

THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title : Electrical Services in Buildings **Subject Code** : CCN2267

Session : Semester One, 2016/17

Numerical Answers

Question B1				
(a) $I_{A/C} = 3.7433 \text{ A}$; $I_{\text{heater}} = 9.0909 \text{ A}$; $I_{\text{lighting}} = 0.4909 \text{ A}$; $I_{S/O} = 20 \text{ A}$ (b) $I_{A/C} = 17.7807 \text{ A}$; $I_{\text{heater}} = 22.7273 \text{ A}$; $I_{\text{lighting}} = 8.8364 \text{ A}$; $I_{S/O} = 70 \text{ A}$ (c) $I_{MD} = 102.6362 \text{ A}$				
Question B2				
\$523590				
Question B3				
(a) $CC = 13$ (b) 28.8889 s				
Question B4				
(a) 62.4 lm/W ; 1241.4086 cd (b) 4.0833 lux				
Question B5				
(a) $RI = 4.2857$ (b) 56 (c) Distance along length = 2.5 m ; Distance along width = 2.1429 m				
Question C1				
(a) $I_b = 59.5821 \text{ A}$; $I_{st} = 357.4924 \text{ A}$ (b) 25 mm^2 cable; tabulated current carrying capacity = 110 A ; Voltage drop in % = 1.881539% ; % of power loss = <u>2.236515%</u> (c) 514.9813A ; $1.9 \pm 0.5 \text{ s}$				
Question C2				
(a)				
Item	Running	Running	Starting kW	Starting kVA

	kW	kVA		
1	30	33.3333	30	33.3333
2	31.25	35.5114	62.1449	124.2898
3	52.5	59.6591	104.4034	208.8068
4	41.8605	49.2476	73.8714	147.7428
5	46.5116	54.7196	82.0793	164.1587
6	30	33.3333	30	33.3333
7	50	52.6316	50	52.6316

(b)

Starting sequence	Stage 1		Stage 2		Steady state	
	kW	kVA	kW	kVA	kW	kVA
Total	298.0956	522.1562	334.0255	467.5836	282.1221	318.4359

(c) 334.0255 kW with 357.2465 kVA.

Question C3

- (a) 320 persons
- (b) CC = 14
- (c) RTT= 128.8826 s; Up peak INT = 32.2206 s; Up peak HC = 417.1239 persons
- (d) For low zone: RTT= 105.9460 s; Up peak INT = 52.9730 s; Up peak HC = 126.8571 persons
For high zone: RTT= 109.7665 s; Up peak INT = 54.8832 s; Up peak HC = 122.4417 persons

Question C4

- (a) Vertical angles: 33.6901°; 19.4400°; horizontal angles: 33.6901°; 21.8014°
- (b) 0.372±0.02
- (c) 4; 175.77 lux
- (d) At C: 510.7509 lux; At D: 20.1704 lux
- (e) 0.3441