

**M.Tech. IN ADVANCED INFORMATION  
TECHNOLOGY - NETWORKING AND  
TELECOMMUNICATION (MTECHTC)**

**Term-End Examination**

**December, 2014**

**MINI-022 : WIRELESS COMMUNICATIONS**

*Time : 3 hours*

*Maximum Marks : 100*

**Note :**

- (i) *Section I is compulsory.*
- (ii) *In Section II, solve any five questions.*
- (iii) *Assume suitable data wherever required.*
- (iv) *Draw suitable sketches wherever required.*

**SECTION I**

*Answer the following compulsory question :*

1. In a licensing process, Vodafone was allocated 7.2 MHz of bandwidth. How many traffic channels will be available if the circle is divided into :

- (a) No cells 10
- (b) 72 cells 10
- (c) 240 cells 10

Assume the K factor to be 12.

## SECTION II

Answer any **five** questions from those given below :

- Using a Hadamard matrix generate random codes and prove that they are orthogonal to each other. 6+8=14
- Looking at the way how humans produce sound, create a mathematical model and explain the process for producing a digitized voice. Refer Figure 1 below : 8+6=14

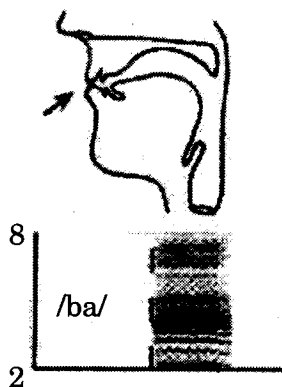


Figure 1

- A mobile call is established from Pune to a Bangalore landline. Explain the signalling done by the devices for establishing the call and illustrate it with the help of a suitable diagram. 14

5. Explain the process wherein a CDMA BTS sends information to 3 users who have been allocated different orthogonal codes and they decode their respective information using their unique codes. 14
  6. Design a  $1/2$  rate convolution encoder whose input has 260 bits and output is 456 bits. 14
  7. What changes would be required for a GSM network to support data services ? Explain the components of the new designed network.  $6+8=14$
  8. Design a hybrid switch that has a Time slot interchange switch with 24 inputs and multiple crossbar switches in the centre. What changes have to be done if the number of crossbar switches has to be reduced to one ?  $8+6=14$
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