

19/10

EE-101: Basic Electronics, Quiz-2

Set Code: EE-101/2019/Q2-PRS

Max. Time: 45 min

Max. Marks: 10

Tutorial Group: T- 18

Roll no.: 190123046

Name: Pradnesh P. Kalkar

Invigilator's Signature:

[Signature]

Instructions

- Write answers neatly with appropriate SI units in the spaces provided
- All answers should be rounded up to the third decimal point.
- Exchange of Calculators or any other material is not allowed.
- Mobile phones are not allowed inside the examination hall.

1. In the balanced three-phase system of Fig. 1, the load impedance $Z_P = 8 + j5 \Omega$. Assume positive (+) phase sequence and $W_1 > W_2$. If the source is operating with a power factor of 0.98 and $W_1 = 15 \text{ kW}$, find the values of (a) R_w , (b) W_2 , (c) total real power absorbed by the load and (d) the reactive power supplied to the load. [2+1+1+1]

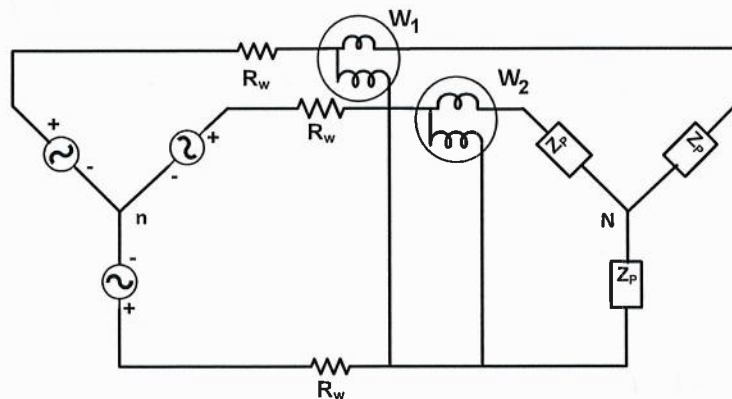


Fig. 1

Solution: (a) $R_w = 16.623 \Omega$ (b) $W_2 = 7.045 \text{ kW}$ (c) Total real power = 22.046 kW

(d) Total reactive power = 13.779 kVAR

2. Let $f_1(A, B, C, D) = \sum m(1, 3, 5, 6, 8, 10, 11, 12, 13)$, $f_2(A, B, C, D) = \sum m(0, 3, 5, 8, 9, 11, 13, 15)$. $f(A, B, C, D)$ is obtained by performing logical AND operation between $f_1(A, B, C, D)$ and $f_2(A, B, C, D)$ as $f(A, B, C, D) = f_1(A, B, C, D) f_2(A, B, C, D)$. (a) Express $f(A, B, C, D)$ as sum of minterms. (b) Given $g(A, B, C, D) = f(A, B, C, D) + \sum d(7, 10, 15)$. Where d represents don't-care conditions. Find a minimal sum-of-products expression. [2+3]

Solution: (a) $f(A, B, C, D) = \sum m(3, 5, 8, 11, 13) = \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD + AB\bar{C}\bar{D}$

(b) $g(A, B, C, D) = A\bar{B}\bar{D} + CD + BD$