



**SRM Institute of Science and Technology**  
**College of Engineering and Technology**  
**School of Computing**

**DEPARTMENT OF COMPUTING TECHNOLOGIES**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (Even)

Mode of Exam  
**OFFLINE**

Test: CLAT-2

Course Code & Title: 18CSE458T/Wireless and Mobile Communication

Year & Sem: III & VI

Date: 3//4

Duration: 100 Mins

Max. Marks: 50

**Course Articulation Matrix:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO4	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-

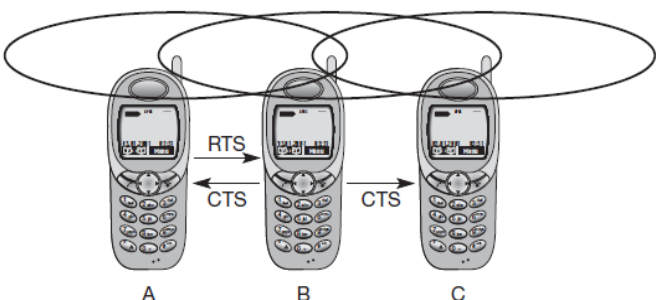
**Part - A**  
**(6x 1 = 6 Marks)**

**Instructions: Answer all**

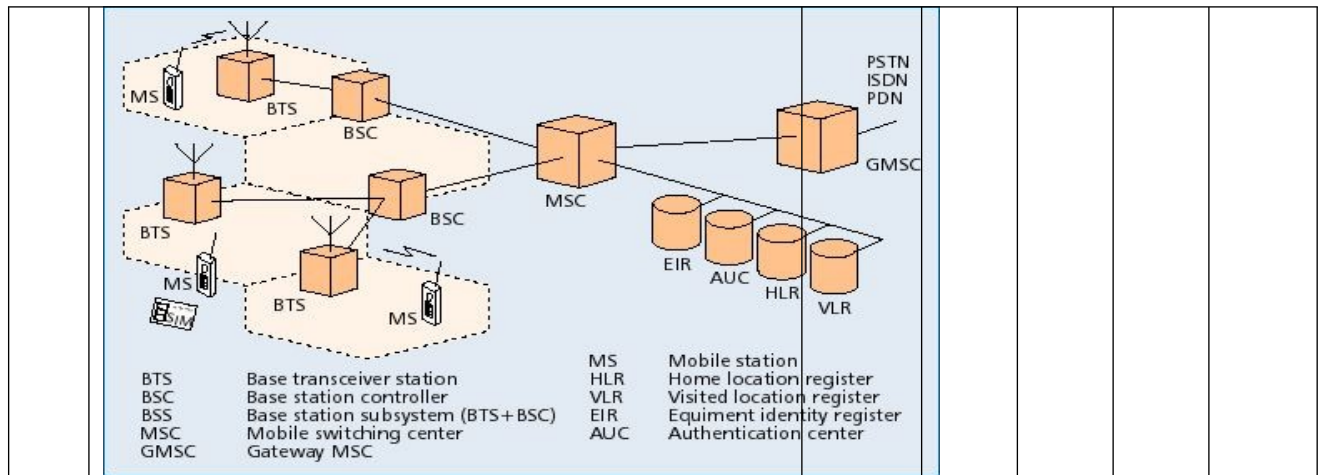
Q. No	Question	Marks	BL	CO	PO	PI Code
1	The retention time over which the call can be maintained within a cell without handoff is called ____  (A) Run time (B) Peak time (C) Dwell time (D) Cell time  <b>Ans: (c) Dwell time</b>	1	1	3	1	1.6.1
2	_____ is the maximum number of channels that can be provided in a fixed frequency band,  (A) Radio capacity (B) Channel capacity (C) Carrier capacity (D) Spectral capacity  <b>Ans: (B) Channel capacity</b>	1	1	2	1	1.6.1
3	In GSM, TDMA allows _____ users within a FDMA channel.  (A) 2 (B) 4 (C) 6	1	1	3	1	1.6.1

	(D) 8 Ans: (D) 8					
4	The shape of the cellular region for maximum ratio coverage is  (A) Circular (B) Square (C) Oval (D) Hexagon Ans: (D) Hexagon	1	1	2	1	1.6.1
5	A small division of a given geographical area in cellular communication is known as  (A) Shell (B) Cell (C) Core (D) Kernel Ans: (B) Cell	1	1	2	1	1.6.1
6	Commonly used mode for 3G network is  (A) TDD (B) TDMA (C) FDD (D) FDMA Ans: (C) FDD	1	1	3	1	1.6.1
<p style="text-align: center;"><b>Part – B</b> (3 x 4 = 12 Marks)</p> <p><b>Instructions: Answer all</b></p>						
7.	List down the methods to increase the capacity of Wireless Communication System  Ans:  • <b>Cell Splitting</b>  ○ Cell splitting is the process of sub dividing a congested cell into smaller cells, each with its own base station and corresponding reduction in antenna height and transmitted power.	4	2	2	1	1.6.1

