B. Tech III Year I Semester Examinations, December-2011
ELECTRICAL MEASUREMENTS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 hours   **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

1.a) Draw the sketch and explain the principle of PMMC and moving iron type instruments. Derive the expression for deflecting Torques Td. What are the materials used for construction?

  b) An ammeter has a range of 100 μA. Meter resistance $R_m = 900\Omega$. The range is to be extended to 100mA and 10A. Find the values of R_{SG}.   [16]

2.a) Draw the schematic of Electrostatic Voltmeters and explain the principle of working.

  b) A current meter has an internal resistance of 80Ω. It is used to measure the current through a resistance R_C, which is in shunt with another resistance $R_b = 1.5K\Omega$. A resistance R_A is in series and its value is $1K\Omega$. The supply voltage is 3V. Draw the circuit and determines the % error in current reading due to loading effect of ammeter.   [16]

3.a) Explain about the constructional features and principles of current transformers and potential Transformers.

  b) Draw the sketch of Dynamometer type wattmeter and explain the principle and working of the instrument.   [16]

4.a) Explain how the range of wattmeter can be extended using instrument transformers.

  b) Draw the circuit and explain the principle of three phase energy meter.   [16]

5.a) Explain about Weston type of Frequency Meter, giving the constructional features.

  b) What are the specifications of A.C and D.C potentiometers? Give typical values.   [16]

6.a) Draw the circuit Kelvin's double bridge and derive the expression for unknown resistance R_x. What are the salient features of this bridge circuit?

  b) Draw the circuit for Anderson's bridge and derive the expression for unknown elements.   [16]

7.a) Draw the Maxwell's bridge circuit and derive the expression for the unknown element at balance.

  b) An A.C bridge has the following elements: Arm AB: $R_1 = 800\Omega$, $G = 0.4\mu$F. Arm BC: $R_2 = 500\Omega$, $C_2 = 1\mu$F. Elements in arm AB are in parallel. Elements In arm BC are in series. Arm CB: $R_3 = 1.2K\Omega$. Arm AD has unknown resistance R_x with usual notation. Find the value of R_X and the frequency at which the bridge is in balance.   [16]

8. Write Notes on any **TWO**:
   a) Ballistic galvanometer
   b) Magnetic potentiometer
   c) Silsbee's method – Testing of CTS.   [16]

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1.a)　Explain about the constructional features and principles of current transformers and potential Transformers.
　c)　Draw the sketch of Dynamometer type wattmeter and explain the principle and working of the instrument.　　　　　　　　　　　　　　[16]

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8.a)　Draw the schematic of Electrostatic Voltmeters and explain the principle of working.
　b)　A current meter has an internal resistance of $80\,\Omega$. It is used to measure the current through a resistance R_C, which is in shunt with another resistance $R_b = 1.5 K\Omega$. A resistance R_A is in series and its value is $1 K\Omega$. The supply voltage is 3V. Draw the circuit and determines the % error in current reading due to loading effect of ammeter.　　　　　　　　　　　　[16]

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