higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

RADIO AND TELEVISION THEORY N2

17 APRIL 2015

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 1.1.1 (a) polarised (b) non-polarised (2)

1.1.2 (a) DC (b) AC (2)

1.2.3 (a) electrolytic and (b) tantalum (2)

1.2.4 (a) the dielectric material, (b) the distance between the plates and (c) the area of the plates (3)

1.2 1.2.1 $Z = \sqrt{R^2 + (X_C - X_L)^2}$

$= \sqrt{180^2 + (144.686 - 78.539)^2}$

$= 191.769\ \Omega$ (2)

1.2.2 $I = \frac{V}{Z}$

$= \frac{115}{191,769}$

$= 0.599$ A (2)

1.2.3 $\Theta = Cos^{-1}\ \frac{R}{Z}$

$= \frac{180}{191,769}$

$= 0.938$

$= 20.177°$ (2)

1.2.4 $1 = \frac{v}{z}$

$= \frac{100}{123.077}$

$= 0.812$A (2)

1.2.5 $\Theta\ Cos^{-1}\ \frac{R}{Z}$

$= \frac{120}{123.077}$

$= 0.974$

$= 12.838°$

(2)
[19]

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QUESTION 2

2.1 The time required to charge the capacitor to 63.2% of the maximum applied voltage or the time it takes to discharge the capacitor to 36.8% of the maximum applied voltage. (3)

2.2.1 $\tau = R \times C$

$= 100 \times 10^3 \times 0.01 \times 10^{-6}$

$= 0.001\,S$ (2)

2.2.2 $V_C = V\left(1 - e^{\frac{-t}{RC}}\right)$

$= 9\,(1 - e^{\frac{-0.002}{0.001}})$

$= 9\,(1 - e^{-2})$

$= 9\,(1 - 0.1353)$

$= 9\,(0.8647)$

$= 7.7823\,V$ (3)

2.2.3 $V_R = V - V_C$

$= 9 - 7.7823$

$= 1.2177\,V$ (2)

2.2.4 $i = \frac{V}{R}\,e^{\frac{-t}{RC}}$

$= \frac{9}{100 \times 10^3} \times e^{\frac{-0.001}{0.001}}$

$= 0.00009 \times e^{-1}$

$= 33.109\,\mu A$ (3)

2.2.5 $i = \frac{V}{R}\,e^{\frac{-t}{RC}}$

$= \frac{9}{100 \times 10^3} \times e^{\frac{-0.002}{0.001}}$

$= 0.00009 \times e^{-2}$

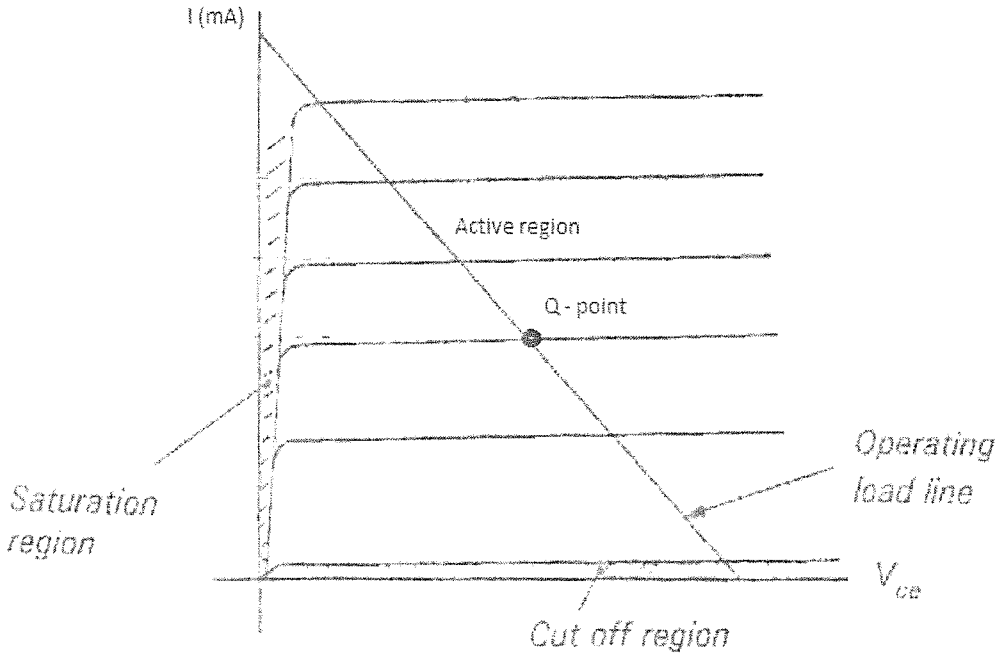
$= 12.18\,\mu A$ (3)

