**B.Tech II Year - I Semester Examinations, May-June, 2012**
**ELECTRICAL AND ELECTRONICS ENGINEERING**
(COMMON TO AME, CE, ME)

**Time: 3 hours**                            **Max. Marks: 75**

**Answer any five questions**
**All questions carry equal marks**
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1.a) Define specific resistance of a conductor.
  b) An electric circuit has three terminals A,B and C. 20 ohm resistor is connected between A and B, 25 ohm resistor is connected between A and C, a parallel combination of 4 and 24 ohms are connected between B and C. A battery of 100V is connected between A and C. Find
  i) total current drawn from the source
  ii) voltage across 4 ohm resistor
  iii) current passing through 24 ohm resistor.
  c) State and explain Kirchoff's laws.                 [3+6+6]

2 a) Derive EMF equation of a D.C generator.
  b) With a neat diagram, explain the operation of a three point starter used in D.C motor.                 [7+8]

3.a) Define voltage regulation and efficiency of a transformer.
  b) A single phase 2200/250 V, 50 Hz transformer has a net core area of 36 sq.cm and a maximum flux density of 6 $Wb/m^2$. Calculate the number of turns of primary and secondary windings.
  c) A 2000/200 V, 20 kVA transformer has 66 turns in the secondary. Calculate the
  i) primary turns                 ii) primary and secondary full load currents.
  Neglect the losses.                 [3+6+6]

4.a) Draw the slip-torque characteristics of three phase induction motor and justify the answer.
  b) Explain the synchronous impedance method of calculating the voltage regulation of alternator.                 [7+8]

5.a) Discuss three essential torques in indicating instruments.
  b) With a neat diagram, explain the working principle of permanent magnet moving coil.                 [7+8]

6.a) Define ac forward resistance and dc forward resistance of a diode.
  b) Explain the principle of operation of full wave bridge rectifier and draw the wave forms.
  c) Draw the symbol of diode and write the significance of symbol.       [3+8+4]

7.a) Explain how a transistor can be used as an amplifier.
  b) Draw the characteristics of SCR.
  c) Write the applications of NPN transistor and SCR.          [7+4+4]

8.a) Name different components of CRT and write the function of each component.
  b) Explain the application of CRO in the field of electrical measurements.     [8+7]

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**Time: 3 hours**                                                    **Max. Marks: 75**
**Answer any five questions**
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1.a)  Define current, voltage and power.
  b)  A 50 ohm resistor is in parallel with a 100 ohm resistor. The current in  50 ohm resistor is 7.4A. What is the value of third resistor to be added in parallel to make the line current 12.1 A?
  c)  State and Explain Kirchoff's laws.                                      [3+6+6]

2.a)  Derive the torque equation of a D.C motor.
  b)  With a neat diagram, explain the operation of a three point starter used in D.C motor.                                                                       [7+8]

3.a)  An ideal  25 kVA transformer has 500 turns on the primary winding and 40 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Calculate
      i) primary and secondary currents on full load
      ii) secondary emf
      iii) the maximum core flux.
  b)  Define voltage transformation ratio of a transformer.
  c)  Write the working principle of a transformer.                          [7+3+5]

4.a)  State and explain the working principle of an alternator.
  b)  Draw the slip-torque characteristics of three phase induction motor and justify the answer.                                                                    [8+7]

5.a)  Discuss the three essential torques in  indicating instruments.
  b)  With a neat diagram, explain the working principle of moving iron instrument.
                                                                            [7+8]

6.a)  Draw V-I characteristics of p-n junction diode.
  b)  Explain the principle of operation of half wave rectifier and draw the wave forms.
  c)  Define ripple factor and efficiency of a diode and write its significance.   [3+8+4]

7.a)  Distinguish between PNP and NPN transistors.
  b)  Explain how a transistor can be used as an amplifier.
  c)  Draw the characteristics of SCR.                                       [4+7+4]

8.a)  Name different components of CRT and  Write the function of each component.
  b)  Explain the application of CRO in the field of electrical measurements.      [8+7]


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- - -

1.a) State and explain Ohm's law.
  b) 10 ohm, 15 ohm and 20 ohm resistors are connected in delta form; Obtain an equivalent star connected resistance values. Derive the necessary formula.
  c) Define resistance and capacitance.             [4+8+3]

