



**higher education  
& training**

---

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE**

**RADIO THEORY N2**

**30 November 2023**

**This marking guideline consists of 6 pages.**

**QUESTION 1**

- 1.1 Positive
- 1.2 Parallel
- 1.3 Remove
- 1.4 Sound
- 1.5 Electrical
- 1.6 Reverse and forward
- 1.7 Current
- 1.8 Direct
- 1.9 Reverse
- 1.10 Amplitude

(10 × 1) **[10]****QUESTION 2**

$$\begin{aligned}
 2.1 \quad 2.1.1 \quad V_{p-p} &= 2V_{max} \\
 &= 2 \times 150 \checkmark \\
 &= 300 \text{ volts } \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 2.1.2 \quad 2\pi f &= 314,159 \\
 \therefore f &= \frac{314,159}{2 \times \pi} \checkmark \\
 &= 50 \text{ Hz } \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 2.1.3 \quad 2\Theta &= 2\pi ft \\
 &= (314,159 \times 0,015) \times (180/\pi) \checkmark \\
 &= 270^\circ \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 2.1.4 \quad e &= E_m \sin \Theta \\
 &= 150 \sin 90^\circ \checkmark \\
 &= 150 \text{ volts } \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 2.1.5 \quad e &= E_{max} \sin\{(2\pi ft)(180/\pi)\} \checkmark \\
 &= 150 \times \sin\{(2 \times \pi \times 50 \times 16,5 \times 10^{-3}) \times (180/\pi)\} \checkmark \\
 &= 150 \times \sin 270^\circ \checkmark \\
 &= -133,651 \text{ volts } \checkmark
 \end{aligned}
 \tag{4}$$

$$\begin{aligned}
 2.2 \quad X_L &= X_L \\
 Z &= \text{and maximum} \\
 \Theta &= 0^\circ \\
 Q &= 1 \\
 I_T &= \text{minimum} \\
 V_L &= V_L
 \end{aligned}$$

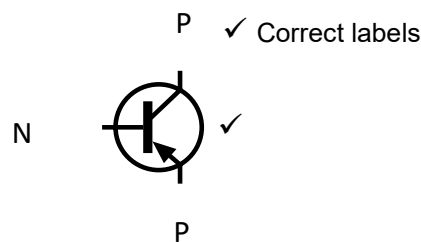
(Any 4 × 1) (4)  
**[16]**

**QUESTION 3**

- 3.1
- Parallax error
  - Width of the scale pointer
  - Vibration of the pointer
  - Accuracy of the scales
  - Zero calibration
  - Number of ranges
  - Errors due to non-horizontal use of the mechanical display (Any 5 × 1) (5)
- 3.2
- An electron gun
  - A focusing and accelerating unit
  - A scan or deflection system
  - A phosphor screen
  - An evacuated glass envelope (Any 3 × 1) (3)
- 3.3
- Multimeter
  - AF Signal generator
  - RF Signal generator
  - Function signal generator
  - Spectrum analyser
  - Sweep generator
  - Signal injector
  - Signal tracer (Any 5 × 1) (5)
- [13]**

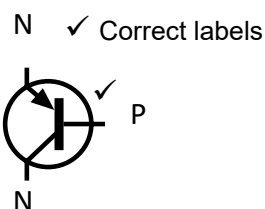
**QUESTION 4**

4.1 4.1.1



PNP TRANSISTOR

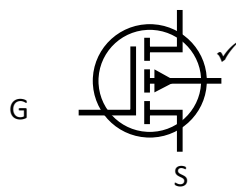
4.1.2



NPN TRANSISTOR

4.1.3

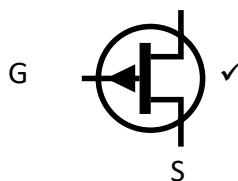
D ✓ Correct labels



MOSFET P- CHANNEL

4.1.4

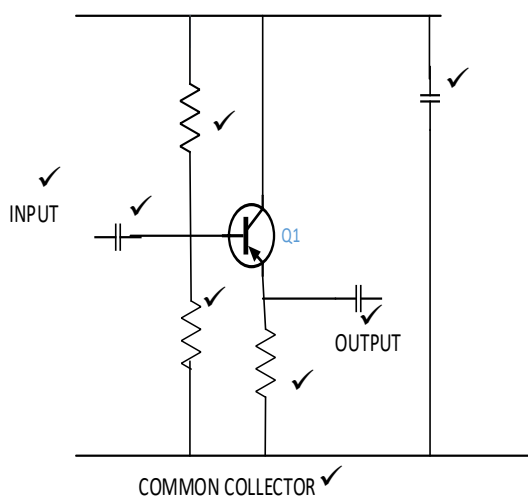
D ✓ Correct labels



JFET N-CHANNEL

(4 × 2) (8)

