6E3115

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B.Tech VI Sem. (Main & Back) Exam. May/June 2013

Electrical Engg.

6EE 6.2 Power System Instrumentation

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.

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT – I

Q1. (a) The following 10 observations were recorded when measuring a Voltage: 31.6, 31.0, 31.7, 31.0, 32.1, 31.9, 31.0, 31.9, 32.5 and 31.8 volt. Find

(i) The probable error of one reading

(ii) The probable error of mean. [8]

(b) Define the following for Gaussian distribution of data:

(i) Precision index

(ii) Probable error

(iii) Standard deviation of mean

(iv) Standard Deviation of standard deviation. [8]

OR

Q1. (a) Define limiting (guarantee) errors. Derive the expression for relative limiting error [8]

(b) Explain the following:

(i) Systematic errors

(ii) Random errors [8]

UNIT – II

Q2. (a) What are different selection criteria for proper transducer? Explain the input, output and transfer characteristics of a transducers. [8]

(b) Derive an expression for the gauge factor of strain gauges. Differentiate the bonded and unbounded type strain gauges. [8]

OR

Q2. (a) Explain the Construction and working of seismic accelerometers. [8]

(b) Explain the various modes of operation of Piezo – electric transducers. Also, give applications of it. [8]

UNIT – III

Q3. (a) Explain the working principle of a function generator with block diagram. [8]

(b) Explain the circuit diagram of Instrumentation amplifiers and discuss the applications, merits, & demerits also. [8]

OR

Q3. (a) Explain the construction and working of frequency to voltage converters with suitable diagrams. [8]

(b) What do you mean by isolation amplifiers? Explain the circuit diagram & applications also. [8]

UNIT – IV

Q4. (a) What is a power factor? Explain the causes of low power factor and methods of improvement of power factor. [8]

(b) Explain the single electrodynamometer type wattmeter method of measurement of reactive power in 3ϕ circuits. [8]

OR

Q4. (a) Explain the construction and working principal of the Ratio meter type frequency meter. [8]

(b) Explain the industrial metering and various types of industrial tariffs. [8]

UNIT – V

Q5. (a) Explain the Wilson compensation method for reduction of errors in current transformers. [8]

(b) Explain the effect of the following on the performance of current transformers:

(i) Change of secondary circuit burden

(ii) Change of frequency [8]

OR

Q5. (a) Explain the various protection criterions for current transformers. [8]

(b) Explain the active and reactive power in the different plants. [8]