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Code No. : 16136 E

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. VI-Semester Main & Backlog Examinations, June-2022

Introduction to Mobile Communication (OE-IV)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What are co-channel interference and system capacity?	2	1	1	1
2.	What is Channel assignment? Write the types of it.	2	2	1	1
3.	What is Free space propagation model? Give the Friss free space equation.	2	2	2	1
4.	Define diffraction and Scattering.	2	1	2	1
5.	Define Doppler effect.	2	1	3	1
6.	Write the types of small-scale fading based on the Doppler spread.	2	1	3	1
7.	Define FDMA. What do you mean by crosstalk in FDMA?	2	1	4	1
8.	Write the applications of TDMA.	2	1	4	1
9.	Write the security features of GSM	2	3	5	1
10.	Show the Frame Structure of Global System for Mobile.	2	3	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain the concept of cells in a cellular system architecture. Describe the functions of various components in the basic system while a call is being processed.	3	2	1	1
b)	If total of 33 MHz bandwidth is allocated to a particular cellular system which uses two 25 KHz simplex channels to provide full duplex voice and control channels. Compute the number of channels available per cell if a system uses (i) 4-cell reuse (ii) 7-cell reuse (iii) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems.	5	3	1	2
12. a)	Explain Knife edge diffraction model	4	2	2	1
b)	Assume a receiver is located 10 km from a 50 W transmitter. The carrier frequency is 6 GHz and free space propagation is assumed, $G_t = 1$, $G_r = 1$ and the maximum dimension of the antenna is 1m. Find	4	4	2	2
	i) Fraunhofer distance				
	ii) Power at the receiver				
	iii) Path loss				

Contd... 2

13. a)	What are small scale fading effects? Which factors influence the small scale fading	4	2	3	1										
b)	Consider the power delay profile of the multipath channel given below and calculate mean excess delay, rms delay spread and coherence bandwidth?	4	3	3	2										
<table border="1"> <thead> <tr> <th>Delay in microseconds</th> <th>Power level (dB)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>-20</td> </tr> <tr> <td>1</td> <td>-10</td> </tr> <tr> <td>2</td> <td>-10</td> </tr> <tr> <td>5</td> <td>0</td> </tr> </tbody> </table>		Delay in microseconds	Power level (dB)	0	-20	1	-10	2	-10	5	0				
Delay in microseconds	Power level (dB)														
0	-20														
1	-10														
2	-10														
5	0														
14. a)	Discuss the features of CDMA digital cellular standard	4	2	4	1										
b)	If GSM uses a frame structure where each frame consists of eight time slots, and each time slot contains 156.25 bits, and data is transmitted at 270.833 kbps in the channel, find	4	3	4	2										
	i) The time duration of a bit ii) The time duration of a slot iii) The time duration of a frame iv) How long must a user occupying a single time slot wait between two successive transmissions.														
15. a)	Show the architecture of a GSM system and explain the components?	4	2	5	1										
b)	Explain different types of channels of GSM system?	4	3	5	1										
16. a)	Explain the following concepts with examples	5	2	1	1										
	(a) Frequency re-use														
	(b) Increasing the capacity of a cellular system														
b)	Explain how radar equation can be used to estimate power in urban mobile scenarios	3	3	2	1										
17.	Answer any <i>two</i> of the following:														
a)	Explain the parameters used to describe the time varying nature of mobile Channel	4	1	3	1										
b)	Explain SDMA technique	4	2	4	1										
c)	Explain the GSM services and features.	4	3	5	1										

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%
