UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: **Cellular & Mobile Communication**   Semester: VII
Program: **B. Tech ECE**   Time 03 hrs.
Course Code: **ECEG 4032**   Max. Marks: 100

Instructions: Answer all the questions.
                 Diagrams must be neat and clean.

SECTION A

Each Question will carry 5 Marks
Instruction: Complete the statement / Select the correct answer(s)

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Q 1	Mention the name of five subsystem of EPC of LTE/.	**CO1**
Q 2	NMT, GSM, EDGE, LTE and IS95 utilizes ………………, ………………….., ……………… …………… & ………………. class of multiple access methods.	**CO3**
Q 3	A city has been allotted a FDD ranging from 400 MHz to 450 MHz for uplink and channel spacing is 100 MHz for an AMPS system. The voice bandwidth of each channel is 10 kHz. Find the number of call connection. spectrum bandwidth and last downlink frequency.	**CO3**
Q 4	Arrange the following in ascending order in terms of total number of subscriber in each. Sector, Cluster, Area, Cell and Microcell.	**CO2**
Q 5	In the designing of cellular structure for maximize the frequency reuse pattern, mention the five possible no of cell configuration?	**CO2**

SECTION B

Each question will carry 10 marks
Instruction: Write short / brief notes

Q 1	Discuss the technological difference between second generation (2G), third generation (3G) and fourth generation (4G) cellular mobile technology in tabular form.	**CO1**
Q 2	State different classes of hand off employed in cellular technology with one specific example of each.	**CO2**
Q 3	Write down the salient features of Time Division Multiple Access. Determine the frame efficiency of a TDMA frame employed in GSM technology.	**CO4**

Q 4	Sketch the LTE Network System Architecture showing hexagonal cells. Mention all the radio interfaces utilizing voice and data services, each system and subsystem part of this architecture.	**CO3**

SECTION-C

Each Question carries 20 Marks.
Instruction: Write long answer.

Q 1	Chachi is a mobile subscriber of Airtel living in Lucknow, whereas same mobile operator also served her friend Activa who lives in Nainital. Both of them are served by the same MSC. Write down the every process of how a call is connected for voice communication from Chachi to Activa. Sketch clearly all the system and subsystem of the cellular architecture involved in the communication process.	**CO3**
Q 2	A cellular operator named EC18 assigned the task of laying the cellular tower of one engineer group ITNB1, whereas the second engineer group ITNB2 task is to look into the significant carrier level and sectoring. EC18 planned to operate in a new town, and hence ITNB1 divide the town in 10 clusters and installed the tower with N = 7 structure. The propagation constant of the path loss for the environment is 4. However, in few months it was noticed that with the growing number of cellular customers in the area, the call quality started to be degraded. On inspection by ITNB2 it was found that the value of C/I is far away from the calculated one. It was revealed by the operator that instead of hexagonal cell the tower is installed with square shape cell design. The operator asked the ITNB2 engineer for sectoring the existing cell without any addition of base tower installation. (a) Calculate the theoretical (hexagonal) and real (square) value of C/I. (b) On sectoring by ITNB2, determine the improvement in C/I. (c) Sketch the sectored design.	**CO4**

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