

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2751

Roll No.

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B.Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION 2012-13

TELEMETRY PRINCIPLES

Time : 3 Hours

Total Marks : 100

Note : (1) All questions are compulsory.

(2) All questions carry equal marks.

1. Attempt any TWO parts of the following : (10×2=20)
 - (a) Draw schematic diagram of a telemetry system identifying different parts of it. Why and how signal is required to be processed or conditioned before transmission by such a system ?
 - (b) Why frequency telemetry is considered superior to voltage or current telemetry, even in short distance cases ? Give the frequency ranges for the standard analogue signal of 4—20 mA range in frequency telemetering system. How can the analogue signal be converted into frequency for transmitting ?
 - (c) Distinguish between a three line and two line electrical type transmitters by describing both. What type of variable does it transmit ? Which one is more popular in industry and why ?

2. Attempt any **FOUR** parts of the following : (5×4=20)

- (a) If the modulating frequency change from 0.1 to 1 kHz, by a factor of 10, and peak carrier deviation is 100 kHz, by what percent does the bandwidth change ?
- (b) Draw a single diode and a two diode mixer circuits.
- (c) Draw the block diagram of a complete telemetry scheme using frequency division multiplexing and demultiplexing. What are the advantages of FM and what are its demerits ?
- (d) How does a TDM system differ from an FDM system ?
- (e) How companding is done using suitable amplifiers both on the transmitting and receiving side ?
- (f) Draw a schematic arrangement to show that PWM and PPM can be obtained from PAM signals.

3. Attempt any **FOUR** parts of the following : (5×4=20)

- (a) The mark and space frequencies in a digital modulation system are 1270 and 1070 Hz respectively. If the clock frequency is 2140 kHz, what would be the count per cycle from the CDL ?
- (b) How are PSK modulation and demodulation obtained ?
- (c) What is a constellation diagram ? In what connection is it referred to ?
- (d) What is differential phase shift keying ? What special advantage is obtained using this modulation technique in digital data transmission ?
- (e) Describe a quadrature amplitude modulation and demodulation system.

(f) What is UART ? How does it function ? Explain using proper diagram.

4. Attempt any **TWO** parts of the following : **(10×2=20)**

(a) Why are super-heterodyne receivers preferred to over others in FM/FM or PCM transmission ? Draw the schematic block diagram of a superheterodyne receiver and explain its operation.

(b) What is an asymmetric-T or LCC network ? How is the design of the circuit parameters initiated for this network ? In a LCC circuit source resistance is 1.7 ohms and load resistance is 35 ohms. If the Q has to be 17.9, obtain the circuit parameters. Take the carrier frequency as 100 kHz.

(c) Sketch different types of horn antennas that are used in practice. What are flare angle, aperture and length of the horn antenna ? How do these determine the gain and directivity of the antenna ? A rectangular horn antenna of dimension 1 m × 0.5 m is used to transmit wave. What would be its power gain and bandwidth ? The frequency of wave is 300 MHz.

5. Write short notes on any **TWO** of the following :

(10×2=20)

(a) Satellite telemetry

(b) Coherent optical fiber communication system

(c) Data acquisition system (DAS)