EE 332   *Electrical Machines I*   15.8.2004

Name: Univ.#:

Note : Write the Best answer in the Answer Box at the Bottom of the page using a
CAPITAL letter.

A 3-phase, 60 Hz, 4 pole, induction motor runs at 1728 rpm. The power crossing the air gap is
120 kW the core loss is 1.7 kW , the mechanical loss is 2.7 kW and the stator copper loss is 3.5
kW.
1. The efficiency of the motor is:
   a) 87.2%   b) 89.7%   c) 88.2%   d) 91.3%

2. The output torque of the motor is:
   a) 541 Nm   b) 602 Nm   c) 687 Nm   d) 612 Nm

A 3-phase, 400 V, 50 Hz , 4 pole, Y-connected induction motor has $R_1 = 0.25\,\Omega$, $X_1 = X_2' = 0.6\,\Omega$,
$R_2' = 0.21\,\Omega$, $X_m = 20\,\Omega$, $P_r = 1.6$ kW. The motor is operated at 1455 rpm.
3. The input power is:
   a) 19.4 kW   b) 23.1 kW   c) 31.6 kW   d) 20.5 kW

4. The output horse power is :
   a) 37.2 hp   b) 23.4 hp   c) 24.5 hp   d) 40.8 hp

5. The slip at maximum torque is:
   a) 0.172   b) 0.124   c) 0.214   d) 0.157

6. The maximum developed torque is:
   a) 219.6 Nm   b) 349.4 Nm   c) 329.5 Nm   d) None of these

A 600 V dc shunt motor drives a load which requires a constant torque of 300 Nm. The motor
rotates at 1500 rpm. $R_a = 0.5\,\Omega$.
7. The armature current I_a is:
   a) 78.6 A   b) 62.8 A   c) 56.5 A   d) 84.5 A

If the shunt field flux of the above motor is reduced by 10% then:
8. The new armature current I_a is:
   a) 69.1 A   b) 62.8 A   c) 93.9 A   d) 88.5 A

9. The speed of the motor is:
   a) 1653 rpm   b) 1456 rpm   c) 1667 rpm   d) 1310 rpm

A 220 V , 12 hp , dc series motor draws 40 A and rotates at 1200 rpm. $R_a = 0.25\,\Omega$, $R_s = 0.1\,\Omega$.
The armature reaction at 40 A reduces the flux by 5%. If the motor draws 20 A , then:
10. The speed (rpm) of the motor is:
    a) 2357   b) 1241   c) 2482   d) 1179

11. The developed torque is:
    a) 16.4 Nm   b) 17.3 Nm   c) 32.8 Nm   d) 34.5 Nm

Answers

1	2	3	4	5	6	7	8	9	10	11