

ENGINEERING TRIPOS PART IIA 2014

MODULE 3A5 – THERMODYNAMICS AND POWER GENERATION

ANSWERS

1. (a) $v = \frac{RT}{p}(1 + Bp)$, $s = -\frac{dF}{dT} - R(\ln p + Bp)$, $h = F - T\frac{dF}{dT}$
- (b) $[\dot{W}_X]_{\min} = 51.47 \text{ kW}$,
 $[\dot{W}_{L,CR}]_{\text{comp}} = 12.69 \text{ kW}$, $[\dot{W}_{L,Q}]_{\text{comp}} = 6.75 \text{ kW}$, $[\dot{W}_{L,CR}]_{\text{pipe}} = 1.14 \text{ kW}$
2. (b) 10.85 bar
3. (c) (i) 0.59 (ii) 0.0415
4. (c) 0.683

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