E&TC

College of Engineering, Pune

END SEMESTER EXAM Nov 2012

Year: (Final B. Tech - E & TC)

(ET 401)- (Mobile Communication)

Day & Date- Friday, 23 /11/2011 | Max. Marks- 50
Timing- 2 to 5 pm | Duration – 3 hours

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Draw neat figure wherever required

Q. 1 A. For the distributed SPC system, explain Level 3 processing. **3**

B. Determine the switch advantage ratio of a three stage network with N inlets and outlets for the case N = 128 and N=2048. **2**

C. An exchange uses a 40 V battery to drive subscriber lines. A resistance of 250Ω is placed in series with battery to protect it from short circuits. The subscribers are required to use a standard telephone set which offers a DC resistance of 50Ω. The microphone requires 23 mA for proper functioning. Determine the farthest distance from exchange at which subscriber can be located if 26 AWG conductor is used. **2**
(Given: For 26 AWG conductor, DC resistance (Ω/km) = 133.89)

D. State various points those are considered while framing the 'charging plan' for PSTN phones by the exchange. **3**

OR

D. What is the objective of 'Numbering plan'? **3**
Explain different fields included in telephone number structure?

Q.2 A. Define following terms for telephone traffic analysis: **4**
i. Time consistent busy hour
ii. CCR
iii. GOS
iv. Traffic intensity

B. Calculate the number of trunks that can be supported on a time multiplexed space switch, given that 32 channels are multiplexed in a given stream, control memory access time is 100 ns, bus switching & transfer time is 100 ns per transfer. **2**

Q.2 C. For TDMA, one way bandwidth of the system is 12.5 MHz, the channel spacing is 30 kHz, total 395 voice channels in the system. The frame duration is 40 ms with 6 time slots per frame, individual user data rate of 16.2 kbps in which the speech with error protection has a rate of 13 kbps. Calculate the efficiency of the TDMA system. **2**

D. Why CCS (Common Channel Signaling) is preferred over In-channel signaling for following points: interference and signaling equipment? **2**

Q. 3 A. What are the issues in design of an Omnidirectional Antenna system in worst case? Comment about selecting correct values of K (frequency reuse factor) in order to get better value of C/I. **3**

B. 'Interference at the cell site can be reduced by using parasitic elements', justify the statement by explaining the technique. **4**

C. Discuss the cross talk problem for cellular radio system explaining cochannel cross talk and telephone line cross talk. **3**

Q.4 A. Consider a GSM TDMA system with following parameters: **2**
Nr = 2, Nt = 24 frames of 120 ms with 8 time slots per frame,
br = 148 bits in each of 8 time slots, bp = 34 bits in each of 8 time slots,
bg = 8.25 bits in each of 8 time slots, T_f = 120 ms, R = 22.8 kbps,
R_{rf} = 270.833 kbps.
Calculate frame efficiency and number of channels per frame.

B. Explain GSM protocol architecture for signaling and mapping onto the corresponding OSI layers. **4**

C. Illustrate **any one** process in GSM, using flow scenarios. **4**
a) 'Call Origination'(wireless to wireline)
b) Intra MSC Handover

Q.5 A. Describe processing of logical channel for IS-95 CDMA forward link. **6**

B. What is the role of RAKE Receiver in CDMA system? **2**

OR

B. Explain how 'Soft hand off' technique is different in CDMA system? **2**

C. Calculate the process gain, 'Gp' for IS-95 CDMA system with 1.23 MHz bandwidth and operating rate of 14.4 kbps. **2**
How Gp controls number of mobile users 'M'.

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