http://www.uptuonline.com

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

PAPER ID : 2003 Roll No. | | | | | | | | | | |

B.Tech.

THIRD SEMESTER EXAMINATION, 2004-2005

ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt ALL the questions.*

(ii) All questions carry equal marks.

1. Answer *any four* of the following : **[5x4=20]**

(a) Explain the following terms :

(i) Static sensitivity

(ii) Range

(iii) Instrument efficiency

(iv) Resolution

(v) Linearity

(b) A multimeter having a sensitivity of 4000 Ω/V is used to measure the voltage across a circuit having an output resistance of 20 kΩ . The open circuit voltage of the circuit is 7.5 V. Find the reading of the multimeter when it is set to its 10 V scale. Also find the percentage error .

http://www.onlineQP.com

http://www.uptuonline.com

(c) Differentiate between :

(i) Direct and indirect measurement

(ii) Primary and international standards

(iii) Random and gross errors.

(d) The wattmeter is used to measure power in the circuit with the help of the following equation $P = (E^2) / R$

Where limiting values of voltage and resistance are , E = 200V + 1 % and R=1000Ω±5 %

Calculate :

(i) the nominal power consumed

(ii) the limiting error of power in watts and percent.

(e) Describe the construction and working of single phase induction type Energy Meters.

(f) An A.C. voltmeter with a maximum scale reading of 50 V has an inductance of 0.09 H and a total resistance of 500 Ω. The coil is wound with copper wire having a resistance of 50 Ω and the remainder of the voltmeter circuit consists of a non-inductive resistance in series with the coil. Find the capacitance that should be placed across the non-inductive resister to make the instrument read both d.c. as well as a.c. .

http://www.onlineQP.com

2. Answer *any two* of the following : [10x2=20]

http://www.uptuonline.com

(a) A current transformer with a bar has 300 turns in its secondary winding . The resistance and reactance of the secondary circuit are 1.5 Ω and 1.0 Ω respectively including the transformer winding. With 5 A current flowing in the secondary winding, the magnetizing mmf is 100 A and iron loss is 1.2 watts. Determine the ratio and phase angle errors.

(b) Write short technical note on the following :

(i) Ratiometer type frequency meter.

(ii) Moving iron power factor meter.

(c) Describe the construction and working of rotating and static type phase sequence indicators.

3. Answer *any two* of the following : **[10x2=20]**

(a) What do you mean by low , medium and high resistance? Describe one method each for the measurement of low, medium and high resistance with their advantages and disadvantages.

(b) Describe the working of Hay's bridge for the measurement of inductance. Derive the equation for the balance condition and draw the phasor diagram at balance. Explain why this bridge is suitable for large Q.

http://www.onlineQP.com

http://www.uptuonline.com

http://www.onlineQP.com