

6E6077

Roll No. \_\_\_\_\_

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**6E6077**

**B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016**

**Electrical Engineering**

**6EE6.2A Power System Instrumentation**

**Common with EE, EX**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

**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 may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

### **UNIT-I**

Q.1 (a) Define the following for Gaussian distribution of data: [8]

(i) Precision index

(ii) Probable error

(iii) Standard deviation of mean

(iv) Standard deviation of standard deviation

(b) A circuit was turned for resonance by eight different students and the frequency of resonance in KHz were recorded as. [8]

532, 548, 543, 535, 546, 531, 543, 536 calculate the

- (i) Arithmetic means
- (ii) Standard deviation
- (iii) Deviation from means
- (iv) Variance
- (v) Average deviation

**OR**

Q.1 (a) Explain the systematic error and classify the systematic error. [8]

(b) Current was measured during a test 30.4A, flowing in Resister by 105Ω. It was discovered later that the ammeter reading was low by 1.2 percent ammeter and marked resistance was high by 0.3% find the true power as a percentages of the power that was originally calculated. [8]

**UNIT-II**

Q.2 (a) Develop the relation between quake factor and Poisson ratio in strain quake. [8]

(b) Define classification of transducer. [8]

**OR**

Q.2 (a) Explain the method of temperature measurement with use of :- [8]

(i) RTDs

(ii) Thermistor

(b) Explain the construction and working principle of LVDT [8]

### UNIT-III

- Q.3 (a) Write down short note on function generator. [8]
- (b) Explain the instrumentation amplifier with op – amp. [8]

### OR

- Q.3 (a) Explain sample and hold circuit in detail. [8]
- (b) Explain the frequency to voltage converter and temperature to current converter. [8]

### UNIT-IV

- Q.4 (a) Explain the measurement of power and power factor in delta connection using two wattmeter method. [8]
- (b) The power flowing in 3 -  $\phi$  3 – wire balanced load system is measured by two wattmeter method. [8]

The reading of wattmeter A is 7500W and reading of wattmeter B is – 1500W

- (i) What is power factor of system.
- (ii) If the voltage of circuit is 400V, what is the value of capacitance which must be introduced in each phase to cause the whole power of power measured to appear on wattmeter A the frequency is 50Hz.

**OR**

- Q.4 (a) Explain the measurement of reactive power using 1- $\phi$  varmeter and also draw its phasor diagram. [8]
- (b) What are the different methods of measurement of frequency in power frequency range? Explain resonance type frequency meter. [8]

**UNIT-V**

- Q.5 (a) Draw the equivalence circuit and phasor diagram of current transformer. Drive the expression for ration and phase angle error. [8]
- (b) Explain the effect of following on the performance of CT [8]
- (i) Change in primary winding current
  - (ii) Change in secondary circuit burden
  - (iii) Change in frequency

**OR**

- Q.5 (a) Explain the working principle of capacitive voltage transformer. [8]
- (b) Describe transient behavior of capacitive voltage transformer. [8]
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