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.**

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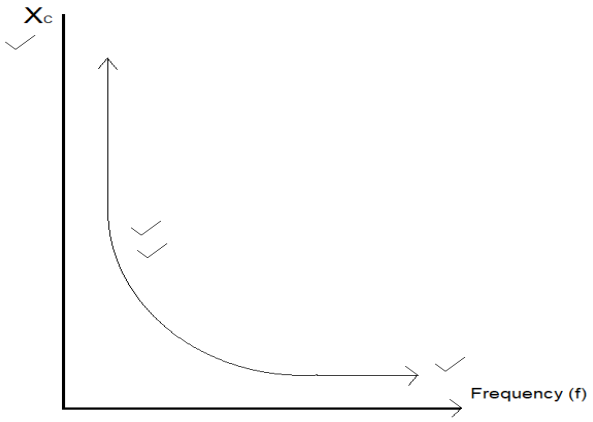
## QUESTION 1

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

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

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

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

$$Q = C_T V_T$$

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

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

(4)

2.2.2

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

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

(2)

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2.3 2.3.1 $\tau = RC = 200 \times 10^3 \times 100 \times 10^{-6}$✓

$= 20\ sec\ o\ nds$✓ (2)

2.3.2 $\tau = 5\tau = 5 \times 20$✓

$= 100$ *seconds*✓ (2)

2.3.3 $V_C = \frac{63,2}{100} \times 100$✓

$= 63,2V$✓ (2)

2.3.4 $V_R = V_{DC} - V_C = 100 - 63,2$✓

$= 36,8$ V ✓ (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 = Minimum
- Θ = 0°
- Z = R
- $I_T$ = Maximum
- $V_L = V_C$
- $f_r = \frac{1}{2\pi\sqrt{LC}}$

*(Any 6 × 1)* (6)

3.3 3.3.1 $X_L = 2\pi fL = 2\pi \times 100 \times 0,01$

$= 6,283\Omega$ ✓

$X_C = \frac{1}{2\pi fC} = \frac{1}{2\pi \times 100 \times 75 \times 10^{-6}}$

$= 21,22\Omega$ ✓

$Z_T = \sqrt{(5)^2 + (21,22 - 6,283)^2}$ ✓

$= 15,75\Omega$ ✓ (4)

3.3.3 $\theta = cos^{-1}\frac{R}{Z}$

$= cos^{-1}\frac{5}{15,75}$ ✓ (2)

$= 71,5^0$ ✓

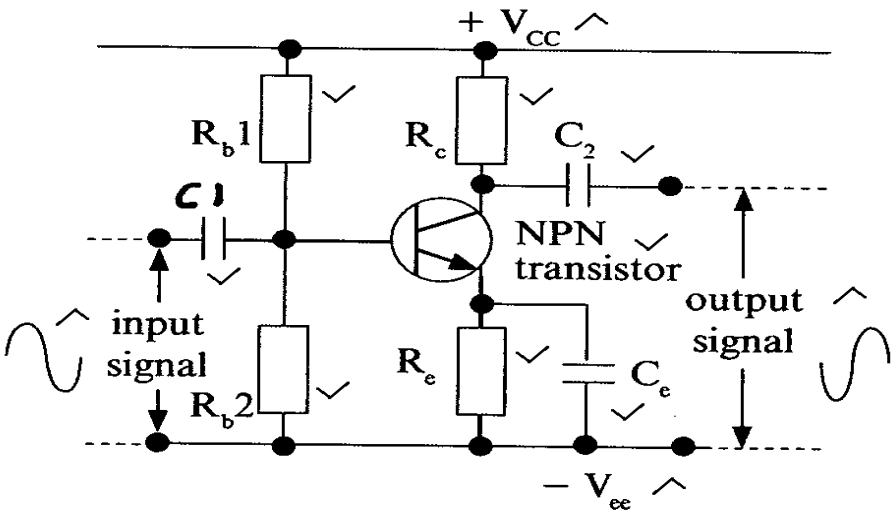
3.3.4 $f_r = \frac{1}{2\pi\sqrt{LC}}$

$= \frac{1}{2\pi\sqrt{0,01\times75\times10^{-6}}}$ ✓✓

$= 183,78Hz$ ✓ (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.

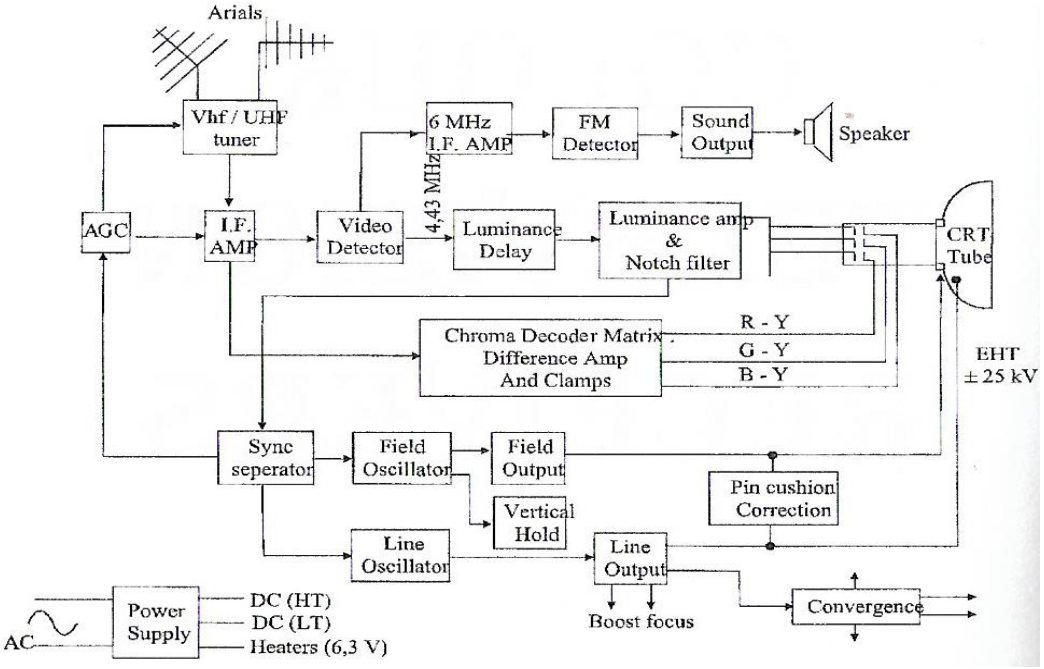
5.3 The ability of a receiver (amplifier) to amplify a very weak signal to a usable level.

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**