbps (D) 2 Mbps

j. AMPS transmits speech signals employing FM and important control information is transmitted in digital form using

- (A) PSK (B) FSK  
 (C) ASK (D) GMSK

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

- Q.2** a. How is an ad hoc network differ from a cellular network? Elaborate the explanation? (6)  
 b. List three prospective applications of sensor networks. (5)  
 c. Explain the terms PDF and CDF. (5)

- Q.3** a. Since free space is an ideal propagation medium, derive an expression for the path loss in dB. What is the difference in path loss occur in urban area and open area? (6)
- b. Explain what is slow fading and show that it's amplitude has a log normal probability density function. (6)
- c. Explain what is inter symbol interference with appropriate diagrams. How it can be reduced. Explain how it affects the bit error rate? (4)
- Q.4** a. If a signal to interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is  $n=4$ . (6)
- b. Explain the frequency reuse concept in cellular mobile systems. (6)
- c. How does slotted ALOHA improve the throughput as compared to pure ALOHA. (4)
- Q.5** a. Compare FCA and DCA. (8)
- b. Compare TDMA, CDMA and SDMA. (8)
- Q.6** a. Differentiate UWB and spread spectrum technique. (8)
- b. Write short note on Smart Antennas and SDMA. (8)
- Q.7** a. Why is it not possible to use circuit switching in adhoc networks. (8)
- b. Write short note on IEEE 802.11. (8)
- Q.8** a. What is Global Positioning Systems (GPS) and what are some possible uses of GPS? (8)
- b. Discuss the parameters influencing handoff and explain how it is useful in Roaming. (8)
- Q.9** a. Explain salient features of IS-95, write about logical channels in IS-95 (8)
- b. Explain frequency band and channels used in GSM, and write about GSM infrastructure. (8)