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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2020

Course: Cellular & Mobile Data Communication   **Semester: VII**
Program: B. Tech ECE   **Time 03 hrs.**
Course Code: ECEG 4002   **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)

S. No		
Q 1	Mention the full form of GSM, UMTS, EDGE, GPRA and VoLTE.	**CO1**
Q 2	NMT, GSM, EDGE, LTE and IS95 utilizes …………………., ………………………….., ……………………, …………………… & ……………………. class of multiple access methods.	**CO3**
Q 3	A city has 500 duplex channel in AMPS system. If the bandwidth of each channel is 10 kHz, then find the spectrum bandwidth.	**CO4**
Q 4	The data flow from top layer to bottom layer in TCP/IP network modal involves ………………..(application layer), …………….(transport layer), ………………..(network layer), …………………(datalink layer), …………….(physical layer) respectively. .	**CO1**
Q 5	Arrange the following in ascending order in terms of contain number of subscriber. Sector, Cluster, Area, Cell and Microcell	**CO2**
Q 6	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) and third generation (3G) cellular mobile technology.	**CO3**
Q 2	State different specification of LTE in context with 4G mobile communication.	**CO3**
Q 3	Write down the salient features of Frequency Division Multiple Access.	**CO4**

Q 4	Sketch the GSM Network System Architecture with all the radio interfaces. Mention the name of each system and subsystem part of this architecture.	CO3
Q 5	Draw the frame structure of GSM in context of Time Division Multiple Access cum Frequency Division Duplexing and find the efficiency.	CO3

SECTION-C

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

Q 1	A cellular engineer designed a particular cell with the employment of the omnidirectional antenna. The C/I ratio is mentioned as 15 dB as desired by the structure. 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. A particular solution to improve the call quality is increasing the signal strength, but the operator does not grant this solution. The operator asked the system engineer for sectoring the existing cell without any addition of base tower installation. How the system engineer will go through to improve the C/I.	CO2

Also, compute the optimal value of N for (a) omni-directional antennas,

(b) 120^0 sectoring, and (c) 60^0 sectoring.

Assume the value of path loss exponent to be 4.

OR

Design a clusters of hexagonal cell for the following three conditions

  (i)   i =2, j=1.

  (ii)   i =1, j=1.

  (iii) i =2, j=2.

In the cellular structure clearly locate the position of Co-Channel cell in

  (a) first complete tier and

  (b) one cell in second tier.

In the same design, if the area of each cell is 4 km^2, and the total coverage of the city is 2000 km^2, then find the system capacity for the above three mentioned (i, ii, iii) structure.

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