



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

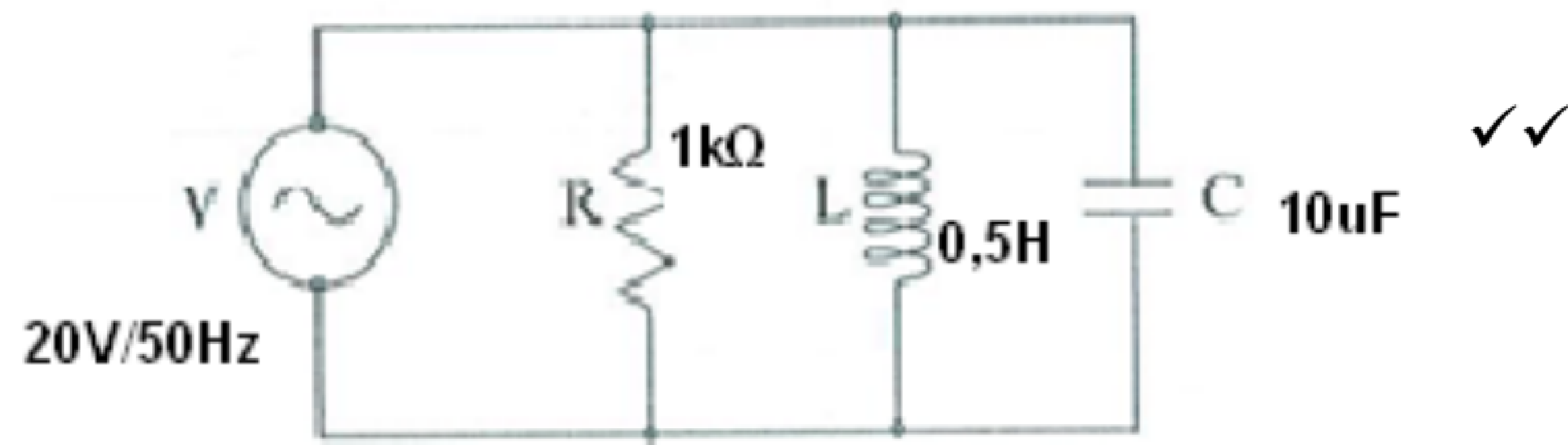
NATIONAL CERTIFICATE COMMUNICATION-ELECTRONICS N5

18 August 2021

This marking guideline consists of 7 pages.

QUESTION 1

1.1 1.1.1



(2)

1.1.2

(a)
$$I_R = \frac{20}{1\,000}$$

$$= 0,1\text{ A} \checkmark$$

(1)

$$I_L = \frac{V}{X_L}$$

$$= \frac{100}{2\pi \times 50 \times 0,5} \checkmark$$

$$= 0,673\text{ A} \checkmark$$

(2)

$$I_C = \frac{V}{X_C}$$

$$= \frac{100 \times 2\pi \times 50 \times 10}{10^6} \checkmark$$

$$= 0,314\text{ A} \checkmark$$

(2)

$$I_x = I_L - I_C$$

$$= 0,673 - 0,314 \checkmark$$

$$= 0,323\text{ A} \checkmark$$

(2)

$$I_T = \sqrt{I_R^2 + I_x^2}$$

$$= \sqrt{0,1^2 + 0,323^2}$$

$$= 0,338\text{ A} \checkmark$$

(1)

