

|      |      |       |                                             |  |
|------|------|-------|---------------------------------------------|--|
| 2008 | 2    |       |                                             |  |
| ( )  |      |       | 02-415-2211<br>02-3474-8844<br>031-757-3388 |  |
|      | 2 30 | A - B |                                             |  |

|     |       |     |       |   |
|-----|-------|-----|-------|---|
| 1.  |       |     |       |   |
| 2.  |       |     |       |   |
| 3.  |       | ( ) |       |   |
| 4.  |       | 0   |       |   |
| 5.  |       |     |       |   |
| 6.  |       | ( ) |       | 0 |
| 7.  | 가     |     | 가     |   |
| 8.  | 가     |     |       |   |
| 9.  | 가 ( ) |     | 가 ( ) |   |
| 10. | ( , ) |     |       |   |

. ( 100 )

1. 4[Ω], C[F] 60[Hz] 가 0.8 .  
30[Hz] 220[V] 가 [W] ? 5

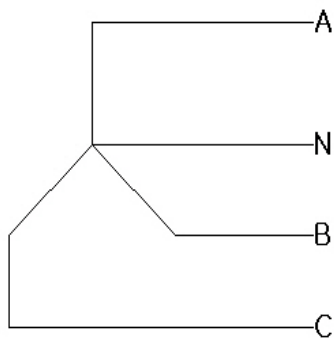
$$\cos \theta = \frac{R}{\sqrt{R^2 + X^2}} = \frac{4}{5} \rightarrow X_C = 3[\Omega]$$

$$X_C = \frac{1}{\omega C} \propto \frac{1}{f} \quad 30[\text{Hz}] \quad X_C = 6[\Omega]$$

$$P = I^2 R = \left( \frac{220}{\sqrt{4^2 + 6^2}} \right)^2 \times 4 = 3723.08[\text{W}]$$

2. 5가 . 5

,  
( ) , ( ) , ,  
.



A : , B : , C : , N :

4.

7가

5

15[A]  
30[A]  
50[A]

20[A]  
40[A]

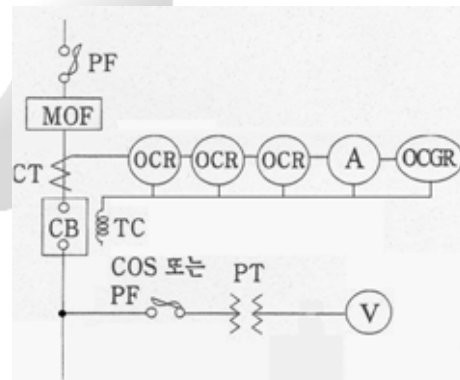
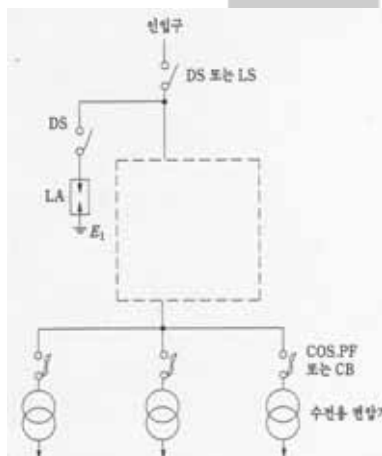
20[A]  
50[A]

5.

( 1 CT , 2 PT )

10

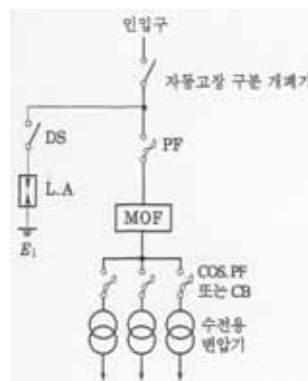
(CB, OCR3, OCGR, MOF, PT, CT, COS, PF, TC, V, A, )



2가

66[kV] DS  
22.9[kV] 1000[kVA]

