

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), May 2019

B. Tech. in Electronics & Communication Engineering, Semester VI

Roll No.....

ECE731: Wireless Communication & Networks

Time: 3 hours

Max. Marks: 40

Instructions to students:

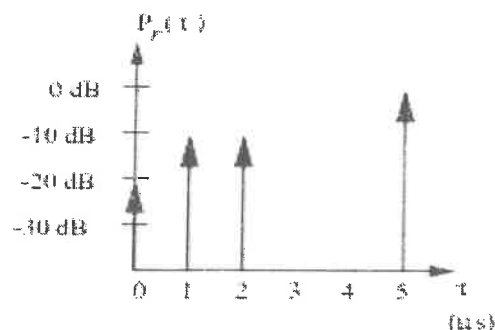
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. Use of Programmable Calculator is not allowed.

Q.1 You have to install a Mobile Communication Antenna System (Tower) on your Roof top in India. 05
Answer the following.

- a) Which organization/company you will go for this proposal? (1)
- b) What are the requirement and technical specifications for installing the system? (2)
- c) What are the RF Signal limits for the Tower Transmission and Mobile Unit? (2)

Q.2A

06



For the above Wireless multipath profile Figure.

- a) Calculate the mean excess delay and rms delay spread. (3)
- b) Estimate the 50% coherence bandwidth of the channel. (1)
- c) Given that signal bandwidths of AMPS, GSM and IS-95 are 30 kHz, 200 kHz and 1.25 MHz respectively, determine if a signal under those systems will experience frequency selective or flat fading. (2)

Q.2B Design a 1x2 Receiver diversity system. For which channel coefficients are $h_1 = 1+2j$, $h_2=2j$. and 06
the data symbol transmitted is '-1'. What will be the linear combiner vector for the system?
Derive the equations to detect the transmitted symbol for the system.

Q.3 Compare MIMO communication system to SIMO Communication System (discuss data rates and System architecture). Design a 2x2 MIMO System, where $x = [-1 \ 1]$ and channel matrix (h) is $\begin{bmatrix} 8 & 9 \\ 4 & 7 \end{bmatrix}$. What will be the pseudo-inverse matrix of h. 06

Q.4 For the given block of data symbols $\{-1 \ -1 -\sqrt{3}j \ -1+\sqrt{3}j \ +1 \ 1+\sqrt{3}j \ 1 -\sqrt{3}j\}$ and the channel matrix $\begin{bmatrix} 2 & 1 \end{bmatrix}$. 17

- a) Design a OFDM Transmitter System. (8)
- b) Design a OFDM Receiver System. (7)

(You can use IFFT, Cyclic Prefix (CP), Convolution, CP Removal and FFT for the above a) and b) system design.)

- c) What will be the effect on data symbols if we don't add CP. (2)