6E6077

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6E 6077

B.Tech. VI Semester (Main) Examination, May-June 2015

Electrical Engineering

6EE6.2A Power System Instrumentation

(Common For EE, EX)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the Instrumental errors and observational errors with suitable examples. **(8)**

   b) Discuss probable error of one reading and precision index for Gaussian distribution curves. **(8)**

OR

1. a) Explain the random errors and limiting errors with suitable examples. **(8)**

   b) Define the following : **(8)**

   i) Standard deviation of mean

   ii) Variance

Unit - II

2. a) A resistance strain gauge with a gauge factor of 2 is cemented to a steel member, which is subjected to a strain of 1×10^{-6}. If the original resistance value of the gauge is 130Ω. Calculate the change in resistance. **(8)**

b) Explain the working of optical pyrometers. Discuss its merits and demerits also. **(8)**

OR

2. a) The output of an LVDT is connected to a 5 V voltmeter through an amplifier whose amplification factor is 240. An output of 2mv appears across the terminals of LVDT when the core moves through a distance of 0.5mm. Calculate the sensitivity of the LVDT and that of the whole set up.The millivoltmeter scale has 100 divisions. The scale can be read to 1/5 of a division. Calculate the resolution of the instrument in mm. **(8)**

b) Explain the working of piezo electric pressure transducers with their applications **(8)**

Unit - III

3. a) Draw and explain the circuit diagram of frequency to voltage converters. Discuss its applications also. **(8)**

b) How will you generate step, ramp and impulse wave using function generators. **(8)**

OR

3. a) Explain block diagram and working of isolation amplifiers with its merits and demerits. **(8)**

b) How will you convert temperature to current parameters. Explain this converter with circuit diagram and their applications. **(8)**

Unit - IV

4. Explain the following with suitable diagrams:

a) Measurement of frequency and phase angle. **(8)**

b) Tarriff meters **(8)**

OR

4. a) Differentiate and explain the active power and reactive power in power plants. **(8)**

b) Explain the measurement and calibration techniques of energy meters. Draw its phasor diagram also. **(8)**

Unit - V

5. a) Explain the effect of the following on the performance of current transformers

   i) Change of secondary circuit burden

   ii) Change of frequency **(8)**

   b) Explain the transient behavior of capacitive voltage transformers. **(8)**

OR

5. a) Draw the equivalent circuit and phasor diagram of current transformer. Derive the expressions for ratio and phase angle errors. **(8)**

   b) What are the sources of errors in capacitive voltage transformers. Discuss about its precautions for minimize the various errors. **(8)**