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JAYPEE UNIVESITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
Test-2, Examination- April 2016
B.Tech. (VIII Sem.), M.Tech. (II Sem.)

COURSE NAME: Advance Wireless and Mobile Communication
COURSE CODE: 10M11EC212 MAX MARKS:25
COURSE CREDIT: 03 MAX TIME:1 hr 30min.

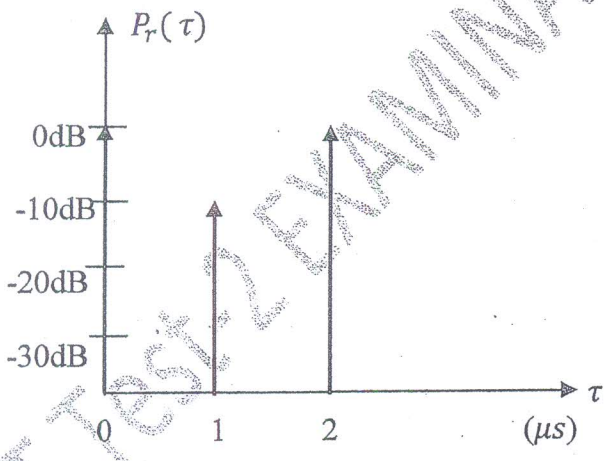
Note: All questions are compulsory. Carrying of Mobile phone during examination will be treated as case of unfair means.

Q1) a) A receiver in an urban cellular radio system detects 1mW signal at $d=d_0=1m$ from the transmitter. In order to mitigate co-channel interference effects, it is required that the signal received at any base station receiver from another base station transmitter which operates with the same channel must be below -100dBm. Determine the major radius of each cell if a seven-cell reuse pattern is used. Assume path loss exponent n=3. What is the major radius if a four-cell reuse pattern is used? [3]

b) Explain how handoff is made in the cellular system. [2]

Q2) Explain different types of small-scale fading. [4]

Q3) A local spatial average of a power delay profile measured at 900MHz is shown in Fig.



(i) Determine the rms delay spread and mean excess delay for the channel.
(ii) Determine the maximum excess delay (20dB).
(iii) If the channel is to be used with a modulation that requires an equalizer whenever the symbol duration T is less than $10\sigma_\tau$, determine the maximum RF symbol rate that can be supported without requiring an equalizer.
(iv) If a mobile travelling at 30km/hr receives a signal through the channel,

determine the time over which the channel appears stationary (or at least highly correlated). [4]

b) Derive and explain water-filling terminology in flat fading channel. [4]

Q4) Assume a channel with bandwidth 30 kHz and three possible received SNRs: $\gamma_1 = .8333$ with $p(\gamma_1) = .1$, $\gamma_2 = 83.33$ with $p(\gamma_2) = .5$ and $\gamma_3 = 333.3$ with $p(\gamma_3) = .4$. Find the outage capacity of this channel and associated outage probabilities for cutoff values $\gamma_0 = .84$ and $\gamma_0 = 83.4$. Which of these cutoff values yields a larger outage capacity? [3]

Q5) a) Explain how a generic adaptive equalizer is trained. [3]

b) Find selection diversity improvement in fading channel. [2]