



Reg. No. :

--	--	--	--	--	--	--	--	--	--	--

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 are 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.

X10345



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

(1×15=15 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.
-