



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

PAPER ID : 3041

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2006-07

MEASUREMENTS & INSTRUMENTATION

Time : 2 Hours]

[Total Marks : 50

- 1 Answer any **three** of the following : $5 \times 3 = 15$
- (a) Explain the working of a mechanical resonance type frequency meter.
 - (b) List various types of phase sequence indicators. Explain the principle of operation of any one of them in detail.
 - (c) Describe briefly, various methods of power measurements at radio frequencies.
 - (d) Define distortion. List various methods of its measurement and their relative advantages.
 - (e) Describe engineering applications of wave analysers.
- 2 Answer any **two** of the following : $5 \times 2 = 10$
- (a) What is a transducer? What is difference between sensor and transducer?
 - (b) Explain Piezoelectric pressure force transducer and derive an expression for its voltage output.
 - (c) Explain transit time flowmeter.

3 Answer any **two** of the following : **5×2=10**

- (a) (i) The tuned circuit in a simple AM transmitter uses a $50 \mu\text{H}$ inductance and 1 nF capacitance. If the oscillator output is modulated by radio frequencies up to 20 kHz , what is the frequency range occupied by side bands?

(ii) Explain voltage telemetering system.

- (b) Find the carrier and modulating frequencies, the modulation index and the maximum deviation of FM wave represented by

$$e_{\text{fm}} = 15 \sin (5 \times 10^8 t + 10 \sin 800 t) \text{ V}$$

what power will this FM wave dissipate in a 5Ω resistor?

(c) Lay down various Bus interface standards.

4 Attempt any **three** of the following : **5×3=15**

- (a) Compare LED and LCD in respect of

(i) Construction material

(ii) Power Consumption

(iii) Voltage and current.

- (b) Explain with the help of schematic diagrams the magnetic recording and reproduction of a sine wave signal by the method of pulse duration modulation.

(c) Explain Raster Scan and Vector Scan of CRTs.

- (d) Explain bi-stable storage and fast storage features of an analog type storage oscilloscope.

- (e) Determine the current required to overcome coulomb friction. The coil is 50 mm long and 20 mm wide. The rated current of the coil is 15 mA. The flux density in the air gap is 2.3×10^{-3} Wb/m². The damping constant is 6×10^{-3} N-m / rad sec⁻¹. The moment of inertia is 6×10^{-3} kg m². The spring constant is 12×10^{-3} N-m / rad. The coulomb friction is 0.4×10^{-6} N-m. Coil produces a deflection of 100°.