LS



6. 10[m<sup>3</sup>] 15[m] , V , 1 [kVA]  
 가? ( , : 65%, : 90%, 15% .) 5

$$P_v = \frac{KQH}{6.12\eta} = \frac{1.15 \times 10 \times 15}{6.12 \times 0.65 \times 0.9} = 48.18 [\text{kVA}]$$

$$P_1 = \frac{P_v}{\sqrt{3}} = 27.82 [\text{kVA}]$$

7. 0[ ] 4000[Ω] . 4500[Ω]  
 가? 5

$$R_t = R_{t_0} [1 + \alpha (t - t_0)] [\Omega]$$

$t_0$  : 기준온도 0°C

$R_{t_0}$  : 기준온도시 전선저항 4000[Ω]

$t$  : 상승시온도

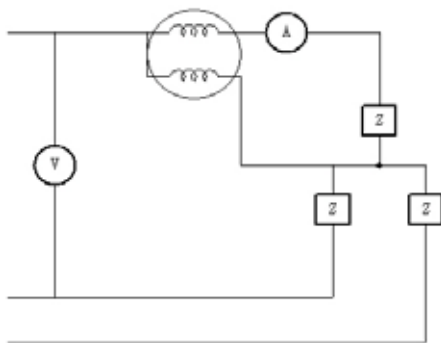
$R_t$  : 온도상승시 전선저항 4500[Ω]

$\alpha$  : 저항의 온도계수  $\frac{1}{234.5 + t}$

$$4500 = 4000 [1 + \alpha t] \text{ 에서 } t = 29.3125 [^\circ\text{C}]$$

$$: 29.31 [^\circ\text{C}]$$

8. V=220[V] , A=20[A], 가 W=2[kW] 5



$$: 1\phi \quad [kW] \quad . \quad 3\phi \quad P_3 = 3P_1 \quad 6[kW] \quad .$$

$$R[\Omega] \quad .$$

$$: P_1 = I^2 R \rightarrow R = \frac{P_1}{I^2} = \frac{2000}{20^2} = 5 [\Omega]$$

$$X[\Omega]$$

$$: P_a = \sqrt{3} \times V \times I = 7621 [\text{VA}] \quad , \quad P = 6000 [\text{W}] \quad ,$$

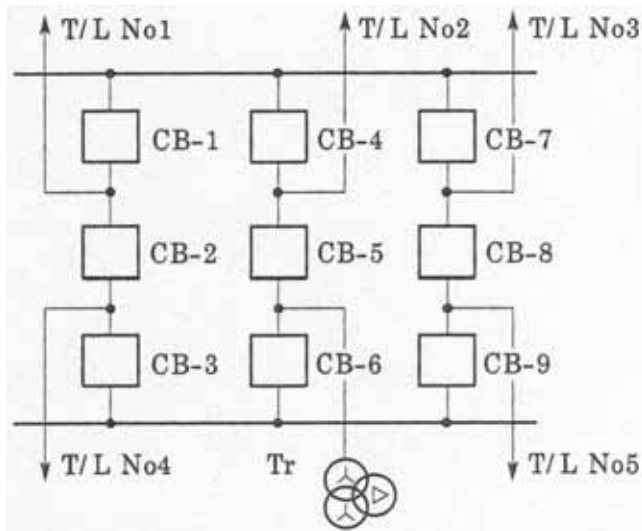
$$P_r = \sqrt{P_a^2 - P^2} = 1566 [\text{Var}] = I^2 X \rightarrow X = \frac{P_r}{I^2} = \frac{1566}{20^2} = 3.92 [\Omega]$$

$$X = 3.92 [\Omega]$$

9. 154[kV] 60[Hz] 200[Km] 3φ  
[kVA] . ( , 1 0.0043[μF/km] .) 5

$$\begin{aligned} Q &= 3 \times 2\pi f C V^2 \times 10^{-9} \\ &= 3 \times 2\pi \times 60 \times 0.0043 \times 200 \times \left( \frac{154,000}{\sqrt{3}} \right)^2 \times 10^{-9} \\ &= 7,689.020374[\text{kVA}] = 7,689[\text{kVA}] \end{aligned}$$

10.



T/L No.4

T/L No.1

Tr

2

1.5

2

CB-2, CB-3

CB-1

가 2

.( S/S, CB )

CB-4, CB-7

가?

