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H – 2939

Reg. No.

Name :

Eighth Semester B.Tech. Degree Examination, November 2019

(2013 Scheme)

13.804 : WIRELESS COMMUNICATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer for **all** questions. Each question carries **2** marks

1. How the pagers are identifying the required messages?
2. List the types of codeless telephones and describe briefly about each one.
3. Why the performance of Bluetooth technology has improved by adopting frequency hopping?
4. How the probability of blocked calls (P_r) can be computed from traffic intensity (A_u)?
5. Give the features of GSM standard for cellular mobile communication.
6. Why Doppler spread and Coherence time are important for a multipath wireless channel?
7. Explain the diffraction of radio wave signals.
8. Why the OFDM system provides best solution for wireless transmission? Give the reasons.
9. Give the impacts of mutual coupling of antenna arrays.
10. What is a geo-stationary satellite?

(10 × 2 = 20 Marks)

P.T.O.



PART – B

Answer **any one** questions from **each** Module.

Each full question carries **20** Marks

Module – I

11. (a) Give the protocol stack for implementing Zig-bee wireless system for low power application and give functions of each layer. **10**
(b) Discuss the evolution of wireless mobile communication system. **10**

OR

12. (a) How the Wireless Local Area Network (WLAN) has implemented with different standards? Describe briefly. **10**
(b) Give the architecture of a modern cellular system for reliable communication and briefly describe the functions of each module. **10**

Module – II

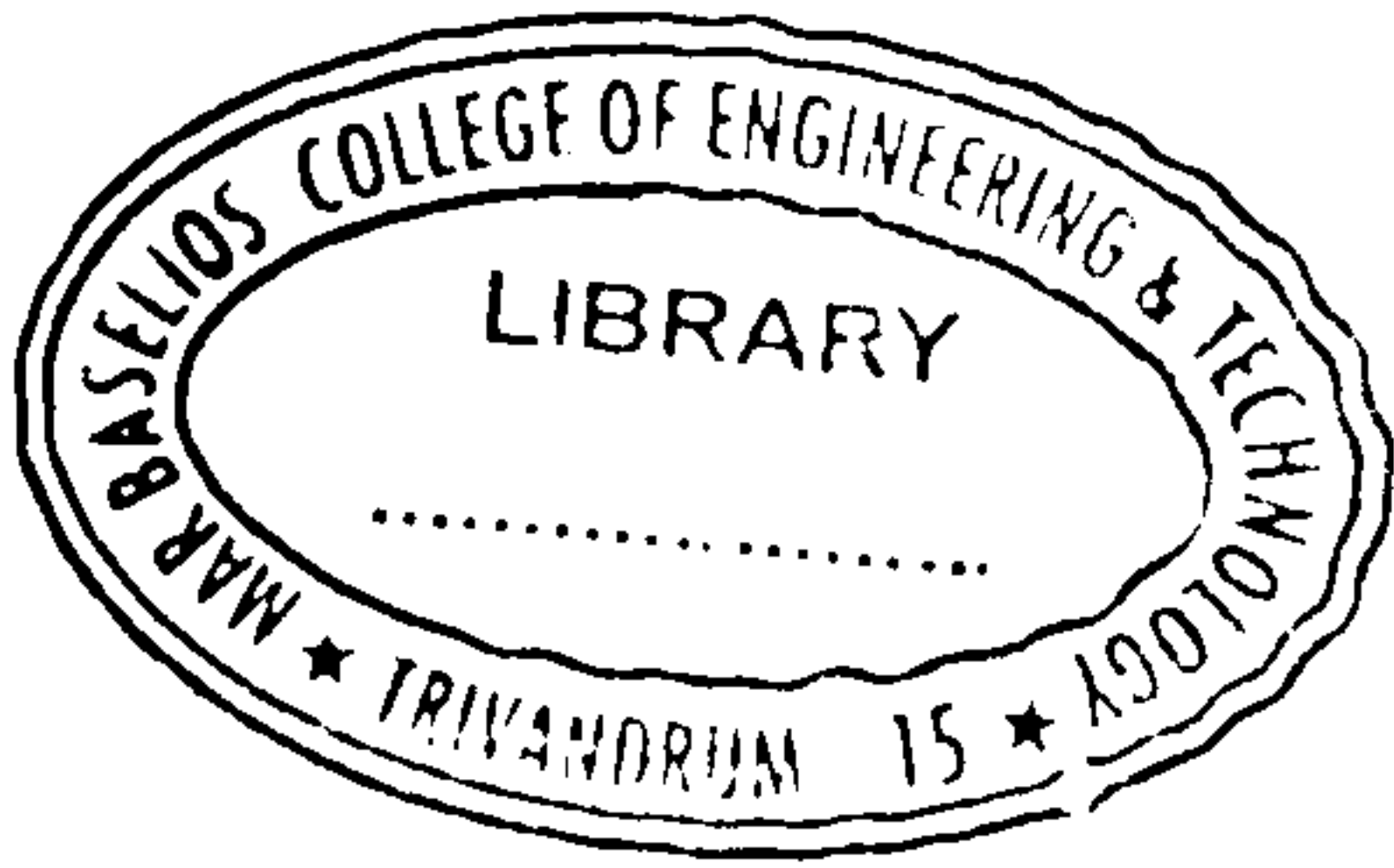
13. (a) Explain about different channel assignment strategies used in cellular systems. **12**
(b) If a Signal to Interference Ratio (SIR) of 30dB is required for satisfactory forward channel performance of a cellular system, what is the frequency re-use factor(Q) and cluster size(N) that should be used for maximum capacity with path loss exponent is
(i) $n=4$ and
(ii) $n=3$?

Assume that there are 6 co-channel cells in the first tier and all of them are at the same distance from the mobile. Use the suitable approximation from the table **8**

	Cluster size(N)	Co-channel re-use ratio(Q)
$i=1 \ j=1$	3	3
$i=1 \ j=2$	7	4.58
$i=2 \ j=2$	12	6
$i=1 \ j=3$	13	6.24

OR





14. (a) Draw the diagram of a cellular call setup system and explain how a cellular telephone call is made between the landline and the mobile user, when the call is initiated by the landline customer. Explain with the help of a timing diagram, **12**
- (b) Give suggestions for improving the capacity and coverage of the cellular system. **8**

Module – III

15. (a) Derive expression for different propagation parameters with reference to Clarke's model for flat fading channel. How the Doppler spread affect the Clarke's model? **12**
- (b) How the MIMO system improves the efficiency of wireless transmission? Describe about narrowband MIMO model with the help of necessary diagrams. **8**

OR

16. (a) Consider a transmitter which radiates a sinusoidal carrier frequency of 1900MHz, for a vehicle moving with a speed of 50mphr, compute the received carrier frequency if the mobile is moving, **8**
- (i) Directly towards the transmitter
- (ii) Directly away from the transmitter
- (iii) In a direction which is perpendicular to the direction of arriving transmitted signal.
- (b) What are the factors which influencing the Small-Scale Fading in wireless channels? **12**

Module – IV

17. (a) Give the block diagram for a typical earth station transmitter and receiver of a satellite communication system and explain about each block. **12**
- (b) Briefly discuss about different traffic routing methods for wireless communication. **8**

OR



18. (a) Briefly discuss about the given multiple access system with necessary diagrams.

(i) Time Division Multiple Access (TDMA)

(ii) Frequency Division Multiple Access (FDMA)

(iii) Space Division Multiple Access (SDMA)

12

(b) How the CDMA cellular system offers better performance? Discuss briefly. 8

