

Total No. of Questions : 4]

SEAT No. :

PD123

[Total No. of Pages : 1

[6410]-445

T.E. (E & TC) (Insem)

CELLULAR NETWORKS

(2019 Pattern) (Semester - II) (304192)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of Calculator is allowed.
- 5) Assume suitable data if necessary.

Q1) a) Explain free space propagation model & derive the formula  $P_t = \frac{P_t G_t G_r \lambda^2}{(4\pi)^2 d^2}$  [6]

b) Discuss factors influencing Small scale fading. [4]

c) What is diversity? Explain its types in brief. [5]

OR

Q2) a) Explain ground- reflection scenario. [5]

b) Employing the Hata model, compute the median loss at a distance  $d = 8$  km, when the carrier frequency  $f_c = 2.1$  GHz,  $h_{te} = 40$  m,  $h_{re} = 2$  m for a large city. [4]

c) Explain in details concept of channel estimation in wireless communication. [6]

Q3) a) Explain with neat diagram working of OFDM transmitter. [6]

b) Define smart antenna and explain the types of smart antenna in brief. [5]

c) Consider  $IHI^2$  and data power  $P = 10$  dB with noise power  $\sigma_n^2 = 0$  dB. Derive the SNR/SINR with and without a carrier frequency offset of  $\epsilon = 5\%$  in a WiMAX system. [4]

OR

Q4) a) Explain multicarrier transmission. [5]

b) Write advantages, disadvantages & applications of MIMO-OFDM. [6]

c) Write note on MIMO. [4]