[16]

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QUESTION 3

3.1



(5)

3.2 To prevent thermal runaway. (2)

3.3 To prevent negative feedback. (2)

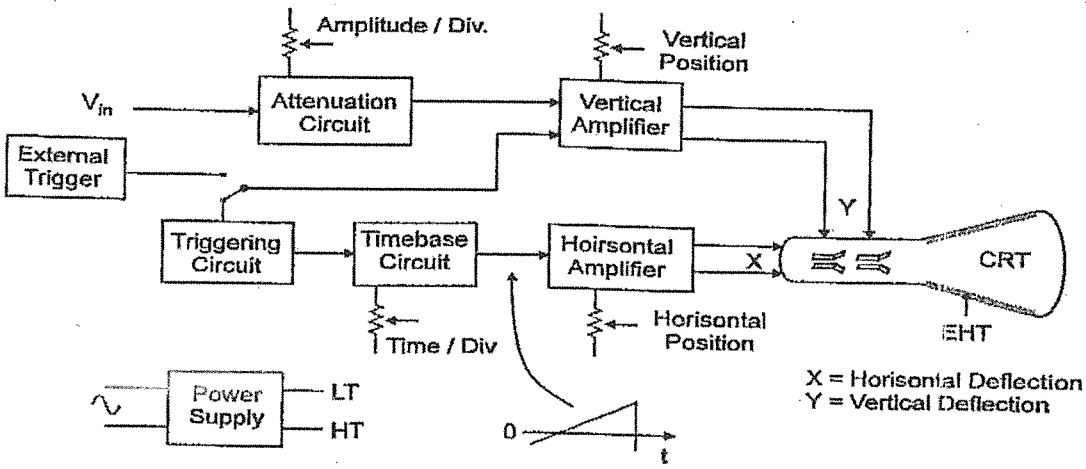
3.4 To stabilise the amplifier. (3)

[12]

QUESTION 4

4.1

BLOCKDIAGRAM OF AN OSCILLOSCOPE



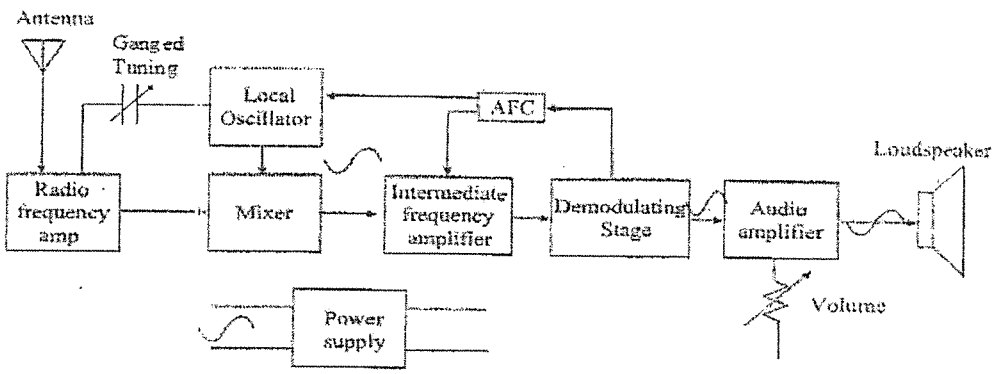
(8)

