

**King Fahd University of Petroleum & Minerals**  
***Electrical Engineering Department***

**DESIGN PROJECT**

**Semester (182)**

**Due on ST's Classes April 14<sup>th</sup> ; MW's Classes April 15<sup>th</sup>**

It is required to design a high-current, low-voltage, shunt and DC motor at rated load current. The output power of the machine is expected to be between (25 to 30) hp. The copper losses including the brush losses should be between 5% and 7% of the output power. The no-load power (i.e., rotational losses) should not exceeds 6% of the output power. The motor speed is available between 1000 and 1200 rpm. The supply voltage is 240V. The brush voltage drop is 2 (+0.your\_section number) V each. The magnetization curve is given as  $\Phi = 0.01I_f$  and the flux per pole should not exceed 30 (+your\_two-digit-serial number) mwb. The number of poles is up to 6 poles. The armature resistance is between (0.05 to 0.10)  $\Omega$ .

Explain all your design steps and give all the machine parameters and variables ( $P_{dev}$ , speed,  $T_{dev}$ , armature current, armature voltage,  $\Phi_p$ ,  $K_a$ ,  $Z$ ,  $P$ ,  $I_c$ ,  $R_a$ ,  $V_t$ ,  $I_t$ ,  $I_f$ ,  $R_f$ ,  $P_{rot}$ ,  $P_{input}$ ,  $T_{input}$ ,  $\eta$ )

Assume any missing data and tabulated in your report.