

**AMIETE – ET/CS (Current & New Scheme)**

Time: 3 Hours

**June 2019**

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. Bluetooth devices provides
  - (A) short distance (1-100 meters) communications upto 1 Mbps data rate
  - (B) short distance (1-100 meters) communications upto 1 Gbps data rate
  - (C) short distance (1-100 meters) communications upto 2 Gbps data rate
  - (D) short as well as long distance (1 m - 1 km) upto 1 Mbps data rate
- b. A  $E_b/N_0$  ratio increases, the bit error rate
  - (A) increases
  - (B) decreases
  - (C) remains same
  - (D) approaches infinity
- c. When an electromagnetic wave travels in free space, it suffers from
  - (A) absorption
  - (B) refraction
  - (C) attenuation
  - (D) super-refraction
- d. The distance between the centers of two adjacent hexagonal cells, each cell having radius of 2 km, is
  - (A)  $2\sqrt{3}$
  - (B)  $\sqrt{3}$
  - (C)  $3\sqrt{3}$
  - (D)  $\sqrt{3}/2$
- e. For a cluster of size 7, the frequency reuse ratio is approximately equal to
  - (A) 3
  - (B) 7
  - (C)  $\sqrt{21}$
  - (D) 21
- f. The total numbers of channels available in extended spectrum US-AMPS cellular standard are
  - (A) 312
  - (B) 416
  - (C) 666
  - (D) 832
- g. Interference on voice channels usually causes
  - (A) missed calls
  - (B) dropped calls
  - (C) blocked calls
  - (D) cross talk

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Subject: WIRELESS AND MOBILE COMMUNICATIONS

- h. \_\_\_\_\_ technique allows multiple subscribers to simultaneously occupy the same frequency spectrum at the same time.  
 (A) FDMA (B) SSMA  
 (C) FHMA (D) SDMA
- i. If the calling rate averages 20 calls per minute and the average holding time is 3 minutes then the offered traffic load in Erlang is  
 (A) 60 (B) 66.6  
 (C) 0.15 (D) 23
- j. The frame period of one TDMA frame in GSM standard is  
 (A) 3.692  $\mu$ s (B) 577  $\mu$ s  
 (C) 4.615  $\mu$ s (D) 4.615 ms

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

- Q.2** a. Compare the features of cellular mobile communication systems with that of conventional mobile telephone systems. (8)
- b. Explain, what are Network protocols? (8)
- Q.3** a. What is fading? Compare fast and slow fading. (8)
- b. Compare linear block codes and cyclic codes. (8)
- Q.4** a. Explain the term cell capacity and derive an expression for capacity of a cell. (8)
- b. What are protocols? Explain the concept of contention based protocols. (8)
- Q.5** a. Compare various multiple access techniques used in wireless communication. (8)
- b. What is channel allocation? Explain any two means of channel allocation. (8)
- Q.6** a. Write short note on GPS. (8)
- b. Explain the characteristics of satellite systems. (8)
- Q.7** a. What are the differences between Cellular and ad-hoc networks? Why is it not possible to use circuit switching in ad-hoc networks? (8)
- b. Explain wireless sensor networks with the help of real time example. (8)
- Q.8** Write short notes on (8+8)
- (a) AMPS (b) IMT-2000
- Q.9** a. What are wireless networks? How and where do we use them? Compare WLAN and WMAN. (8)
- b. When conventional antennas are there, why do we require directional and smart antennas? Give any application where we have replaced conventional antennas with smart antennas. (8)