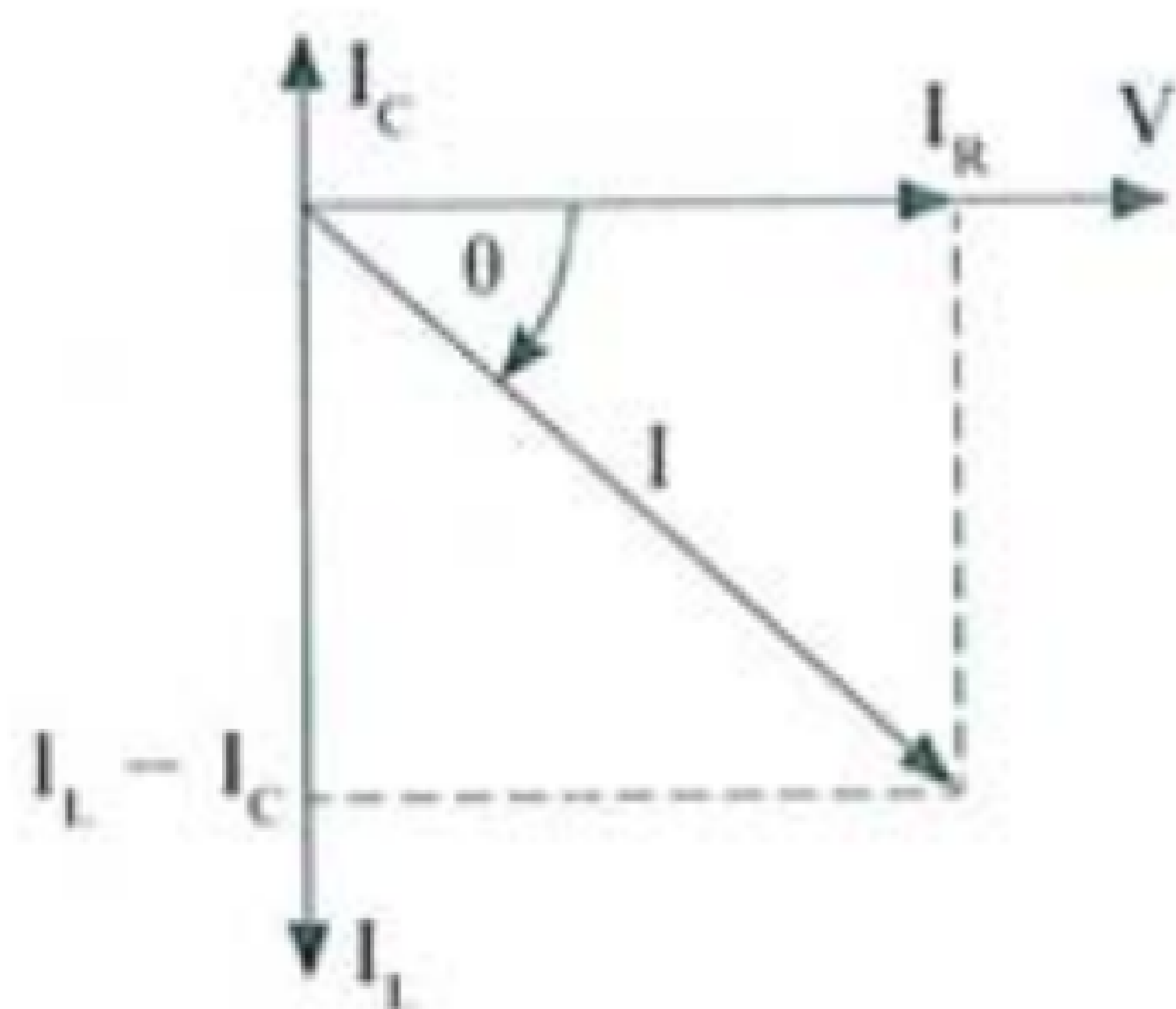
(b)
$$\theta = \tan^{-1} \frac{I_x}{I_R}$$

$$= \tan^{-1} \frac{0,323}{0,1} \checkmark$$

$$= 72^\circ 46' \checkmark$$

(2)

1.2



(4)

1.3 1.3.1 $Z_{RL} = R + jX_L$
 $Z_{RL} = 3 + j4$
 $Z_{RL} = 5\Omega \angle 25.32^\circ$

$Z_C = 0 - jX_C$
 $Z_C = 0 - j3$
 $Z_C = 3\Omega \angle -90^\circ \checkmark\checkmark$

$$I_{LR} = \left(\frac{Z_C}{Z_{LR} + Z_C} \right) I_S$$

$$I_{LR} = \left(\frac{3\Omega \angle -90^\circ}{3 + j4 - j3} \right) 50A \angle 30^\circ$$

$$I_{LR} = 75A \angle -41,565^\circ \quad \checkmark\checkmark\checkmark \quad (5)$$

1.3.2

$$I_C = \left(\frac{Z_{LR}}{Z_{LR} + Z_C} \right) I_S$$

$$I_C = \left(\frac{5\Omega \angle 25.32^\circ}{3 + j4 - j3} \right) 50A \angle 30^\circ$$

$$I_C = \left(\frac{100V \angle 55,32^\circ}{2\Omega \angle 18,433^\circ} \right)$$

$$I_C = 50A \angle 36,89^\circ \quad (4)$$

[25]

QUESTION 2

Looking in from R1

$$R1 = RA + \frac{RB \times R2}{RB + R2} \quad (1)$$

Multiply by the common denominator RB + R2

$$R1 (RB + R2) = RA (RB + R2) + RB \cdot R2$$

$$R1RB + R1R2 = RARB + RAR2 + RB \cdot R2 \dots\dots\dots \text{Eq. 1} \quad (2)$$

Looking in from R2

$$R2 = \frac{RB(R1 + RA)}{RB + (R1 + RA)}$$

$$R2 = \frac{RBR1 + RARB}{RB + R1 + RA} \quad (2)$$