

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012****Subject code: 141102****Date: 31/12/2012****Subject Name: Communication Engineering****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain basics of communication system with the help of necessary block diagram. **07**
- (b) Discuss the types, causes and effects of the various forms of noise which may be created within a receiver or an amplifier. **07**
- Q.2** (a) Define amplitude modulation and modulation index. Sketch amplitude-modulated wave. Derive the relation between the output-power of an AM transmitter and the depth of modulation. **07**
- (b) Describe frequency modulation with the help of necessary wave form and derive the formula for the instantaneous value of an FM voltage. **07**
- OR**
- (b) What is single-side band suppressed-carrier modulation? Explain filter method of side band suppression with the help of necessary block diagram. **07**
- Q.3** (a) Explain how the constant intermediate frequency is achieved in the superhetrodyne receiver. List and discuss the factors influencing the choice of the Intermediate frequency for a radio receiver. **07**
- (b) Describe the differences between FM and AM receivers. What is pre-emphasis? Sketch a typical pre-emphasis circuit and explain why de-emphasis must be used. **07**
- OR**
- Q.3** (a) What is modem ? Describe the RS-232 interface and explain its value for data transmission. **07**
- (b) Explain briefly: PCM , FDM , TDM **07**
- Q.4** (a) Draw the block diagram of a colour TV receiver, showing all the important function from the tuner to the picture tube. **07**
- (b) Explain briefly: Television systems and standards. **07**
- OR**
- Q.4** (a) An AM transmitter supplies 10 kW of carrier power to a 50 Ω load. It operates at a carrier frequency of 1.2 MHz and is 80% modulated by a 3 kHz sine wave. **07**
- (i) Sketch the signal in frequency domain with frequency and power scales. Show the power in dBW.
- (ii) Calculate the total average power in the signal in watts and in dBW.
- (iii) Calculate the RMS voltage of the signal.
- (iv) Calculate the peak voltage of the signal.
- (b) Two resistors 10 k Ω and 25 k Ω are at room temperature for a bandwidth of 150 kHz .Calculate thermal noise for each resistor , if two resistors are in series and two resistors are in parallel. Assume room temperature = 290 K **07**
- Q.5** (a) Explain briefly: Information theory , Telemetry **07**
- (b) Briefly explain different elements of long distance telephony **07**
- OR**
- Q.5** (a) For a silica optical fiber the refractive index of core layer is 1.56 and that of cladding is 1.35. calculate critical angle , relative refractive index difference , numerical aperture and acceptance angle **07**
- (b) Write short note on optical fiber cables and compare step index fibers with graded index fibers. **07**