D 41399 (Pages : 2) Name.....

Reg. No.....

EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2018

Electronics and Communication Engineering

EC 14 803—WIRELESS MOBILE COMMUNICATIONS

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. With illustration, explain how a call initiated by a mobile is established ?
2. Explain Cellular Frequency Reuse Concept.
3. Explain Hand-off scenario at Cell Boundary.
4. Explain the classification of small scale fading.
5. Determine the proper spatial sampling interval required to make small-scale propagation measurements which assume that consecutive samples are highly correlated in time. How many samples will be required over 10 m travel distance if f_c = 1900 MHz and v = 50 m/s ? How long would it take to make these measurements, assuming they could be made in real time from a moving vehicle ? What is the Doppler spread B_D for the channel ?
6. For a Rayleigh fading signal, compute the positive-going level crossing rate for $\rho = 1$, when the maximum Doppler frequency is 20 Hz. What is the maximum velocity of the mobile for this Doppler frequency if the carrier frequency is 900 MHz ?
7. What is a Pseudorandom sequence ? Explain with the generalized feedback shift register block diagram.
8. Explain the features of CDMA.
9. With block diagram explain the voice modulation process in AMPS ?
10. Explain GSM operations from speech input to speech output.

(8 × 5 = 40 marks)

Part B

11. (a) (i) With illustration, explain the Cellular System.

(8 marks)

(ii) What is an Umbrella Cell Approach ? Explain.

(7 marks)

Or

Turn over

(b) 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 exponents is (i) $n = 4$ (ii) $n = 3$? Assume that there are 6 co-channel cell s in the fires tier, and all of them are at the same distance from the mobile. Use suitable approximations.

12. (a) With suitable derivation explain the two ray ground reflection model.

Or

(b) (i) Explain frequency selective fading.

(7 marks)

(ii) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz. For a vehicle moving 60 mph, compute the received carrier frequency if the mobile is moving (1) directly towards the transmitter, (2) directly away from the transmitter, (3) in a direction which is perpendicular to the direction of arrival of the transmitted signal.

(8 marks)

13. (a) Explain Direct sequence spread spectrum with its transmitter and receiver.

Or

(b) With neat sketch explain RAKE receiver.

(8 marks)

14. (a) (i) With network architecture, explain UMTS System.

(ii) Explain Error protection for USDC output speech coder output. (7 marks)

Or

(b) Explain GSM System architecture and various interfaces used in GSM.

[4 × 15 = 60 marks]