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SE-8347

B. E. - III (Sem. V) (Instrumentation & Control) Examination

May / June – 2011

Analogue & Digital Communication System

Time :3 Hours] [Total Marks : **100**

Instructions : (1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 3 (SEM. 5) (INSTRUMENTATION & CONTROL)

Name of the Subject :

☛ Analogue & Digital Communication System

☛ Subject Code No. : 8 3 4 7 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(1) Attempt all Questions.
(2) Figure to the right indicates marks.
(3) Answer of two sections must be written in separate answer books.

Q.1 **(a)** **Answer the following:** **10**

(i) A 400 watts carrier is modulated to a depth of 75% modulation. Find the total power in the amplitude modulated wave. Assume the modulating signal to be a sinusoidal one.

(ii) Which modulation system performs better in presence of noise? Why.

(iii) If the highest modulating frequency in a signal is 25 khz. What will be the bandwidth of modulated signal if AM is used?

(iv) Define modulation index for AM wave.

(v) Find bandwidth of commercial FM transmission if frequency deviation Δf=75khz and the modulating frequency=15khz.

(b) Derive the relation for power contained in an AM (Amplitude Modulated) Wave. Hence find out the expression for total power contained in a single tone AM system. **08**

Q.2 (a) Explain the concept of Frequency Modulation in detail deriving the mathematical expression. Mention the criteria used to calculate the bandwidth of FM signal. Also differentiate between Narrowband FM and Wideband FM. **08**

(b) An audio signal given as $15\sin 2\pi(1500t)$ amplitude modulates a carrier given as $60\sin 2\pi(100{,}000t)$. Determine the following **08**

(i) Sketch the audio and carrier signals.

(ii) Construct the modulated wave.

(iii) Determine the modulation index and percentage modultaion.

(iv) What are the frequencies of audio signal and the carrier wave?

(v) What frequencies would be present in the spectrum analysis of the modulated wave?

OR

Q.2 (a) Derive an expression for a single tone FM modulated wave. Also describe the rule used to estimate the bandwidth of FM modulated system. **08**

(b) Discuss in brief PAM, PWM and PPM. Also explain in detail how PWM signal is generated. **08**

Q.3 **Attempt any two:** **16**

(a) What are character codes? Explain ASCII code format.

(b) Name the two character oriented protocols and explain any one.

(c) Explain with an example error correction using parity.

Q.4 (a) **Answer the following:** **10**

(i) Name one DCE device.

(ii) What is the Nyquist Sampling rate?

(iii) Name any two light sources for fiber optic communication.

(iv) Name two framing bits used in asynchronous data transmission.

(v) What are guard bands?

(b) Write a short note on FSK modems. **08**

Q.5 (a) Describe briefly the seven layers of OSI model. **08**

(b) Draw and explain the following network topologies: BUS, STAR, RING, MIXED. **08**

OR

Q.5 (a) Write a short note on refractive indexes in fiber cores. **08**

(b) Write a short note on sampling. **08**

Q.6 **Attempt any two:** **16**

(a) Explain pulse code modulation.

(b) Explain the Hamming code for error correction and generate Hamming code for the word 'SCET'.

(c) Draw any four binary data signal formats for the ASCII coded letter 'C'.
