B.E. / B.Tech. (Model Curriculum) Semester - I & II
ESC101 / BSC104 - Basic Electrical Engineering

P. Pages : 2

Time : Three Hours
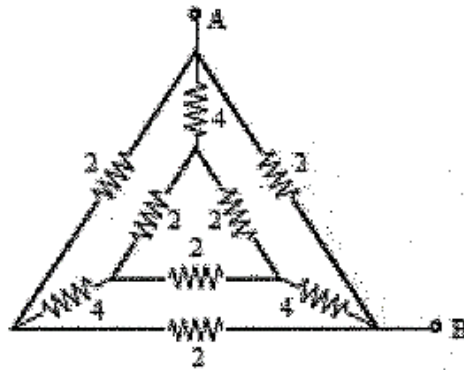
Max. Marks : 80

1610

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Notes : 1.   All questions carry equal marks.
2.   Assume suitable data wherever necessary.
3.   Illustrate your answers wherever necessary with the help of neat sketches.
4.   Discuss the reaction, mechanism wherever necessary.

1. a)   Find the equivalent resistance between terminals A & B for figure shown below. All resistances are in ohms.   **8**

   b)   State & Explain Kirchoff's current and Voltage law with suitable example.   **8**

<div align="center">OR</div>

2. a)   State and Explain superposition theorem with suitable example.   **8**

   b)   State and Explain Thevenins theorem with suitable example.   **8**

3. a)   Show that in purely inductive circuit, the current lags behind the voltage by 90º with appropriate waveforms & phasor diagram.   **8**

   b)   Two circuits the impedances of which are given by $\overline{z}_1 = (15 + j12)\,\Omega$ and $\overline{z}_2 = (8 - j5)\,\Omega$ are connected in parallel. If the potential difference across them is $(250 + j0)$ volt, calculate: **8**
   i)   Total current and branch currents.
   ii)   Total power and power consumed in each branch and
   iii) Overall power factor and power factor of each branch.

<div align="center">OR</div>

4. a)   Define rms and average value as applied to ac voltage. Also obtain their expression for sinusoidal voltage having the maximum value Vm.   **8**

   b)   Three coil each having resistance of 10Ω & inductance of 0.02H are connected in star across 440V, 50Hz, 3phase supply. Calculate the line current and total power consumed.   **8**

5. a) What is B-H curve. Compare Magnetic and Electrical Circuit. **8**

   b) Define the following terms. **8**

      i) Magnetomotive force   ii) Fringing

      iii) Leakage coefficient   iv) Reluctance.

OR

6. a) Derive & explain the condition for maximum efficiency & regulation of a transformer. **8**

   b) The following test data is obtained on 5 kVA, 220/440 volt single phase transformer: **8**
O.C. Test : 220V, 2 Amp, 100W ………… L.V. side
S.C. Test : 40V, 11.4 Amp, 200W,……H.V. side
Find all the parameters of equivalent circuit of transformer refer to primary side. Also draw the equivalent circuit.

7. a) Explain the working principle of a 3-phase induction motor. State its types and application. **8**

   b) Derive an expression for electromagnetic torque developed of single phase induction motor. Also derive condition for maximum torque. **8**

OR

8. a) Explain speed control of separately excited of DC motor. **8**

   b) The armature of a 4 pole DC motor carries 314 conductors which are lap connected for an armature current of 20Amp, the torque produced has to be 50 N.M. Determine the required flux per pole. **8**

9. a) Explain construction & working of diode. What are the application of diode as a rectifier. **8**

   b) Explain the following safety devices in short. **8**

      i) SFU   ii) MCB

      iii) ELCB   iv) MCCB

OR

10. a) State & Explain Types of Wires and Cables. **8**

    b) State & Explain Types of Battery. Also draw their characteristics. **8**

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