higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N2

9 April 2020

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 False
1.2 False
1.3 True
1.4 False
1.5 True
1.6 True
1.7 True
1.8 False
1.9 False
1.10 False
1.11 True
1.12 False
1.13 False
1.14 False
1.15 True

(15 × 1) **[15]**

QUESTION 2

2.1
- Size/area of the plates
- Distance between the plates
- Dielectric constant between the plates (3)

2.2 5 time constants (1)

2.3 2.3.1
$$\begin{aligned} T &= RC \\ &= 100 \times 10^3 \times 100 \times 10^{-6} \checkmark \\ &= 10 \text{ seconds} \checkmark \end{aligned}$$ (2)

2.3.2 10×5 (time constant) $= 50 \text{ seconds}$ (3)

2.3.3
$$\frac{63,2}{100} \times 50 = 31,6\ V$$ (2)

2.3.4
$$\begin{aligned} V_R &= V_{DC} - V_C \\ &= 50 - 31,6 \\ &= 18,4\ V \end{aligned}$$ (2)

[13]

QUESTION 3

3.1 3.1.1 Instantaneous voltage; volts

3.1.2 Maximum voltage; volts

3.1.3 Frequency; Hertz

3.1.4 Time; seconds

(4 × 2) (8)

3.2 3.2.1 V peak-to-peak $= 100 \times 2 = 200 \quad V$ (2)

3.2.2 $\sin\theta = \sin 2\pi ft$

$\therefore \theta = 2\pi ft \quad \surd$

$= 2 \times 3{,}142 \times 50 \times 0{,}015 \times \frac{180}{\pi} \quad \surd$

= 270°√ OR 270,053° (3)

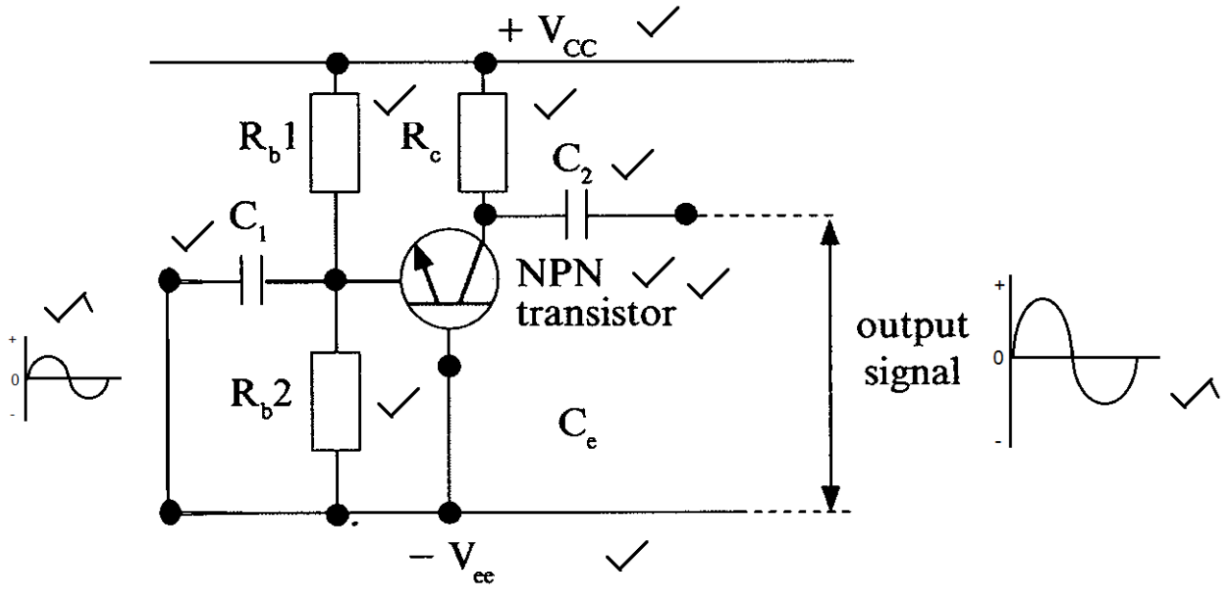
3.2.3 $e = E\sin\theta$

$= 100\sin 270^0 \quad \surd$ OR 100sin 270,053^0

$= -100\,V \quad \surd$ OR = -99,999 V (2)

[15]

