



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N2

6 August 2021

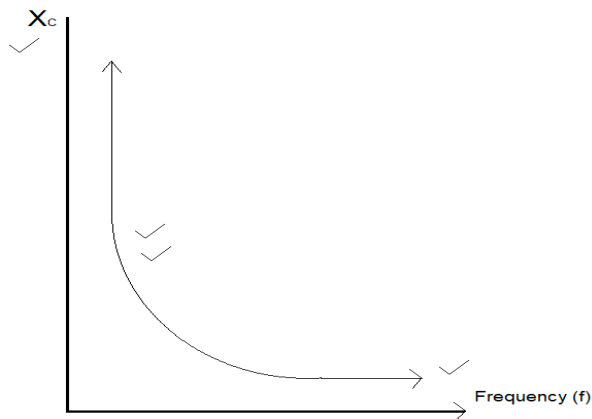
This marking guideline consists of 5 pages.

QUESTION 1

1.1	F
1.2	H
1.3	A
1.4	I
1.5	B
1.6	J
1.7	C
1.8	D
1.9	E
1.10	G

(10 × 1) **[10]****QUESTION 2**

2.1



(4)

2.2

2.2.1

$$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$C_T = \frac{1}{\frac{1}{100 \times 10^{-9}} + \frac{1}{25 \times 10^{-6}}} \checkmark$$

$$C_T = 99,6 \text{ nF} \checkmark$$

$$Q = C_T V_T$$

$$= 99,6 \times 10^{-9} \times 100 \checkmark$$

$$= 9,96 \mu\text{F} \checkmark$$

(4)

2.2.2

$$V_{C1} = \frac{Q}{C_1} = \frac{9,96 \times 10^{-6}}{100 \times 10^{-9}} = 99,6 \text{ V} \checkmark$$

$$V_{C2} = \frac{Q}{C_2} = \frac{9,96 \times 10^{-6}}{25 \times 10^{-6}} = 0,3984 \text{ V} \checkmark$$

(2)

- 2.3 2.3.1 $\tau = RC = 200 \times 10^3 \times 100 \times 10^{-6} \checkmark$
 $= 20 \text{ seconds} \checkmark$ (2)
- 2.3.2 $\tau = 5\tau = 5 \times 20 \checkmark$
 $= 100 \text{ seconds} \checkmark$ (2)
- 2.3.3 $V_C = \frac{63,2}{100} \times 100 \checkmark$
 $= 63,2V \checkmark$ (2)
- 2.3.4 $V_R = V_{DC} - V_C = 100 - 63,2 \checkmark$
 $= 36,8 V \checkmark$ (2)
- 2.4 Impedance is the combined opposition to the flow of current in a circuit containing both resistance and reactance. (2)
[20]

QUESTION 3

- 3.1 A rejector circuit is a parallel resonant circuit where the current flow is at minimum and the impedance is at maximum. (2)
- 3.2
 - $X_L = X_C$
 - $Z = \text{Minimum}$
 - $\theta = 0^\circ$
 - $Z = R$
 - $I_T = \text{Maximum}$
 - $V_L = V_C$
 - $f_r = \frac{1}{2\pi\sqrt{LC}}$ (Any 6 × 1) (6)
- 3.3 3.3.1 $X_L = 2\pi fL = 2\pi \times 100 \times 0,01$
 $= 6,283\Omega \checkmark$
 $X_C = \frac{1}{2\pi fC} = \frac{1}{2\pi \times 100 \times 75 \times 10^{-6}}$
 $= 21,22\Omega \checkmark$
 $Z_T = \sqrt{(5)^2 + (21,22 - 6,283)^2} \checkmark$
 $= 15,75\Omega \checkmark$ (4)
- 3.3.3 $\theta = \cos^{-1} \frac{R}{Z}$
 $= \cos^{-1} \frac{5}{15,75} \checkmark$ (2)

