

ENGINEERING TRIPOS PART IIA 2014

MODULE 3A3: FLUID MECHANICS II Double Module

List of numerical answers

- Q1: b) i) $A=0.01996\text{m}^2$ ii) $A_d/A_n > 0.0318\text{m}^2$
c) $m = 4.753 \text{ kg/s}$ Compressor work: 224 kW
- Q2: a) i) $T_{01} = 614.5 \text{ K}$ ii) $u_1 = 258.5 \text{ m/s}$
c) $Q = 4.32 \text{ MW}$
- Q3: c) $A=0.29\text{m}^2$, (54cm square)
- Q4: b) 8.1% loss
d) 5.5% loss
- Q5: a) 314 m/s
b) 11.94 MW
c) total-to-total: 93.3%, total-to-static: 83%
d) stage loading: 1.78, reaction: 53.3%
e) 0.0638
f) $F_x = -43.03 \text{ kN}$, $F_{\text{theta}} = 28.09 \text{ kN}$