DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institute Affiliated to VTU, Belagavi)

Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078

UG Semester End Examination, February/March 2022

Course: **Wireless and Mobile Communication**   Maximum marks: **100**

Course Code: **18EC7DCWMC**   Duration: **03 hours**

Semester: **VII**

Note: i). Question ONE (a to t) has to be answered from pages 5 to 7 only, also candidate must write the answer along with the option.

ii). Question 1 to 4 is compulsory.

iii). Any missing data should be suitably assumed

Q. No.		Marks
1a)	The radiation lobe containing the direction of maximum radiation is called as _____ i) Major Lobe ii) Minor lobe iii) Side lobe iv) Back lobe	01
b)	For a center fed short antenna, current distribution is ____ at center and ___ at ends. i) Low, high ii) High, high iii) Low, low iv) High, low	01
c)	If directivity of antenna increases, then the coverage area ____ i) Decreases ii) Increases iii) Increases and then decreases iv) Remains unchanged	01
d)	What is the Beam area for Directivity to be 1 in Steradian? i) 4π ii) $1/2\pi$ iii) 2π iv) $1/4\pi$	01
e)	If beam efficiency is 0.87 then the stray factor is ___ i) 1.87 ii) 0.13 iii) 1.30 iv) 0.87	01
f)	The propagation path loss _____ i)Increases with frequency of transmission but decreases with distance. ii) Decreases with frequency of transmission and distance. iii) Increases with frequency of transmission and distance. iv) Independent of frequency of transmission and distance.	01
g)	Long distance propagation occurring due to the phenomenon of super refraction is called i) Duct propagation ii) Refraction iii) Diffraction iv) LOS transmission	01
h)	In a digital communication system the delay spread along with fading causes _____ there by limiting the maximum symbol data rate. i) Intersymbol interference ii) Multipath fading iii) Doppler Effect iv) High bit-error rates	01
i)	Multipath fading can be reduced by using. i) error control coding ii) Interleaving iii) Diversity iv) All	01
j)	Determine the number of cells in the cluster for i=2, j=4. i) 28 ii) 27 iii) 25 iv) 19	01
k)	Cells using the same set of frequencies are called _____ i) Clusters ii) adjacent cells iii) Co channel cells iv) Neighboring cells	01
l)	A cluster in a cellular system is a ____ i) Group of frequencies ii) Group of cells iii) Group of subscribers iv) Group of mobile systems	01
m)	A regular _____shaped cell is the closest approximation to a circle which has been used for cellular system design. i) Circle ii) Triangle iii) Square iv) Hexagon	01
n)	The FDMA channel carries _____ phone circuit at a time i) Ten ii) Two iii) One iv) Several	01
o)	Which of the following leads to evolution of 3G networks in CDMA systems? i) IS-95 ii) IS-95B iii) CdmaOne iv) Cdma2000	01
p)	Which one is not a TDMA standard of second generation networks? i) GSM ii) IS-136 iii) AMPS iv) PDC	01
q)	OFDMA stands for _____ i)Omnidirectional frequency division multiple access ii) Orthogonal frequency duplex multiple access iii)Orthogonal frequency divider multiple access	01

iv) Orthogonal frequency division multiple access

r) What does LTE stands for?   01
   i) Level Telecom Advanced   ii) Long Terminal Advanced   iii) Long Term Evolution
   iv) Long Time Evolution

s) What is the Access technique used by an LTE or LTE-A network?   01
   i) WCDMA   ii) FDMA   iii) PDMA   iv) OFDMA

t) What are the advantages of a 4G LTE network over 3G networks?   01
   i) More Spectral Efficiency   ii) Low power consumption   iii) Scalability and Flexibility with other networks   iv) All

2	a)	Define the following: i. Half power beam width ii. Radiation Intensity iii. Directivity iii. Antenna Efficiency iv. Resolution	06
	b)	Find the Directivity of the antenna if the radiation intensity ,U= $U_m \cos^n \theta$ ($0 \le \theta \le \pi/2$)	05
	c)	Derive the relation between Effective aperture and Directivity.	05
3	a)	Explain the basic radio propagation mechanism in a mobile communication	08
	b)	Derive the equations of path loss and received power of two ray point - to- point propagation model in a mobile communication.	08
4	a)	Why is a hexagonal cell shape preferred over other shapes to represent the cellular architecture? Describe the principle of frequency reuse concept with a neat diagram	08
	b)	Derive the relationship between frequency reuse ratio and cluster size.	04
	c)	Determine the number of channels/cluster and system capacity if system area is covered with 10 clusters having 7 cells in each cluster. 16 channels are assigned to each cell.	04
5	a)	What is OFDM , Justify the Reduction of Intersymbol Interference using OFDM	08
	b)	Compare the cellular network generation from 1G to 5G	08

<div align="center">OR</div>

6	a)	Explain the concept of TDMA and the frame structure of TDMA	10
	b)	List the difference between FDMA and TDMA.	06
7	a)	Elaborate on the Architecture of the UMTS terrestrial radio access network.	08
	b)	Analyse the significance of the channel capacity theorem as applied to mobile communication	04
	c)(	Discuss the different ways to increase the channel capacity.	04

<div align="center">OR</div>

8	a)	Illustrate and explain the evolution of the system architecture from GSM and UMTS to LTE.	08
	b)	What are the Requirements of LTE and LTE-Advanced?	04
	c)	List the 3GPP specification series used by UMTS and LTE.	04