



RM-7723

B. E. IV (Sem. VIII) (ECC) Examination

May / June - 2010

Cellular Mobile Technology

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. 4 (Sem. 8) (ECC)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Cellular Mobile Technology"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="7"/> <input type="text" value="2"/> <input type="text" value="3"/>	<input type="text" value="Student's Signature"/>
Section No. (1, 2,.....) : <input type="text" value="1&amp;2"/>	

- (2) Assume suitable data whenever necessary.
- (3) Use scientific calculator Casio Fx 82, 83, 100 or equivalent.
- (4) Figure to the **right** indicate full marks.

### SECTION - I

- 1 Give the answers of the followings : 20
    - (a) (i) What is channel sharing and channel borrowing? 10
    - (ii) Explain the concept of Frequency Reuse.
    - (iii) What is forced hand off? In which condition it is required?
    - (iv) How can we minimize the effect of sudden fading and burst error in GSM Communication?
    - (v) Prove that modulation data rate for GSM is 270.833 Kbps.
  - (b) Derive the equations for Reuse distance (D) in terms of reuse factor (K). Clearly mention all assumption made.
  - (c) Discuss how the error protection is achieved in GSM signal processing. 5
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- 2 Answer the following questions :
    - (a) Explain channel allocation strategies for side A and side B carriers. Discuss the importance of numbering and allocation of total available channels. 7

- (b) What is MSRN and LAI in GSM communication? 8  
Elucidate a sequence of call flow which requires use of above terms of call processing.
- OR**
- 2 (a) Briefly explain the role of Cell Splitting and Sectorization in mobile communication. 7  
(b) What are Security Triplets? Where and for what purpose they are used in GSM? 8
- 3 Attempt any **three** : 15  
(i) Protocol Model for GSM  
(ii) Call blocking probability  
(iii) NSS in GSM  
(iv) Frequency hopping and modulation in GSM  
(v) Umbrella cell approach.

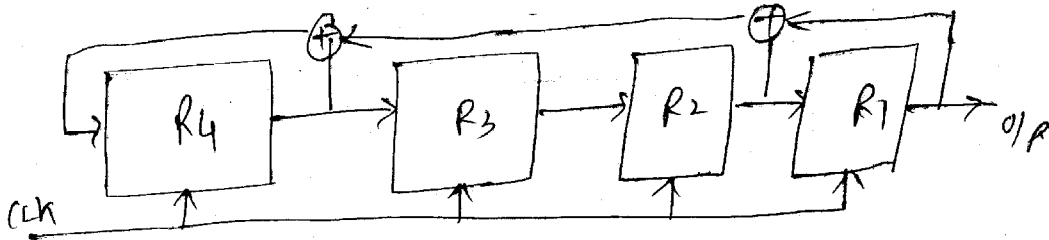
## SECTION - II

- 4 (a) Answer the following questions in brief. 10  
(i) Discuss "for rural areas, wireless communication is better choice compared to wire line n/w".  
(ii) What are the types of frequency selecting fading? Explain coherence bandwidth.  
(iii) Discuss : "CDMA system has ideally reuse factor of 1(one) still cellular concept is used in CDMA."  
(iv) Critically evaluate and discuss in brief : "The coherence time must be much larger than the message bit duration."  
(v) Explain the concepts of orthogonal codes to PN codes.
- (b) Derive the system capacity of CDMA system. 5  
(c) Based on results of above part (b) discuss : "capacity of CDMA network is much higher than - (i) TDMA + FDMA based and (ii) FDMA based systems." 5
- 5 (a) Derive walsh code (in bits) for W4, W13 using symmetry property. Compare "walsh codes" as efficient coding technique, with other coding technique(s) available in context of CDMA. 7

- (b) In case of CDMA systems 16 bits are received as 0000000011110111. It is expected that the received sequence is in error. Use following decoding method(s) to detect the correct code transmitted by the system : 8
- (i) Hamming distance
  - (ii) Walsh decoding method.

**OR**

- 5 (a) List the properties to generate Walsh codes. 8  
Derive Walsh code (in bits) for W6, W8 using Walsh coding properties with  $T = 16$ .
- (b) Find the output sequence for the following Linear Feedback Shift Register. 7



**Fig. 1**

Take initial seed  $(R_1, R_2, R_3, R_4) = 1000$ . Does this result in to MLSR sequence?

- 6 Write short notes : (any **three**) 15
- (a) Hand off strategies in CDMA
  - (b) Power as constrained resource, in CDMA
  - (c) Spread Spectrum technology
  - (d) Diversity in CDMA.