

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
END TERM TEST  
SUMMER SEMESTER - JUNE 2016  
B.Tech/ IV Semester

COURSE CODE: 10B11EC413

MAX. MARKS: 50

COURSE NAME: ANALOG COMMUNICATION

COURSE CREDITS: 3

MAX. TIME: 2 Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. With the help of suitable diagram explain the working of Foster-Secley discriminator. [10 Marks]
2. Explain the working of a superheterodyne receiver in detail. [10 Marks].
3. State Sampling Theorem and derive an expression for the same. [8 Marks]
4. Design an Armstrong indirect FM modulator to generate an FM carrier with a carrier frequency of 96 MHz and  $\Delta f = 20$  kHz. A narrow band FM generator with  $f_c = 200$  kHz and adjustable  $\Delta f$  in the range of 9 to 10 MHz is available. The stock room also has an oscillator with adjustable frequency in the range of 9 to 10 MHz. There is a bandpass filter with any centre frequency and only frequency doublers are available. [10 Marks]
5. With the help of suitable diagrams explain PPM and PWM. [6 Marks]
6. If we pass a WSS random process  $X(t)$  with autocorrelation function

$$R_X(\tau) = \delta(\tau)$$

through a bandpass filter with characteristics

$$H(\omega) = \begin{cases} 1e^{i\omega} & \omega_a \leq \omega \leq \omega_a - 2\pi B \\ 1e^{-i\omega} & -(\omega_a + 2\pi B) \leq \omega \leq -\omega_a \\ 0 & \text{otherwise} \end{cases}$$

Find the average output power. [6 Marks]