3

11. , 4

가? 5

( )

12.

가?

$$\sqrt{\frac{90-\theta}{30}}$$

θ

4

13.

[     ]

: 2 , 300

:

|   | [m <sup>2</sup> ] |    |
|---|-------------------|----|
| 1 | 50                | 50 |
|   | 70                | 40 |
|   | 90                | 30 |
|   | 110               | 30 |
| 2 | 50                | 60 |
|   | 70                | 20 |
|   | 90                | 40 |
|   | 110               | 30 |

가 [VA] : 80[m<sup>2</sup>]

750[VA]

150[m<sup>2</sup>]

1000[VA]

1 : 1700[m<sup>2</sup>], 2 : 1700[m<sup>2</sup>]

[m<sup>2</sup>]

: 30[VA/m<sup>2</sup>],

: 7[VA/m<sup>2</sup>]

70 65[%]

100 60[%]

150 55[%]

200 50[%]

[     ]

100[%]

1

150[m]

110/220[V]

3

3

1.4

100[%]

3[%]

IV

325[m<sup>2</sup>]

13200/22900[v] Y 3 4

1

$$\{[(50 \times 30) + 750] \times 50\} + \{[(70 \times 30) + 750] \times 40\} + \{[(90 \times 30) + 1000] \times 30\} + \{[(110 \times 30) + 1000] \times 30\}$$

$$= 466,500[\text{VA}]$$

$$= 466,500 + 1700 \times 7 = 478,400[\text{VA}]$$

2

$$\{[(50 \times 30) + 750] \times 60\} + \{[(70 \times 30) + 750] \times 20\} + \{[(90 \times 30) + 1000] \times 40\} + \{[(110 \times 30) + 1000] \times 30\}$$

$$= 469,000[\text{VA}]$$

$$= 469,000 \times 0.55 + 1700 \times 7 = 269,850[\text{VA}]$$

[kVA] 3 가? , 10%  
75, 100, 150, 200, 300[kVA] .

$$\text{합성최대전력} = \frac{\text{최대전력}}{\text{부동률}} = \frac{\text{설비용량} \times \text{수용률}}{\text{부동률}}$$

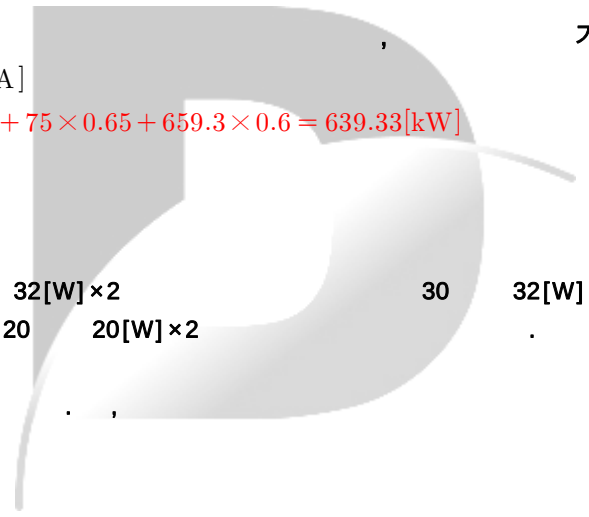
$$= \frac{466500 \times 0.55 + 1700 \times 7 + 469000 \times 0.55 + 1700 \times 7}{1.4} = 384,518[\text{VA}]$$

$$\text{변압기용량} = \frac{384,518}{3} \times 1.1 \times 10^{-3} = 140,99[\text{kVA}]$$

, 150[kVA] .

( ) , 가?  
 $150 \times 3 = 450[\text{kVA}]$

( ) , 가?  
 $478.4 + 480.9 = 959.3[\text{kVA}]$   
 $75 + 75 \times 0.85 + 75 \times 0.75 + 75 \times 0.65 + 659.3 \times 0.6 = 639.33[\text{kW}]$

14. 

