



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE COMMUNICATION-ELECTRONICS N5

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This marking guideline consists of 8 pages.

QUESTION 1

$$1.1 \quad I_C = I_L \sin \Theta$$

$$I_C = \frac{V}{X_C} = \frac{E}{\frac{1}{WC}} = EWC$$

$$I_C = \frac{E}{\sqrt{R^2 + (X^2)}} \quad (2)$$

$$\sin \Theta = \frac{W_L}{\sqrt{R^2 + W^2 + L^2}}$$

$$EWC = \frac{E}{\sqrt{R^2 + W^2 + L^2}} \times \frac{W_L}{\sqrt{R^2 + W^2 + L^2}}$$

$$EWC = \frac{EWC}{R^2 + W^2 + L^2} \quad (2)$$

$$C = \frac{L}{R^2 + W^2 + L^2}$$

$$R^2 + W^2 + L^2 = \frac{L}{C}$$

$$W^2 L^2 = \frac{L}{C} R^2 \quad (2)$$

$$\frac{W^2 L^2}{L^2} = \frac{L}{C} - \frac{R^2}{L^2}$$

$$W^2 = \frac{1}{LC} - \frac{R^2}{L^2}$$

$$W = \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}} \quad (2)$$

$$2\pi = \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}} \times \frac{1}{2\pi}$$

$$F_r = \frac{1}{2\pi} \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

$$= \frac{1}{2\pi} \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}} \quad (2)$$

1.2 1.2.1 $F_r = \frac{1}{2\pi\sqrt{LC}}$

$$= \frac{1}{2 \times 3,14 \sqrt{(50 \times 10^{-6}) \times (22 \times 10^{-12})}}$$

$$= 4,8 \text{ mHz}$$

1.2.2 $X_L = 2\pi fL$

$$= 2 \times \pi \times 4,8 \times 10^6 \times 30 \times 10^{-6}$$

$$= 1\,508 \, \Omega$$

1.2.3 $X_C = \frac{1}{2\pi fC}$

$$= \frac{1}{2 \times \pi \times 4,8 \times 10^6 \times 22 \times 10^{-6}}$$

$$= 1\,508 \, \Omega$$

1.2.4 $Q = \frac{WL}{R}$

$$= \frac{2 \times \pi FL}{R}$$

$$= \frac{2 \times \pi \times 4,8 \times 10^6 \times 30 \times 10^{-6}}{20}$$

$$= 75$$

(4 × 2) (8)

1.3 The ability of a tuned circuit to discriminate against frequencies other than its resonance frequency

(3)
[21]