2.a) Explain the working principle of DC generator.
  b) Derive the torque equation of a D.C motor.
  c) Mention three types of DC generators and write the application of each generator.
                                                         [4+5+6]

3.a) Derive the emf equation of a transformer.
  b) An ideal 60 kVA transformer has 500 turns on the primary winding and 50 turns on the secondary winding. The primary is connected to 4000 V, 50 Hz supply. Calculate
  i) primary and secondary currents on full load
  ii) secondary emf
  iii) the maximum core flux.             [8+7]

4.a) Explain the working principle of three phase induction motor.
  b) Explain the synchronous impedance method of calculating the voltage regulation of alternator.             [7+8]

5.a) Write the principle of operation of electrical instruments.
  b) With a neat diagram explain the working principle of permanent magnet moving coil instrument.
  c) What should be the resistance of the moving coil of an ammeter which requires 2.5 mA for full scale deflection so that it may be used with a shunt having a resistance of 0.0025 ohms for a range of 0-10A?             [4+8+3]

6.a) A half wave crystal diode rectifier is transformer fed from a 230 V line. Calculate
  i) turns ratio
  ii) diode PIV rating if the circuit provides an output of 12 V dc.
  b) Explain the principle of operation of full wave bridge rectifier and draw the wave forms.
  c) Draw the circuit diagram and output waveforms of half wave rectifier.      [4+8+3]

7.a) Explain how a transistor can be used as an amplifier.
  b) Write the applications NPN transistor and SCR.
  c) Define PIV and holding current of SCR.             [7+4+4]

8.a) Name different components of CRT and Write the function of each component.
  b) Explain the application of CRO in the field of electrical measurements.      [8+7]

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1.a) A 35 V DC supply is connected across a resistance of 600 ohms in series with the unknown resistance R. A voltmeter having a resistance of 1200 ohms connected across 600 ohms has shown a reading of 5V. Calculate the value of R.

  b) An electric circuit has three terminals A, B and C. 10 ohms resistor is connected between A and B, 25 ohms resistor is connected between A and C, a parallel combination of 14 and 24 ohms are connected between B and C. A battery of 120 V is connected between A and C. Find
i) total current drawn from the source
ii) voltage across 4 ohm resistor
iii) current passing through 24 ohm resistor.

  c) Distinguish between inductor and capacitor.            [5+6+4]

2.a) Mention three types of DC motors and write the application of each motor.
  b) Derive the torque equation of a D.C motor.
  c) Draw a neat sketch of three point starter.            [4+7+4]

3.a) An ideal 100 kVA transformer has 500 turns on the primary winding and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Calculate
i) primary and secondary currents on full load
ii) secondary emf
iii) the maximum core flux.

  b) Explain the working principle of single phase transformer.

  c) Mention different types of losses in a transformer and write their significance in deciding the rating of a transformer.            [6+5+4]

4.a) Define:
i) slip speed      ii) slip of induction motor.
  b) Write the applications of three phase induction motor.
  c) Explain the synchronous impedance method of calculating the voltage regulation of alternator.            [4+3+8]

5.a) What should be the resistance of the moving coil of an ammeter which requires 3.5 mA for full scale deflection so that it may be used with a shunt having a resistance of 0.0025 ohms for a range of 0-10A?
  b) With a neat diagram, explain the working principle of moving iron instrument.
  c) Write the advantages and disadvantages of permanent magnet moving coil instrument.            [3+8+4]

6.a) A half wave crystal diode rectifier is transformer fed from a 220 V line. Calculate
i) turn ratio      ii) diode PIV rating if the circuit provides an output of 12 V dc.
  b) Explain the principle of operation full wave bridge rectifier and draw the wave forms.
  c) Define ac forward resistance and dc forward resistance of a diode.      [4+8+3]

7.a)  Explain how a transistor can be used as an amplifier.
  b)  Write the applications of NPN transistor and SCR.
  c)  Draw the characteristics of SCR.                    [7+4+4]

8.a)  Name different components of CRT and  Write the function of each component.
  b)  Explain the application of CRO in the field of electrical measurements.      [8+7]

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