Fourth Year
Electrical and Electronic Engineering

EE4010
Electrical and Electronic Power Supply Systems

Answers to Summer 2005 Paper

Q.1. (a) 26.6 years, 7.3 years
  (b) $\theta_{in} = 45°C$ $\theta_{out} \approx 600°C$, $\eta_{Carnot} \approx 63.5\%$ 226.3 tonnes/hour
  (c) 1.58 m
  (d) $10.8\angle -34°\,A$, 6.16 kW

Q.2. $D = 11.3\,m$ $P_{min} = 6.1\,kW$ $P_{max} = 95.4\,kW$

Q.3. $\bar{I}_a = 10.72\angle -68.2°\,A$ $\bar{I}_a = 8.61\angle -72°\,A$

Q.4. $X_{g\,pu} = 1.65\,pu$ $\bar{V}_t = 13.28\angle 4.15°\,kV$ $pf = 0.997$ (lagging)
  $\bar{E}_f = 21.39\angle 51.74°\,kV$ $\bar{S}_g = (80.26 + j5.82)\,MVA$

Q.5. $\bar{E}_f = 7.152\angle 11.10°\,kV$ $\bar{I}_a = 334\angle -60.9°\,A$ $P_{max} = 20\,MW$

Q.6. $\bar{I}_{a\,3\phi} = -j1.92\,kA$ $\bar{I}_{a\,1\phi} = -j1.73\,kA$ $\bar{I}_{a\,L-L} = -1.66\,kA$

Q.7. $DPF = 0.8696$ $pf = 0.6367$ $I_{rms} = 15\,A$