



THE UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
Department of Electrical & Electronic Engineering

EEE 3352: Electromechanics & Electrical Machines

ASSIGNMENT 1: REVIEW OF BASIC ELECTRICAL ENGINEERING PRINCIPLES

(Class Quiz - 15/08/2018)

Time 1 hr 20 minutes (80 minutes)

Name: _____ **A. Zulu** _____ Computer No. _____ **Instructor** _____

For each question choose the letter representing the right answer and enter it in the answer strip below. You score +10 points for a right answer, zero for a blank and -2 points for a wrong answer. Total score will not be less than zero.

Question No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	b	d	a	b	e	d	a	e	b	c	c	b	c	b	a

1. A sinusoidal ac voltage is represented in time domain as $v_1 = 34 \cos(314t - \frac{\pi}{6})$. The rms and peak voltages are (respectively)

(a) 34 V and 24 V (b) 24 V and 34 V (c) 41.6 V and 29.4 V (d) 29.4 V and 41.6 V (e) 24 V and 29.4 V.

2. The instantaneous value of v_1 in Q1, 10 ms from $t=0$, is

(a) 0 V (b) 29.4 V (c) -34 V (d) -29.4 V (e) 34 V.

3. Another sinusoidal ac voltage source is described by $v_2 = 17 \sin(314t - 0.78)$. If v_1 in Q1 and v_2 are connected in series, the resultant rms voltage is

(a) 36 V (b) 51 V (c) 34 V (d) 17 V (e) 8 V.

4. The phase difference between v_1 (of Q1) and v_2 (of Q3) is

(a) 30° (b) 104.7° (c) 14.7° (d) 44.7° (e) 17° .

5. The source v_1 of Q1 is connected directly to a coil of resistance 5Ω and inductance 20 mH. The rms value of the current in the coil is

(a) 4.8 A (b) 11.6 A (c) .96 A (d) 2.1 A (e) 3 A.

6. The power and power factor of the coil in Q5 with source v_1 connected are

(a) 120 W, 0.63 (b) 120 W, 1.0 (c) 22.6 W, 0.8 (d) 45 W, 0.63 (e) 72 W, 1.0.

7. If a 12-V dc source is instead connected to the coil in Q5, the current in the coil 1ms after making the connection is

(a) 0.53 A (b) 2.40 A (c) 1.87 A (d) 0 A (e) 1.06 A.

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8. While connected to v_l the coil has a capacitance C inserted in series with the coil to change the power factor to unity. The value of C is
 (a) 3.2 mF (b) 20 mF (c) 5 F (d) 11.3 F (e) 500 μ F .
9. If the coil in Q5 is connected to a 12-V dc source for a long time, the energy stored and the power dissipated in the coil are
 (a) 58 mJ, 12.7 W (b) 58 mJ, 29 W (c) 29 J, 29 W (d) 0 W, 29 W (e) 29 J, 0 W .
10. If a capacitor of 1 mF is connected to a 12-V dc battery, the energy stored and the power dissipated in the capacitor are (a) 0 J, 0 W (b) 45.2 J, 0 W (c) 72 mJ, 0 W (d) 45.2 J, 45.2 W (e) 0 J, 72 mW .

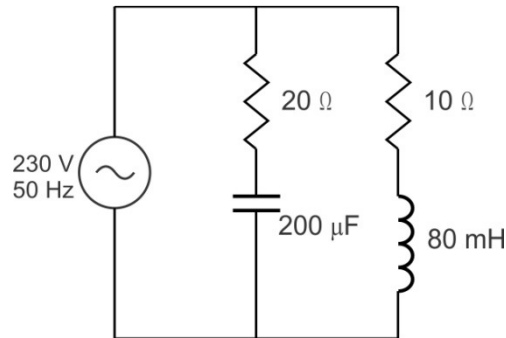


Figure 1: For Q11-15

11. In figure 1, taking supply voltage as the reference, the current in the branch with capacitance is
 (a) $18.47\angle 51.5^\circ$ A (b) $18.47\angle -51.5^\circ$ A (c) $9.0\angle 38.5^\circ$ A (d) $9.0\angle -38.5^\circ$ A (e) $6.4\angle 38.5^\circ$ A
12. The current in the branch with inductance is
 (a) $24.75\angle -21.7^\circ$ A (b) $8.5\angle -68.3^\circ$ A (c) $24.75\angle 21.7^\circ$ A (d) $8.5\angle 68.3^\circ$ A (e) $6.5\angle 68.3^\circ$ A.
13. The total impedance of the circuit is
 (a) $35.5\angle -38.51^\circ$ Ω (b) $30\angle 0^\circ$ Ω (c) $22.03\angle 12.7^\circ$ Ω (d) $22.03\angle -12.7^\circ$ Ω (e) $35.5\angle 38.5^\circ$ Ω .
14. The total current as seen by the source is
 (a) $17.5\angle -28.8^\circ$ A (b) $10.44\angle -12.7^\circ$ A (c) $7.9\angle 90^\circ$ A (d) $34.5\angle 0^\circ$ A (e) $15.3-j8.4$ A .
15. The total power and overall power factor as seen by the source are
 (a) 2342 W, 0.975 (b) 3270 W, 1.0 (c) 727 W, 1.0 (d) 727 W, 0.975 (e) 727 W, 0.87 .