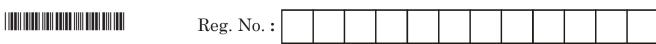
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Question Paper Code: X10345

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020 Seventh Semester

Electronics and Communication Engineering EC8092 – ADVANCED WIRELESS COMMUNICATION (Regulations 2017)

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

PART - A (10×2=20 Marks)

- 1. Why is there a continuous drive for high data rates?
- 2. Differentiate Diversity and Array gain.
- 3. Give the sources for macroscopic fading.
- 4. How does diversity combining methods alleviate propagation effects?
- 5. State the principle used in Delay diversity scheme.
- 6. Why is maximum likelihood decoding logic more preferred?
- 7. What is that STBC codes are deprived of but available with STTC codes?
- 8. When antenna correlation is high? What is its impact on end user performance?
- 9. Give any two characteristics features of OFDM systems.
- 10. Why layered space time codes area used in recent days?

PART – B (5×13=65 Marks)

11. a) Derive the expressions for MIMO system capacity starting from the Mutual Info. Principle. Also comment on the MIMO capacity limits when the transmitter knows the channel state information.

(OR)

b) How the random channels does affects the MIMO channel capacity? Derive the expressions for channel capacity of such channels to prove your statement. Provide necessary diagrams.

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12. a) Present a detailed outline on the Hata and Okumra outdoor propagation models with emphasis on its suitability on terrain and frequencies with relevant equations.

(OR)

- b) With neat diagrams, elaborate on various type of microscopic fading and compare their characteristics, source and effects.
- 13. a) With a block diagram of Alamouti space time encoder, with 2 transmit antenna, derive the expression for maximal ratio combining and brief its performance.

(OR)

- b) Present a broad overview on the STBC codes employed for real and complex signal constellations considering the number of transmit antennas = 2 or 4.
- 14. a) Derive the Pairwise Error Probability (PEP) of a space time code word with $M_t \times L$ size. Apply the design criteria of space time trellis codes on a slow fading channel and compute the PEP for this case. What is its impact on the rank and determinant criteria?

(OR)

- b) Give a detailed picture on the effect of imperfect channel estimation and antenna correlation on the performance.
- 15. a) How are layered space time architecture different from the conventional STBC/STTC codes? Elaborate on the types of encoding in LST transmitter. Provide diagrams.

(OR)

- b) Give a detailed note on the following:
 - i) MC receiver

ii) ZR receiver.

(6+7)

PART - C

 $(1\times15=15 \text{ Marks})$

16. a) Present a broad comparison on the impact of the following critical factors like fading correlation, LOS, XPD influencing MIMO capacity.

(OR)

b) It is needed to perform a study between comparative STBC/STTC with codes having 4 and 8 coding states. Also present the performance curves to substantiate your answer.