B.TECH. I Year(R05) Supplementary Examinations, May/June 2010
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Bio-Technology)

Time: 3 hours
Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Define the terms
    i. active power
    ii. reactive power and
    iii. apparent power, and give the expressions for the same.
   (b) A single phase motor operating at 440 V, 50 HZ supply is developing 10 kW with an efficiency of 84% and power factor 0.7 lag. Calculate (a) the input KVA and active power, and reactive power. [6+10]

2. (a) Does the induction motor have any similarities with the transformer. Compare the similarities and differences between them.
   (b) A 20 h.p, 400 V, 50 Hz, 3-phase induction motor has an efficiency of 80% and working at 0.7 p.f. The motor is connected to 400 Volts, 3-phase supply calculate the current drawn by the motor from the mains. [8+8]

3. (a) Explain how a P-type semiconductor is formed. What are the different impurities used for this process.
   (b) Derive the expression for intrinsic conductivity.?
   (c) Explain about charge densities in a semiconductor. [7+4+5]

4. (a) Draw the circuit diagram of half wave rectifier and explain its operation.
   (b) A half wave rectifier is fed by 220 V, 50 Hz via a step down transformer of turns ratio 11:1 find
    i. the output DC and
    ii. peak inverse voltage under no load condition. [8+8]

5. (a) Give the basic structure of UJT and explain its operation with the help of its emitter characteristic.
   (b) Give the circuit diagram of UJT relaxation oscillator and sketch the various output waveforms. Also explain its operation. [8+8]

6. (a) List out different distortions that occur in amplifiers and discuss.
   (b) Enumerate the effect of negative feedback on the various characteristics of the amplifier.
   (c) Draw the circuit diagram of an emitter follower circuit and mention what type of feedback is employed? Justify your answer. [6+6+4]

7. (a) With the help of neat circuit diagram, explain the following applications of OP-AMP
    i. Multiplier
    ii. differentiator
    iii. Subtractor.
   (b) Design a scaling adder circuit using OP-AMP, to give the output voltage $V_o = -(3_{V1} + 4_{V2} + 5_{V3})$, where V_1, V_2 and V_3 are the input voltages given to the circuit. [10+6]

8. (a) Explain with a block diagram the major blocks of a digital computer.
   (b) Implement the following with either NAND or NOR gates. Use only 4 gates only the normal inputs are available.
      F = w'xz + w'yz + x'yz' + wxy'z.
   (c) With a circuit diagram, explain Counter type A to D converter. [4+6+6]

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