Assignment for EE 6503 (Part 2, test: Chapter 1 + Chapter 2+ Chapter 3)

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Before 01/05 2020 (Week 15))

1. A three-phase Y-Y connection asynchronous motor, its rated frequency of the stator voltage is f_N=50 Hz, the rated rotor speed is n_N=720 r/min. When the slip ratio s=1, the rotor line electromotive force E_{2N}=260 V. The rotor resistor R_2=0.06 Ω, rotor inductive reactance $X_{\sigma 2}$=0.2 Ω.
   What is the pole-pairs **P** ?

   A. 4

   B. 3

   C. 5

   D. 8

   E. 2

2. A three-phase Y-Y connection asynchronous motor, its rated frequency of the stator voltage is f_N=50 Hz, the rated rotor speed is n_N=720 r/min. When the slip ratio s=1, the rotor line electromotive force E_{2N}=260 V. The rotor resistor R_2=0.06 Ω, rotor inductive reactance $X_{\sigma 2}$=0.2 Ω.
   What is the rated slip ratio $\mathbf{S_N}$?

   A. 0.04

   B. 0.02

   C. 0.08

   D. 0.12

   E. 0.16

3. A three-phase Y-Y connection asynchronous motor, its rated frequency of the stator voltage is f_N=50 Hz, the rated rotor speed is n_N=720 r/min. When the slip ratio s=1, the rotor line electromotive force E_{2N}=260 V. The rotor resistor R_2=0.06 Ω, rotor inductive reactance $X_{\sigma 2}$=0.2 Ω.
   What is the frequency of the rotor $\boldsymbol{f_2}$?

A. 20 Hz

B. 1 Hz

C. 2 Hz

D. 10 Hz

E. 50 Hz

4. A three-phase Y-Y connection asynchronous motor, its rated frequency of the stator voltage is f_N=50 Hz, the rated rotor speed is n_N=720 r/min. When the slip ratio s=1, the rotor line electromotive force E_{2N}=260 V. The rotor resistor R_2=0.06 Ω, rotor inductive reactance $X_{\sigma 2}$=0.2 Ω.
If rotor is at rated speed, what is the rotor phase electromotive force E_{2sN}:

A. 3 V

B. 5 V

C. 6 V

D. 8 V

E. 10 V

5. A three-phase Y-Y connection asynchronous motor, its rated frequency of the stator voltage is f_N=50 Hz, the rated rotor speed is n_N=720 r/min. When the slip ratio s=1, the rotor line electromotive force E_{2N}=260 V. The rotor resistor R_2=0.06 Ω, rotor inductive reactance $X_{\sigma 2}$=0.2 Ω.
If rotor is at rated speed, calculate the rotor current I_{2sN};

A. 95.34 A

B. 99.12 A

C. 101.01 A

D. 150.25 A

E. 40.87 A

6. Please explain the advantages and disadvantages of the DC motor

7. Please points out the characteristics of the single-phase asynchronous motor compared to the three phase asynchronous motor.

8. Please depict the mechanical characteristics curve of the asynchronous motor and points out its stable operation reign.

9. A three-phase wound rotor asynchronous motor, the rated output power P_N=160 kW, Rated line voltage of the stator U_{N1}=380 V, the rated frequency of the stator voltage f_{N1}=50 Hz, the rated rotor speed n_N=1470 r/min, the overload ability of the motor k_T=2.1.

   (a) The expression of the motor torque;

   (b) Calculate the start-up torque of this motor;

   (c) Calculate the rotor speed when the load torque T_L=655 N·m.