20[W] × 2      32[W] × 2      20      20[W] × 2      30      32[W] × 3      20[W] × 2

95,000

5

( : , )

| 10[W] × 1  | 0.123 | 0.150 | 0.182 |
|------------|-------|-------|-------|
| 20[W] × 1  | 0.141 | 0.168 | 0.214 |
| 20[W] × 2  | 0.177 | 0.215 | 0.273 |
| 20[W] × 3  | 0.223 | -     | 0.335 |
| 20[W] × 4  | 0.323 | -     | 0.489 |
| 30[W] × 1  | 0.150 | 0.177 | 0.227 |
| 30[W] × 2  | 0.189 | -     | 0.310 |
| 40[W] × 1  | 0.223 | 0.268 | 0.340 |
| 40[W] × 2  | 0.277 | 0.332 | 0.415 |
| 40[W] × 3  | 0.359 | 0.432 | 0.545 |
| 40[W] × 4  | 0.468 | -     | 0.710 |
| 110[W] × 1 | 0.414 | 0.495 | 0.627 |
| 110[W] × 2 | 0.505 | 0.601 | 0.764 |



16. 0.8 150[kW] 0.6 100[kW] 90% [kVA] ? 5

$$Q = \frac{0.6}{0.8} \times 150 + \frac{0.8}{0.6} \times 100 = 245.83 [\text{kVAR}]$$

$$P = 150 + 100 = 250 [\text{kW}]$$

$$\cos\theta = \frac{P}{\sqrt{P^2 + Q^2}} = \frac{250}{\sqrt{250^2 + 245.83^2}} \times 100 = 71.3028 \therefore 71.3 [\%]$$

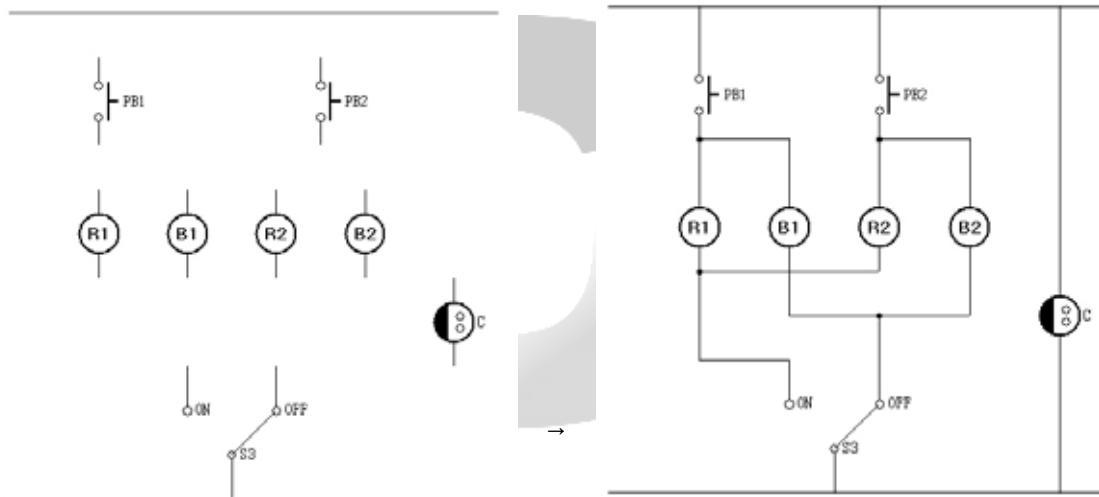
$$Q_1 = P(\tan\theta_1 - \tan\theta_2) = 150(\tan\cos^{-1}0.8 - \tan\cos^{-1}0.9) = 39.85 [kVA]$$

$$Q_2 = P(\tan\theta_1 - \tan\theta_2) = 100(\tan\cos^{-1}0.6 - \tan\cos^{-1}0.9) = 84.9 [kVA]$$

$$\therefore Q = Q_1 + Q_2 = 124.75 [kVA]$$

: 71.3[%], 124.75[kVA]

17. 3 5



3 S<sub>3</sub> OFF PB-1 B1 , PB-2 B2가 .  
3 S<sub>3</sub> ON PB-1 R1 , PB-2 R2가 .