

(3 Hours)

Total marks : 100

- N.B.: (1) Question No:1 is compulsory  
(2) Attempt any four questions out of the remaining six questions  
(3) Assume suitable data, wherever necessary

- 1 a) What is frequency reuse concept? (05)  
b) In a certain cellular system, for sufficient voice quality, S/I ratio is required to be greater than or equal to 18dB. Assume that the first layer of co-channel cells that create interference are all approximately equidistant from the desired base station. Path loss exponent,  $n = 4$ . Determine cluster size. (05)  
c) Explain MAHO (05)  
d) Distinguish between hard hand-off and soft hand-off. (05)
- 2 a) Prove that for a hexagonal cell geometry, the co-channel reuse ratio is given by  $Q = \sqrt{3N}$ , where  $N = i^2 + ij + j^2$ . (05)  
b) In cell splitting, if the radius of each new microcell is half that of the original cell, show that: (07)  
i) Traffic load can increase four times  
ii) Transmit power must be reduced by 12 dB to maintain the  $\frac{S}{I}$  requirement with a path loss exponent of 4.  
c) Distinguish between Erlang B and Erlang C system. Explain Grade of Service of both systems. (08)
- 3 a) Sketch block diagram of OFDM system, with symbolic representation of the output of each block. (10)  
b) State advantages of OFDM over conventional FDM. (04)  
c) Five 100 KHZ channels are multiplexed using conventional FDM (assume no guard band) with five different carriers. If instead, the five carriers are placed orthogonally to each other, compare the occupied bandwidth in both the cases and find the savings in bandwidth for OFDM case. (06)
- 4 a) With a suitable sketch, explain GSM architecture. List the functions of each unit. (08)  
b) Explain the authentication, cipher key generation and encryption process in GSM (06)  
c) Explain the signal processing steps in GSM with a block diagram (06)

[Turn Over

- 5 a) Explain power control in CDMA IS 95 system (08)  
b) With a suitable sketch, explain the working of RAKE receiver. (06)  
c) List and explain the forward and reverse logical channels in CDMA IS 95 system (06)
- 6 a) Explain CDMA 2000 layering structure (10)  
b) Explain with respect to CDMA 2000 : i) MAC sublayer (10)  
ii) LAC sublayer
- 7 Write short notes on any four: (20)  
a) GPRS  
b) Zigbee  
c) Bluetooth  
d) UWB  
e) Sectoring
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BE Electronics SEM-VI (old)  
VLSI Design

15/12/2016

Q.P. Code : 630501

Time:-3 Hrs

Marks: 100

- N.B. :
1. Question one is compulsory
  2. Solve any four out of remaining six questions
  3. Draw neat diagrams
  4. Assume suitable data if required.
  5. Symbols have their usual meanings.

- Q. 1. A) Draw and explain VTC of CMOS inverter. 20  
B) Explain diffusion process.  
C) Explain lambda based design rules  
D) Explain the necessity of HDL
- Q. 2. A) Draw and explain fabrication steps of CMOS inverter. 10  
B) Draw mask layout for two input CMOS NOR gate. 10
- Q. 3. A) Explain epitaxial process. 10  
B) Explain implementation of ripple carry adder. 10
- Q. 4. A. Explain constant voltage scaling in detail. 10  
B. Derive equations for Noise margin for CMOS inverter. 10
- Q. 5. A. Write Verilog programme for full adder using two half adders. 10  
B. Differentiate between semi-custom and full-custom devices. 10
- Q. 6. A. Explain various short channel effects. 10  
B. Realize  $Y=(A+B)(C+D)$  using CMOS technology. 10
- Q.7 Write short notes on following 20  
A. VLSI design flow  
B. VLSI design rules  
C. Buried contact  
D. Depletion load inverter
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