

Sheet (5)**PM Synchronous Machines**

Q1: Consider an interior PMSM running as a motor of 2000 rpm, Calculate the following parameters when the machine is operating with an armature current of 10A, and a torque angle of 90° .

- a) Back emf
- b) Terminal Voltage
- c) Reluctance Torque
- d) Magnet Torque
- e) Total Torque.

Motor Parameters:

Number of Poles: 6

$R_a = 0.9\Omega$

$L_d = 20 \text{ mH}$

$L_q = 50 \text{ mH}$

Flux linkage = 0.5 V.s

Q2: Prove that a rotating magnetic field of constant amplitude is produced when a 3-phase balanced windig is excited by three phase balanced currents.