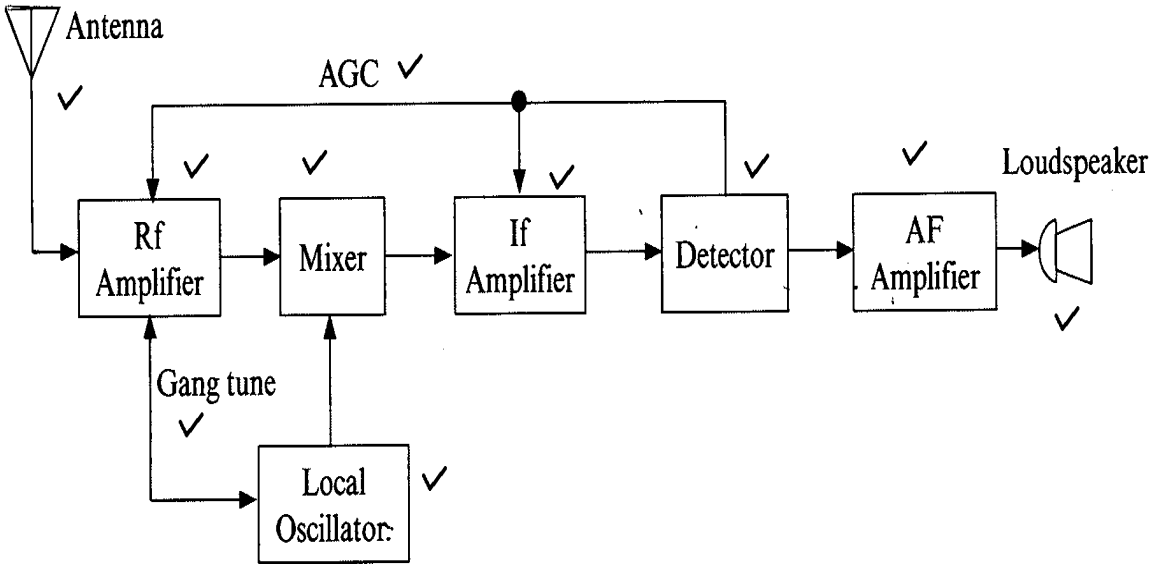
QUESTION 4



[10]

QUESTION 5

5.1



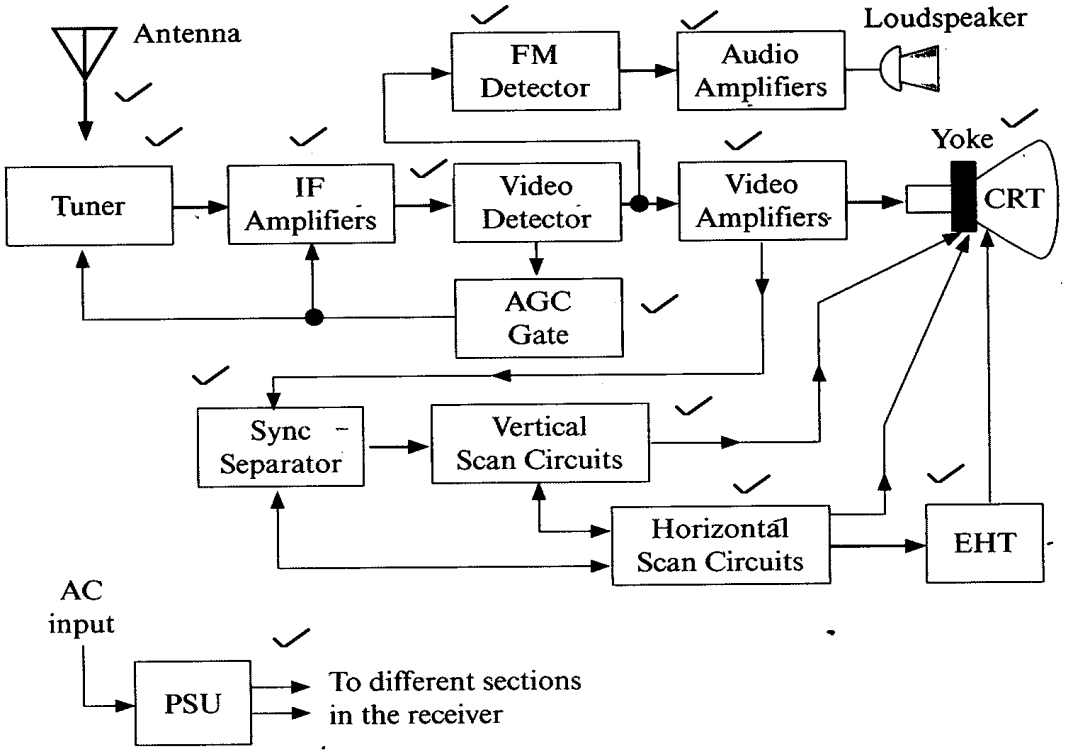
(10)

5.2
- Selectivity is the ability of an RF stage to select a particular frequency from a range of frequencies and to reject all other unwanted frequencies.
- Sensitivity is the ability of a receiver to use/detect weak signals.

(3)
[13]

QUESTION 6

6.1



(14)

6.2 6.2.1 It consists of inner and outer conductors that have an impedance of 75 W. It serves two purposes, i.e. it connects the antenna and conducts the composite signal to the RF stage of the receiver.

6.2.2 The sound and the video signals are separated with the sound carrier being sent to the FM detector and the luminance subcarrier signal to the video amplifier.

6.2.3 The composite video signal is amplified to a level of 100 V to 150 V peak-to-peak to drive the CRT.

(3 × 2) (6)
[20]

QUESTION 7

- The electron gun assembly – to produce an electron beam
- Focusing and accelerating elements – to produce a well-defined beam of electrons
- Horizontal and vertical deflecting plates – to control the vertical and horizontal movements of the beam
- An evacuated glass envelope with a phosphorescent screen – displays a waveform when the electron beam strikes the screen. **[8]**

QUESTION 8

- Dry joints – this can cause the equipment to malfunction periodically
- Discoloured components – this condition will cause the component to lose its function capabilities. Two causes of discolouration are aging and heat.
- Sparks – caused by a lack of insulation
- Damaged components – easy to spot and repair or replace

(Discolouration must be mentioned and any 2 other conditions given above) (3 × 2) **[6]**

TOTAL: 100

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