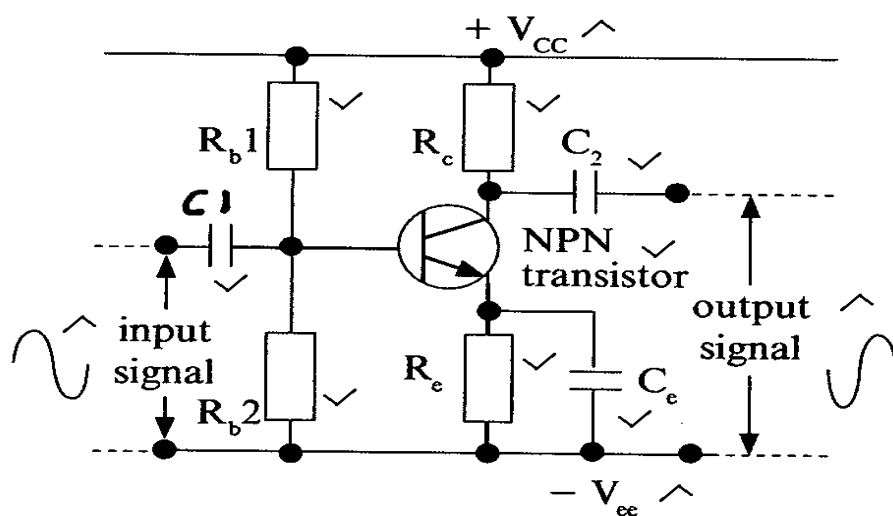
$$= 71,5^0 \checkmark$$

3.3.4

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$= \frac{1}{2\pi\sqrt{0,01 \times 75 \times 10^{-6}}} \checkmark \checkmark$$

$$= 183,78 \text{ Hz} \checkmark$$

(3)
[17]**QUESTION 4**

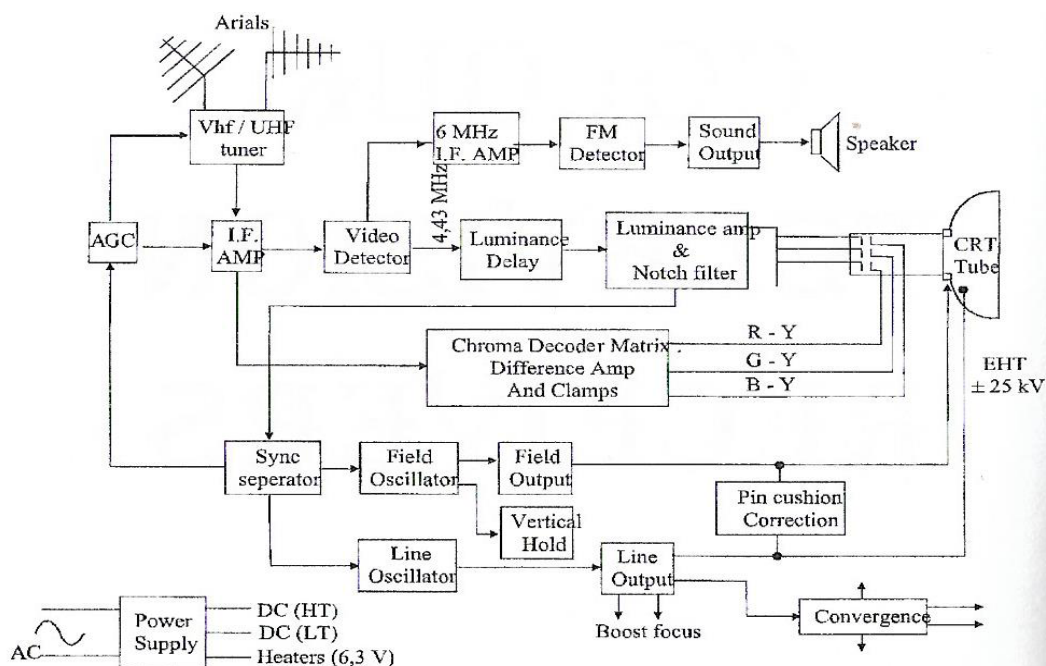
[10]

QUESTION 5

- 5.1 When two or more circuits with variable elements are connected mechanically, it is known as gang tuning.
- 5.2 The ability of an RF stage to select a particular frequency from a range of frequencies and to reject unwanted frequencies.
- 5.3 The ability of a receiver (amplifier) to amplify a very weak signal to a usable level.
- 5.4 It is used to extract the original information from the carrier wave at the receiver OR It is at this stage that the IF signal needs to be removed from the AF.
- 5.5 It is used to remove noise spikes and amplitude variations.

(5 × 2) [10]

QUESTION 6



(Any 18 correct labeled blocks)

[18]

QUESTION 7

- 7.1
- High sensitivity over the full range.
 - Auto-ranging facility provided.
 - More robust against mechanical shock.
 - Immediate reading – no interpretation of scale needed.
 - Overload indication.
 - No parallax errors.
 - Reversal of leads compensated for.

(7)

- 7.2
- Sawtooth
 - Square
 - Sine
 - Triangular

(Any 3 × 1)

(3)

[10]

QUESTION 8

- 8.1 It is used to measure frequency, DC voltages, AC voltages, time period of waves and phase difference.

(Any 3 × 1)

(3)

- 8.2
- No picture
 - No sound

(2)

[5]

TOTAL: 100