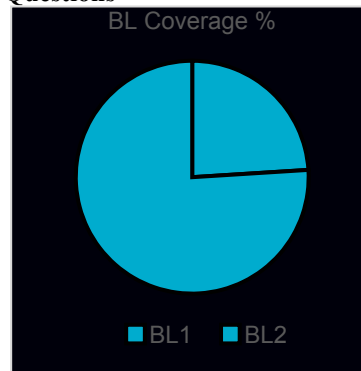
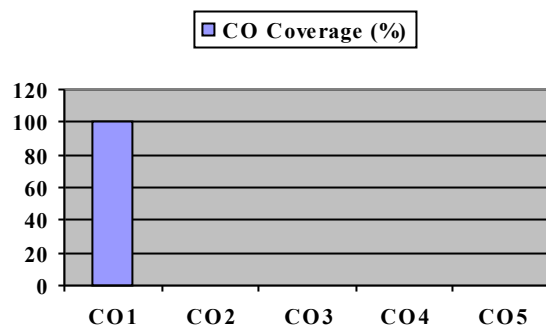
	<ul style="list-style-type: none"> <li>○ Cell splitting increases capacity of a cellular system since it increases number of times that channels are reused.</li> <li>● <b>Cell Sectoring</b> <ul style="list-style-type: none"> <li>○ In cell sectoring a single omnidirectional antenna at base station is replaced by several directional antennas, each radiating within a specified sector.</li> <li>○ By using directional antennas power is transmitted in single desired direction decreasing number of interfering co-channel cells and co-channel interference.</li> <li>○ The technique for decreasing co-channel interference and thus increasing system performance by using directional antennas is called sectoring.</li> <li>○ The factor by which the co-channel interference is reduced depends on the amount of sectoring used. A cell is normally partitioned into three sectors.</li> <li>○ When sectoring is employed, the channels used in a particular cell are broken down into sectorized groups and are used only within a particular sector.</li> </ul> </li> <li>● <b>Microcell zone concept</b> <ul style="list-style-type: none"> <li>○ The increased number of hand off, increase load on the switching and control link because of sectoring. A solution to this problem is given by microcell zone concept</li> <li>○ Large control base station is replaced by several lower power transmitters on the edge of cell.</li> <li>○ The mobile retains the same channel and the base station simply switches the channel to a different zone site and the mobile moves from zone to zone.</li> <li>○ Since a given channel is active only in a particular zone in which mobile is travelling, base station radiation is localized and interference is reduced.</li> </ul> </li> </ul>					
8.	Analyze the effect of area and shape of the cell on	4	3	2	1	1.6.1

	<p>Handoff.</p> <p>Ans:</p> <ul style="list-style-type: none"> <li>• Size of the cell should be large enough to minimize handoff</li> <li>• But mobility of MS is difficult to predict</li> <li>• Impossible to predict the match between MS mobility and shape</li> <li>• In rectangular cell, we can compute the mobility with the shape of the cell using standard formulas</li> <li>• But proper horizontal and vertical axes should be there</li> <li>• But, in another cell, it is difficult to obtain, whereas it is possible to some extent in hexagonal shape</li> </ul>					
9.	<p>What are the major limitations of GPS system?</p> <p>Ans:</p> <p>Various factors will introduce errors in GPS,</p> <ul style="list-style-type: none"> <li>• Speed of radio signals are constant only in vacuum and varies in atmosphere</li> <li>• Multiple path due to obstacles</li> <li>• Satellite geometry</li> <li>• Propagation delay of waves</li> <li>• Selective availability</li> <li>• Atomic clock errors</li> </ul> <p>GPS capability in mobile devices</p>	4	2	3	1	1.6.1
<p align="center"><b>Part – C</b> (2 x 16 = 32 Marks)</p>						
10.	<p>a). Describe the Multiple access technique with Collision Avoidance scheme in detail.</p> <ul style="list-style-type: none"> <li>• MACA (Multiple Access with Collision Avoidance)</li> <li>• CTS</li> <li>• RTS</li> <li>• Hidden terminal</li> <li>• Exposed terminal</li> </ul> 	16	3	2	1	1.6.1

	<p>or</p> <p>b) Describe the significance of Frequency reuse in Cellular networks with a neat sketch.</p> <ul style="list-style-type: none"> <li>The same group of frequencies are reused to cover another cell separated by a large enough distance to keep co-channel interference within limits.</li> <li>Same set of frequency can be used in other cells of the cluster so that sharing of frequency spectrum takes place</li> <li>It improves the simplicity of the cellular design and decreases the cost of installation and maintenance</li> </ul>					
11.	<p>a) Explain in details about UMTS architecture with suitable diagram.</p> <p>MS/UE — 2G/3G mobile station  RAN — Radio access network  CAP — CAMEL application part  GMSC — Gateway MSC  GGSN — Gateway GPRS support node  SGSN — Serving GPRS support node</p> <p>BS/NB — 2G/3G base station  RNC — Radio network controller  MAP — Mobile application part</p> <ul style="list-style-type: none"> <li>Explanation of all the major components in UMTS architecture</li> </ul> <p>or</p> <p>b) Explain in details about GSM architecture with suitable diagram.</p> <ul style="list-style-type: none"> <li>What is GSM?</li> <li>Cellular Concept</li> <li>Explanation about architecture components like MS, BTS, etc.</li> <li>GSM Architecture</li> </ul>	16	3	3	1	1.6.1



### Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



Approved by the Audit Professor/Course Coordinator