Diploma in Electrical and Mechanical
Engineering

Term-End Examination

December, 2010

00643

BEE-031 : ELECTRICAL TECHNOLOGY

*Time : 2 Hours*   *Maximum Marks : 70*

Note :   Answer five questions in all.   Question no. 1
compulsory. Attempt any four of the remaining
questions. Use of calculator is allowed.

1.   State true or false for the following statements.

(a)   Speed control is possible in Induction motor
        but not in synchronous motors.   **14x1=14**

(b)   Induction motor and synchronous motor
        both possess inherent starting torque.

(c)   The operation of matching two alternators
        in series is known as synchronizing.

(d)   In general voltage rises calculated by EMF
        method of voltage regulation are higher
        than the true values obtained by direct test.

(e)   Slip can be measured only either by
   measuring the rotor Frequency or by
        Stroboscopic method.

(f) D.C. series motors can be used in over head cranes.

(g) In a pure capacitor the current leads the applied voltage (A.C.) by 90°.

(h) A pure capacitor when connected to A.C. supply does not consume any power from the source.

(i) Nortons equivalent of a circuit is a current source in series with a resistor.

(j) Equivalent resistance between the terminals A and B in the given figure is 3R.
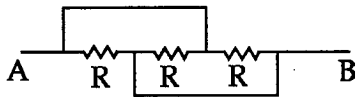
(k) An Ohmic circuit might become Non-ohmic circuit if the temperature is increased.

(l) In motoring action the commutator works as a rectifier which converts the AC voltage into DC voltage.

(m) A.C. is more dangerous than D.C.

(n) Long distance transmission is always done at 600 kV.

2. (a) Derive an expression for the root mean square (rms) value of sinusoidal A.C. voltage having peak value E_o.　　7

(b) State and prove maximum power transfer theorem.　　7

3. (a) Two alternators operating in parallel supply   7
         a total load of 40 kW at p.f. 0.8 lagging, and
         the load on one machine is 20 kW at 0.9 p.f.
         lagging. What is the load on the other
         machine and at what power factor it
         operates ?

    (b) What is voltage regulation in Alternators ?   7
         Discuss any one method for its calculation
         in case of synchronous generators.

4. Discuss various methods of speed control of 3   14
    phase Induction motor.

5. (a) Derive an expression for the r.m.s. value of   7
         induced emf (emf equation) of a
         transformer.

    (b) At no load test, a transformer draws a   7
         current of 0.2 amp. lagging behind the
         applied voltage by 80°; when the low
         voltage winding of the transformer is
         connected to a 500 volt source. Calculate;

         (i) Iron loss.

         (ii) Components of the no load current.

6. With the help of necessary diagrams explain the   14
    construction & working of a DC machine.
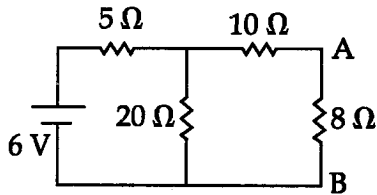
7. (a)   7

Draw the Thevenins equivalent circuit of the given circuit. across the terminals A & B clearly showing the values of open circuit. Voltage thevenins resistance.

(b) Explain the working principle of a   7
synchronous motor.

2x7=14

8. Explain *any two* of the following.

(a) Super position theorem.

(b) Synchronous condenser.

(c) Ward Leonard system.

(d) Effect of slip on Rotor parameter.