**Basic Electrical & Electronics Engineering**
**(EE-101, Dec-2006)**

**Note:** Section A is compulsory. Attempt any five questions from section B & C taking at least two questions from each part.

## Section-A

1. a) What is Ohm's law? State its limitations.
   b) Give concept of Work & Energy.
   c) A capacitor of 25 μF is connected to a supply of 200 V, 50 Hz. What will be current flowing through the capacitor?
   d) What is parallel resonance and why it is also known as current resonance?
   e) State similarities of electric and magnetic circuits.
   f) Define terms slip and slip frequency in case of 3-phase induction motor.
   g) What is photoelectric transducer?
   h) Sketch turn off characteristics of Thyristor.
   i) Draw and label the pin diagrams of IC 555.
   j) What is race-around in JK flip flop?

## Section-B

2. (a) State and explain Kirchoff's law.
   (b) A current of 20 A flows through two ammeters A and B in series. The potential difference across A is 0.2 V, and across B is 0.3 V. Find now the same current will divide between A and B, when they are in parallel.
3. (a) Derive the conditions of resonance in a.c. RLC series circuits.
   (b) A series RLC circuit with R=250Ω, and L=0.6 H results in a leading phase angle of 60° at frequency 40 Hz. At what frequency will be circuit resonate?
4. (a) State Faraday's law of electromagnetic induction.
   (b) Explain the constructional detail and working principle of a DC generator. Draw the internal and external characteristics.
5. (a) With the help of neat diagram, explain the construction and principle of operation of a single phase energy meter.
   (b)Discuss advantages and disadvantages of Permanent magnet moving coil instruments. Why these instruments are not suitable for a.c measurements?

## Section-C

6. (a) What do you understand by piezoresistive effect? Derive an expression to show that if the change in resistivity of a material when strained is neglected then the gauge factor (Gf) to a strain gauge equals to 1+2v, where v is Poisson's ratio.
   (b) Give the working principle of photoelectric transducer.
7. (a) What is the difference between avalanche and zener breakdown? How does zener diode maintain a constant voltage across the load?
   (b) Explain the construction and working of JFET. What is the difference between FET and bipolar transistor?
8. (a) Convert the hexadecimal 8A3D into decimal and binary equivalent. Convert the decimal number 5796.12 into hexadecimal.
   (b) What are universe gates and why they are called so? How can OR and XOR gates be realized using NAND gates only?
9. (a) What are the characteristics of an ideal operational amplifier? Define the terms CMRR and PSRR.
   (b) Discuss the application of IC 741 as non converting amplifier.