# EE-101: Basic Electronics, Quiz-2

Set Code: **EE-101/2019/Q2-PRS** Max. Time: **45 min** Max. Marks: **10**

**Tutorial Group: T-** **Roll no.:** **Name:**

***Invigilator's 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 $W_1 = 15$ **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]**

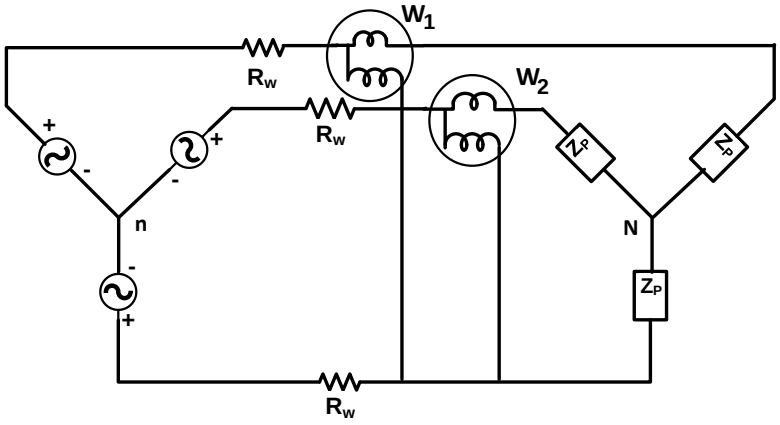


**Fig. 1**

**Solution: (a)** $R_W$ **= 16.631 Ω** **(b)** $W_2$ **= 7.044 kW** **(c) Total real power = 22.044 kW**

**(d) Total reactive power = 13.780 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)** $f(A,B,C,D) = \sum m(3,5,8,11,13)$

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

# EE-101: Basic Electronics, Quiz-2

Set Code: **EE-101/2019/Q2-RIC** Max. Time: **45 min** Max. Marks: **10**

**Tutorial Group: T-** **Roll no.:** **Name:**

***Invigilator's 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 $W_2 > W_1$. If the source is operating with a power factor of **0.95** and $W_1 = 15$ **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]**

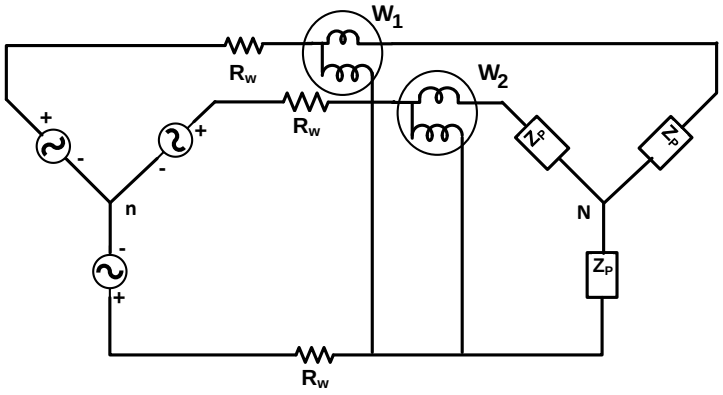


**Fig. 1**

**Solution: (a) $R_W$ = 7.205 Ω (b) $W_2$ = 31.945 kW (c) Total real power = 46.945 kW**

**(d) Total reactive power = 29.350 kVAR**

**2.** Let $f_1(A,B,C,D) = \sum m(1,3,5,7,9,13,14,15)$, $f_2(A,B,C,D) = \sum m(0,3,4,7,8,9,13,15)$. $f(A,B,C,D)$ 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 $g(A,B,C,D) = f(A,B,C,D) + \sum d(0,5,12)$. Where $d$ represents don't-care conditions. Find a minimal sum-of-products expression. **[2+3]**

**Solution: (a)** $f(A,B,C,D) = \sum m(3,7,9,13,15)$

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

# EE-101: Basic Electronics, Quiz-2

Set Code: **EE-101/2019/Q2-KBD** Max. Time: **45 min** Max. Marks: **10**

**Tutorial Group: T-** **Roll no.:** **Name:**

***Invigilator's 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 $Z_P = 10+j8\ \Omega$ . Assume positive (+) phase sequence and $W_1 > W_2$. If the source is operating with a power factor of **0.98** and $W_1 = 15$ *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]**

