Vidyvardhini's College of Engineering and Technology

Department of Electronics and Telecommunication Engineering

Subject: Mobile Communication systems

Subject Code: ECC 702

Year: BE/ VII Sem

Sample Question Paper

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks (2 marks each)**
1	A mobile communication system has an allocated number of 1000 voice channel. If the service area is divided into 20 cells with a frequency reuse factor of 7, the system capacity is (a)1000 (b) 2000 (c) 3000 (d) 4000
2	A mobile communication system is designed with a cluster size of 9. If the area of a cell is 5 sqkm, the area of cluster is (a)35 sqkm (b) 40 sqkm (c) 55 sqkm (d) 45 sqkm.
3	---------- is the major concern in frequency reuse. (a) System noise (b) Co-channel Interference (c) Intermodulation (d) Adjacent channel interference
4	If frequency spectrum of 25 Mhz is allocated for duplex service with user simplex BW of 20 khz, calculate no. of duplex channels. (a) 250 (b) 625 (c) 1000 (d) 700
5	If there are M cells per cluster and C is the total channels in a cluster. Number of channel per cell in a cluster (a) C×M (b) C / M (c) M / C (d) M×C×C
6	Shadowing effect of large size objects (buildings, mountains) causes a) Noise b) Small scale fading c) Large scale fading

	All of the above
7	Relative motion between base station & mobile station causes random frequency modulation called a) Doppler shift b) Time shift c) Coherence Time d) Multipath fading
8	Coherence Time less than Symbol Period a) Flat fading b) Fast fading c) Slow fading d) Frequency selective fading
9	There are large number of multiple reflective paths with no line of sight (NLOS) it is a) Rayleigh fading b) Rician fading c) Fast fading d) Slow fading
10	Mobile system is operating at 925MHz. For a user moving at a speed of 75km/h, calculate the doppler shift if the user is moving directly towards the BS a) 67Hz b) 64.2Hz c) – 64.2Hz d) – 67Hz
11	Spreading factor if data is transmitted at the rate of 14.4 kbps and spreaded with PN sequence generated at the rate of 3.84mcps. a) 267 b) 269 c) 296 d) 299
12	In CDMA2000 Power control command is transmitted at a) 800bps b) 1500bps c) 400bps d) No power control
13	UMTS use which multiple access technique? a)CDMA b)TDMA c)FDMA d) SDMA
14	In GSM, number of bits per time slot (a) 125.25 (b) 150.5 (c) 156.25 (d) 122.25

15	Calculate number of bits per time slot if there are 1550 bits in one TDMA frame in GSM system. a) 193.75 b) 183.75 c) 156.75 d) 193.25
16	_____ is a technique of transmit diversity used in 4G cellular systems. a) Space Time Transmit Diversity b) Spatial Multiplexing c) Collaborative Uplink MIMO d) MU-MIMO
17	Identify which statements are benefits of MIMO a) Effect of fading minimized. b) Improves Quality of Service c) Reduces data rate d) Reduces transmission power
18	LTE system is having M transmitting antennas and N receiving antennas, the capacity of system will be a) $C = B\log_2(1+SNR)$ b) $C = B\log_2(1+SNR\times N)$ c) $C = B\log_2(1+SNR\times MN)$ d) $C = B\log_2(1+SNR\times M)$
19	Identify which statement is not false for smart antenna a) Increases coverage b) Decreases capacity (data rate) c) Reduces battery life d) All of the above
20	It improves capacity (data rate) by combining array gain, diversity gain and by minimizing interferences a) Power Amplifier b) Smart antenna technology c) Equalizer d) Dipole antenna
Q.2 (a)	**Solve any Two** **5 marks each**
i	How umbrella cell approach serves slow speed and high-speed users and addresses the problem of frequent HO for high speed users.
ii	Explain GSM architecture.
iii	If a call request rate is 10 calls/hour and average holding time of call is 5 minutes, calculate traffic intensity offered by each user.

Q.2(b)	**Solve any one** **10 marks each**
i	Mention the methods used to improve system capacity. Which method is used to increase the system capacity as well as reduces the number of HO, verify mathematically?
ii	Explain IS 95 CDMA forward link traffic channel with block diagram.
	Explain factors affecting small scale fading.
Q.3 (a)	**Solve any Two** **5 marks each**
i	Explain power control in 3G
ii	Distinguish among FDMA, TDMA and CDMA.
iii	Draw FDD frame structure in 4G network. What are the advantages of 4G?
Q.3 (b)	**Solve any one** **10 marks each**
i	Draw UMTS architecture. Explain the function of RNC
ii	Compare WCDMA and CDMA 2000. What is AAA server.