請按題號次序作答

第一部份

1.簡答題

1-1. 為何變壓器的額定使用 MVA, kVA, 或 VA，而不使用 MW, kW, 或 W？[5 %]

1-2. 為何在相同的電樞電流下，直流串激馬達比直流並激馬達能夠提供較大的輸出力矩 (Torque) ？ [5 %]

1-3. 何謂電樞效應(Armature reaction)？其影響如何？[5 %]

1-4. 說明變壓器(Transformer)與自耦變壓器(Auto-Transformer)之優缺點。 [5 %]

1-5. 何謂 Power BJT 的 Safe Operating Areas ？[5 %]

1-6. 何謂 Zero Voltage Switching ？其目的為何？[5 %]

2. 圖 1 為 Cuk Converter，請推導輸出電壓 V_o 與輸入電壓 V_{dc} 之關係。[10 %]

3. 圖 2 為二極體全橋整流電路，若負載為 10 A 之電流源。a. 請畫出電源端之電壓與電流波形；b. 請計算電源端的功率因數。 [$\mathbf{V_{ac}} = 100\sqrt{2}\sin 200t$] [10 %]

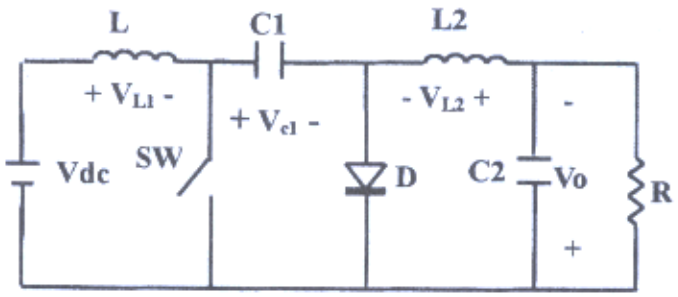

圖 1

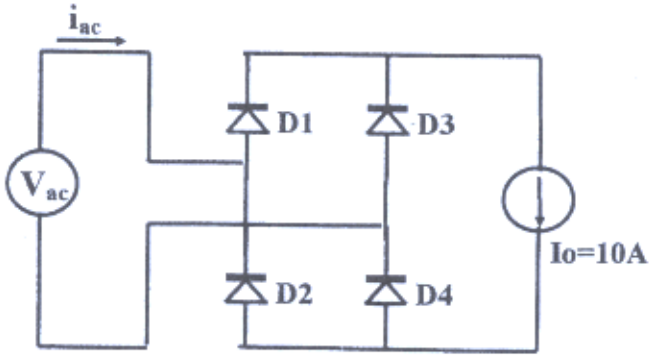

圖 2

(背面仍有題目,請繼續作答)

第二部份

4. A 4-pole induction motor draws 25A from a 60Hz, 480V source, three-phase line at power factor 0.85lagging. The stator copper losses is 1000W, and the rotor copper losses is 500W. The rotating losses are friction and windage are 250W, and stator core losses 800W. Calculate: [18 %]

(a) the air gap power, Pg
(b) the developed mechanical power, Pconv
(c) the output horsepower,
(d) the slip,
(e) the operating speed,
(f) the output torque.

5. 簡答:

5.1 What happens in a shunt dc motor if its field circuit opens while it is running? [5 %]

5.2 Would you expect a 400Hz generator to be larger or smaller than a 60Hz generator of the same power and voltage rating? Why? [6 %]

5.3 What is a TCUL transformer? [5 %]

5.4 Explain why the open--△(delta) transformer connection is limited to supplying 57.7% of a normal △--△ transformer bank's load. [8 %]

5.5 What is the bundled conductor? What advantages of this conductor? [8 %]