

THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title : Mechanical Services

Subject Code : CCN3146

Session : Semester Two, 2015/16

Numerical Answers

Question B1

S = 5.6026; H = 7.0884

Question B2

- (a) Option 1: ROR = 41.6667%
- Option 2: ROR = 15.2727%
- Option 3: ROR = 10.625%
- Option 4: ROR = 39.8148%

Question B4

- (a) 0.13
- (b) 2.09

Question C1

- (a) 2.5 m/s
- (b) 174.92 s
- (c) 29.1533s
- (d) 790.3050 persons

Question C2

- (b) 0.8
- (c) $14.6^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 1945.2225 L/s
- (d) $62\% \pm 5\%$
- (e) SA = 630 mm; AB = 500 mm; AC = 500 mm; BD = 500 mm
- (f) S to D: 15.2835 Pa, S to C: 9.9335 Pa

Question C3

- (b) $h_1 = 405 \text{ kJ/kg} \pm 5 \text{ kJ/kg}$, $s_1 = 1.73 \text{ kJ/kg}^\circ\text{C} \pm 0.02 \text{ kJ/kg}^\circ\text{C}$
- (c) $T_3 = 30^\circ\text{C}$, $h_3 = 243 \text{ kJ/kg} \pm 5 \text{ kJ/kg}$, $T_2 = 45^\circ\text{C} \pm 3^\circ\text{C}$, $h_2 = 425 \text{ kJ/kg} \pm 5 \text{ kJ/kg}$
- (d) 7.5963 kg/s
- (e) 5.6700
- (f) 1382.5266 kW

Question C4

- (a) $h = 10.5$, $k = 720000$
- (b) $a = 800000$
- (c) Suction head loss = 3.3287 mH , Discharge head loss = 1.1713 mH
- (d) $\text{NPSH}_{req} = 3.55 \text{ mH}$, available NPSH = 5.2962 mH