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206604

May, 2019
B.Tech. (EIC) - VI SEMESTER
Telemetry Data Processing and Recording (EI-310-C)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Differentiate between active and passive remote sensing. (1.5)

    (b) Draw the waveforms of FM and PM signals corresponding to $m(t) = A_m \cos \omega t$, $c(t) = A_c \cos ct$ where $c \gg \omega$. (1.5)

    (c) How field effect LCD is different from scattering type LCD? (1.5)

    (d) Define resolution and sensitivity. (1.5)

    (e) List some of analog and digital telemetry techniques. (1.5)

    (f) Differentiate between TDM and FDM. (1.5)

(g) Why gamma rays, X-rays and U-V rays not used in remote sensing? (1.5)

(h) Define quantization and its types. (1.5)

(i) Differentiate between PM and FM. (1.5)

(j) What are the reasons which makes digital signal processing more advantageous over analog signal processing? (1.5)

PART-B

2. (a) Explain the functions of instruments and measurement systems. Also explain the applications of measurement system. (09)

(b) Draw and explain the circuit of Force Balance Current Telemetry system in detail. (06)

3. (a) Explain the operation of torque balance telemetry system. Also explain its advantages over position balance telemetry system. (08)

(b) Enlist the applications of remote sensing. Explain the concept of microwave remote sensing in detail. (07)

4. (a) What is the need of multiplexing in telemetry system? Draw and explain the operation of FDM in telemetry system alongwith block diagram. (08)

(b) Describe the following :
   (i) LIDAR.
   (ii) Hyper spectral remote sensing. (07)

5. (a) A 75MHz carrier signal having amplitude of 50V is modulated by a 3KHz audio signal having amplitude of 20V.
   (i) Sketch the audio signal.
   (ii) Sketch the carrier signal.
   (iii) Construct the modulated wave.
   (iv) Determine the modulation index and percent modulation.
   (v) What frequencies would be there in a spectrum analysis of the modulated wave?
   Write trigonometric equation for the carrier and the modulating waves. (09)
   (b) Explain the operation of digital indicating instruments over their analog counterparts. (06)

6. (a) Design a 4-bit decade counter using T- flipflop. Also draw the timing waveforms. (09)
   (b) Describe the functioning of a diode matrix for conversion of BCD system to decimal readout. (06)

7. Describe the following :
   (i) Power Line Carrier Channels.
   (ii) Energy Recording Technology.
   (iii) LCD Display. (15)

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