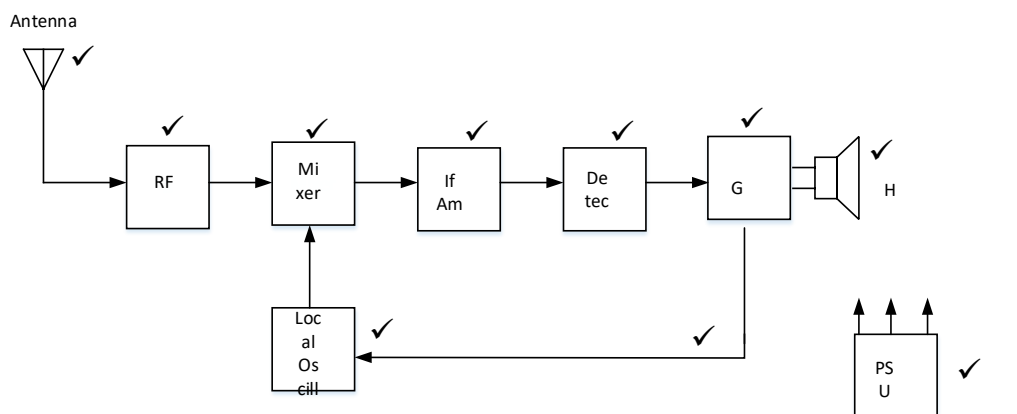
4.2

(8)  
[16]**QUESTION 5**

- 5.1 If any undesired signal is present, the limiter removes the amplitude variation by 'clipping' the top and bottom interference ✓ and will not lose the original intelligence. ✓

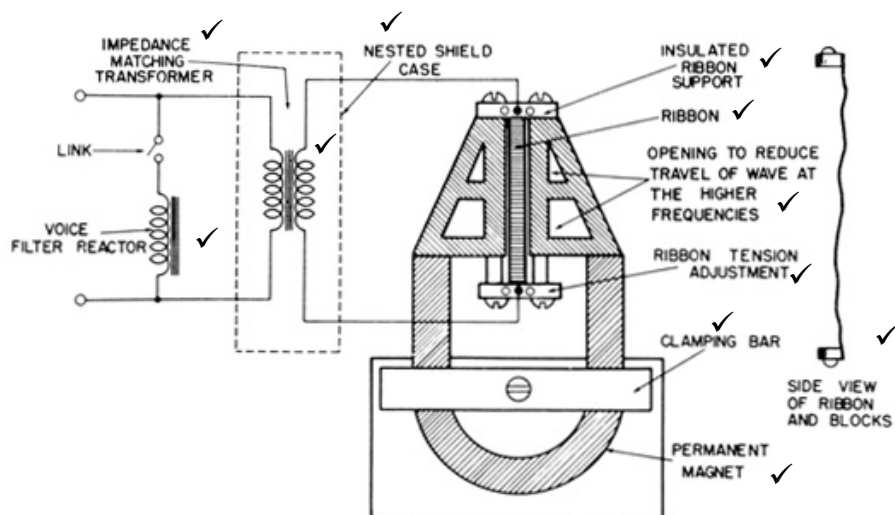
(2)

5.2

**SUPERHETERODYNE RECEIVER**

(10)

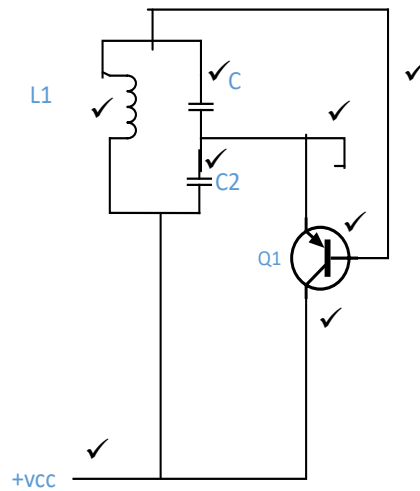
5.3 Modulation is the process of combining audio frequencies✓ onto a carrier frequency.✓

(2)  
[14]**QUESTION 6**

[11]

**QUESTION 7**

7.1



COLPITT'S OSCILLAT

(8)

7.2 Germanium diode = 0,3 V  
Silicon diode = 0,6 V

(2)  
[10]**QUESTION 8**

8.1 Class – A amplification  
Class – B amplification  
Class – C amplification  
Class – AB amplification

(4)

8.2 The signal from the detector is blocked, ✓ therefore, there will be no sound at the output of the audio amplifier (dead). ✓ The audio amp will not be able to drive the speaker. ✓

(3)

8.3

- Mains transformer
- Auto transformer
- Radio frequency transformer

(3)  
[10]**TOTAL: 100**