

Code No: V3209

**R07****Set No. 1****III B.Tech II Semester Supplementary Examinations, April- 2017****INSTRUMENTATION**

(Electrical and Electronics Engineering)

**Time: 3 hours****Max. Marks: 80****Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Distinguish between systematic and random errors in a measurement? [8M]  
b) Explain the concept of error in measurement? [8M]
- 2 a) What do you mean by distortion of a periodic signal and how it is estimated? [6M]  
b) Discuss in detail about the phase and frequency modulation, defining the modulation index for each case. [10M]
- 3 a) Describe the significance of the following Lissajous figures: [6M]  
(i) Straight line (ii) Ellipse  
b) List out the application of CRO? [4M]  
c) A sampling oscilloscope is being used to observe a 400 MHz sine wave. A sampling pulse occurs every 3 ns. Draw five cycles of the 400 MHz signal and place a dot at the sampled point on each of the five cycles. [6M]
- 4 a) Explain the working of digital frequency meter with neat sketch? [8M]  
b) Describe the working principle of digital phase angle meter? [8M]
- 5 Write a short note on the following with neat sketch [16M]  
i) Spectrum analyzers ii) RMS voltmeter
- 6 a) Name some common types of strain gauges? Explain its principle of operation of strain gauge? [10M]  
b) Explain the advantages of electrical transducers? [6M]
- 7 a) Explain the principle of measurement of torque using magneto-strictive transducer. [8M]  
b) A mild steel shaft is used to connect a motor drive to a constant load torque. A foil strain gauge having a resistance of 120 and a gauge factor 2 is mounted on a shaft with its active axis at angle of 45 degrees to the axis of the shaft. The shear modulus of steel is  $80 \text{ GN/m}^2$ , the shaft radius is 15mm and the change in strain gauge resistance due to the load 0.24 . Find the load torque. [8M]
- 8 What is the principle of ultrasonic flow meter? Explain the operation of ultrasonic flow meter with neat sketch. [16M]

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