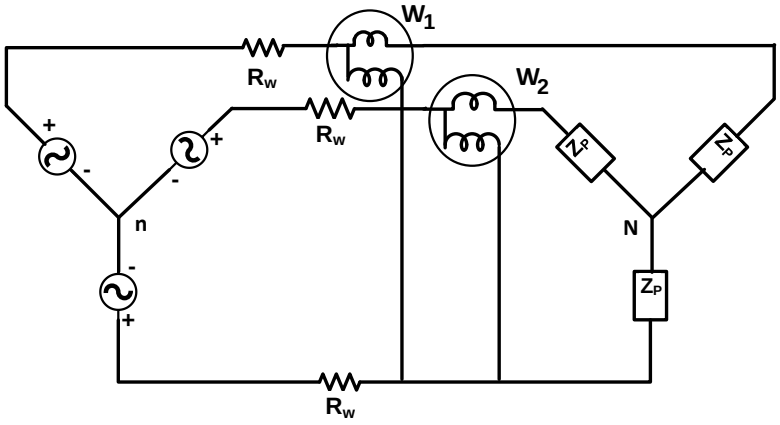


**Fig. 1**

**Solution: (a) $R_W$ = 29.409 Ω (b) $W_2$ = 5.521 kW (c) Total real power = 20.521 kW**

**(d) Total reactive power = 16.418 kVAR**

**2.** Let $f_1(A,B,C,D) = \sum m(0,1,4,8,10,11,12,14)$, $f_2(A,B,C,D) = \sum m(0,1,2,4,10,12,13,14,15)$. $f(A,B,C,D)$ 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 $g(A,B,C,D) = f(A,B,C,D) + \sum d(5,8,11)$. Where $d$ represents don't-care conditions. Find a minimal sum-of-products expression. **[2+3]**

**Solution: (a)** $f(A,B,C,D) = \sum m(0,1,4,10,12,14)$

**(b)** $g(A,B,C,D) = \overline{A}\,\overline{C} + A\overline{D}$

# EE-101: Basic Electronics, Quiz-2

Set Code: **EE-101/2019/Q2-ROH** Max. Time: **45 min** Max. Marks: **10**

**Tutorial Group: T-** **Roll no.:** **Name:**

***Invigilator's Signature:***

## Instructions

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- 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 $Z_P = 10+j8\ \Omega$ . Assume positive (+) phase sequence and $W_2 > W_1$. If the source is operating with a power factor of **0.95** and $W_1 = 15$ **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]**

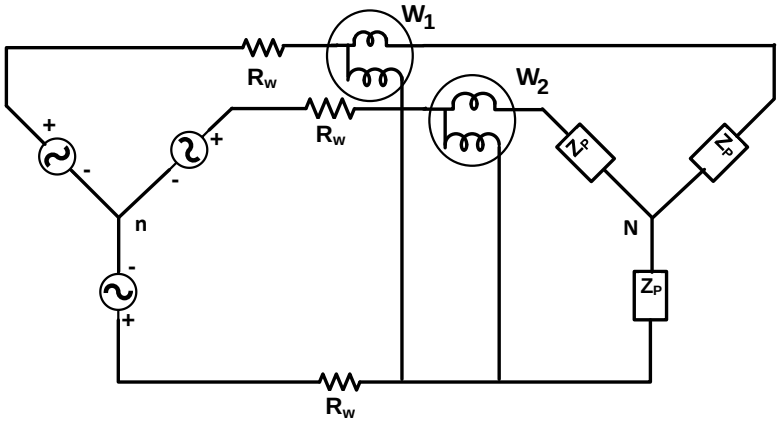


**Fig. 1**

**Solution: (a) $R_W$ = 14.316 Ω (b) $W_2$ = 40.759 kW (c) Total real power = 55.759 kW**

**(d) Total reactive power = 44.616 kVAR**

**2.** Let $f_1(A,B,C,D) = \sum m(0,2,4,5,7,11,12,13)$ , $f_2(A,B,C,D) = \sum m(1,5,6,8,11,12,13,15)$. $f(A,B,C,D)$ 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 $g(A,B,C,D) = f(A,B,C,D) + \sum d(0,10)$. Where $d$ represents don't-care conditions. Find a minimal sum-of-products expression. **[2+3]**

**Solution: (a)** $f(A,B,C,D) = \sum m(5,11,12,13)$

**(b)** $g(A,B,C,D) = AB\overline{C} + A\overline{B}C + B\overline{C}D$