Paper Code: IC-702/EIC-702	**Roll No.**									

B.Tech.
SEVENTH SEMESTER EXAMINATION, 2016-17
TELEMETRY PRINCIPLES

[Time: 3 hrs.] [Max. Marks: 100]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any *four* parts of the following: - **(5x4=20)**

(a) How is voltage converted to current for use in telemetering system? Explain with suitable diagram and analysis.
(b) Discuss the telemetry standards of baseband configuration in terms of frequency as stipulated by IRIG. What are PBW & CBW in this context?
(c) Describe through explanation & appropriate diagrams, data transmission and reception processes as carried out by modems in a complete telemetry system.
(d) How are selectivity and sensitivity improved in RF receivers? What is the order of sensitivity in FM receivers? If the carrier rf is 80 MHZ and the local oscillator frequency is 90 MHZ, calculate the image frequency and the intermediate frequency.
(e) Draw the scheme of an optical fibre-based communication system. How is the line loss taken care of in such systems?
(f) Draw (i) a single diode (ii)a two diode, and(iii)a four diode mixer circuits. Which one is called the doubly-balanced type and why?

2. Attempt any *four* parts of the following: - **(5x4=20)**

(a) What is a window comparator? Design a window comparator with two OAs and an AND gate and obtain its transfer characteristics.
(b) Why synchronization is necessary in all TDM systems? How is a clock recovery circuit useful in synchronization? Explain its function.
(c) Describe quadrature phase shift keying. Why is it adopted in digital data transmission? Demonstarte by carrier sine wave mixing how QPSK can be obtained?
(d) Draw the schematic block diagram of an AM transmitter. How is the distortion in the power amplifier taken care of in such a system? Discuss with necessary diagrams.
(e) Explain power gain and directivity of an antenna. Show that for power P radiated from a Hertzian dipole, at an angle θ, a field of magnitude $\sqrt{90P}/r$ is produced at a distance r.
(f) Distinguish between FIR and IIR filters. What is windowing? How does windowing increase realizability of an FIR filter?

3. Attempt any *two* parts of the following: - **(10x2=20)**

(a) Draw the circuit diagram of a frequency meter that is used for analog indication of telemetered data. Explain the function of the circuit and its working principle showing the waveforms at different stages including output. Why frequency telemetry considered superior to voltage or current telemetry?
(b) What is a UART? How does it function? Decribe synchronous(bisync)and X-modem protocols used in modem systems.

(c) (i)Write a short note on WDM.
(ii) Show that the roots of a low pass Chebyshev filter (denominator) lie on an ellipse.

4. Attempt any *two* parts of the following: - **(10x2=20)**

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

(b) What are SCPC and MCPC operation and how are they made effective? Explain the functioning of TT & C subsystems of a satellite communication.

(c) (i)How does TDM/PAM/PM system work? Draw a schematic diagram to show how PAM signals are generated?
(ii)What do you mean by log periodic antenna? What special advantage is obtained by using it?

5. Attempt any *two* parts of the following: - **(10x2=20)**

(a) (i) What are major considerations in coupling the transmitting antenna to the amplifier stages? Dicuss the interstage coupling circuits with appropriate diagrams.
(ii) In an LCC circuit source resistance is 1.7 ohms and the load resistance is 35 ohms. If the Q has to e 17.9,btain the circuit paramaters.Assume carrier frequency as 100 KHZ.

(b) What are the three basic principles for realization of second (or higher) order active RC filters? Show these principles through diagrams and derive their transfer functions. Explain Universal filters.

(c) Draw schematic block diagram of a telemetry system identifying different parts in it. Classify telemetry systems & explain its application in medical field**.**