4.2 Volt/division
Time/division
Brightness
X-shift
Y-shift
Focus
Mode switch
AC/DC ground switch

(8)
[16]

QUESTION 5

5.1



Block diagram of FM receiver

(10)

5.2 Write the following in full:

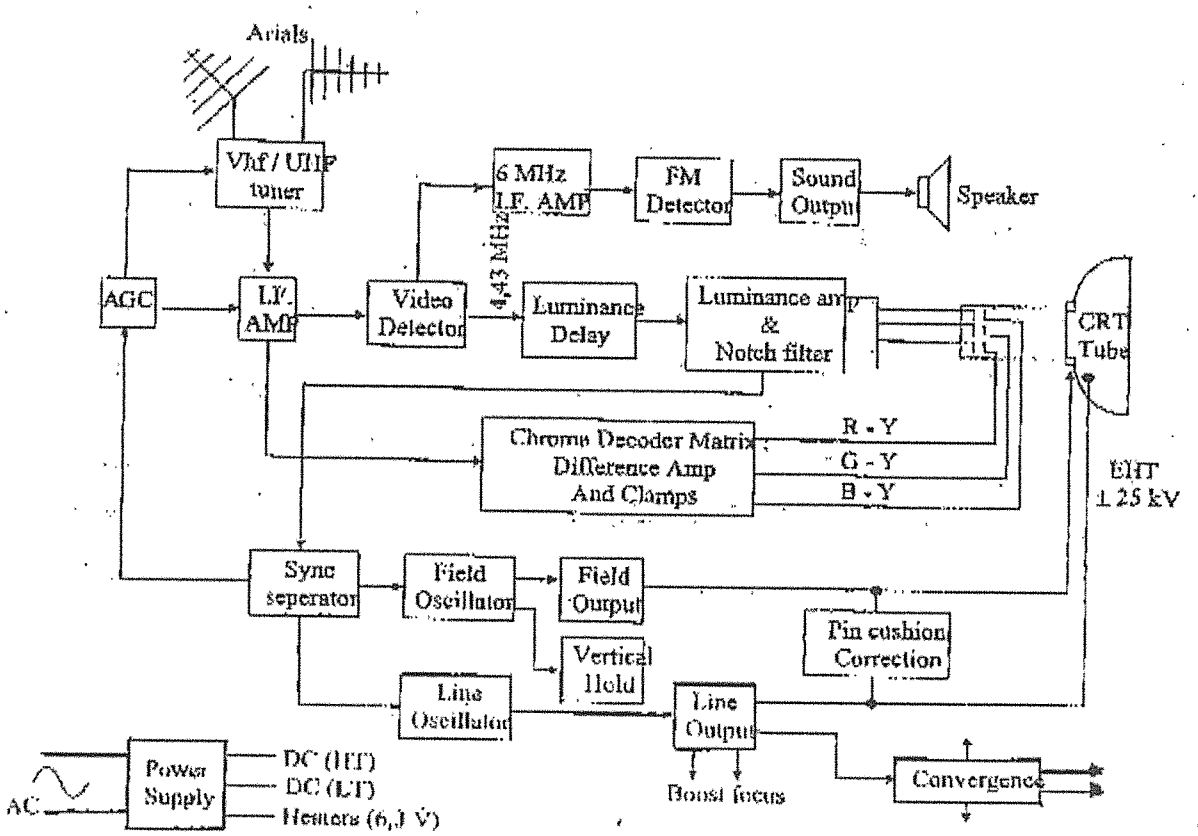
5.2.1 Frequency modulation

5.2.2 High fidelity

5.2.3 International Maritime Satellite

(3 × 2) (6)
[16]

QUESTION 6



[15]

QUESTION 7

7.1 Blanking prevents the beam from being seen during line and field flyback. (2)

7.2 Sync separator separates the vertical and horizontal synch pulses to be applied to the line and field oscillators for synchronisation of the scan circuits. (2)

7.3 Line time base causes the horizontal movement of the screen. (2)
[6]

TOTAL: 100

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