MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

RADIO AND TELEVISION THEORY N2

12 NOVEMBER 2014

This marking guideline consists of 7 pages.

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1.2 $C_T = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

$= \frac{1}{1} + \frac{1}{2} + \frac{1}{3}$

$= \frac{6+3+2}{6}$

$= 0.545\mu F$ (3)

1.3 $Q = C \times V$

$= 0.545 \times 9$

$= 4.905\ \mu C$ (2)

1.4 $V_{C1} = \frac{Q}{C_1}$

$= \frac{4.905}{1}$

$= 4.905\ V$

$V_{C2} = \frac{Q}{C_2}$

$= \frac{4.905}{2}$

$= 2.452\ V$

$V_{C3} = \frac{Q}{C_3}$

$= \frac{4.905}{1}$

$= 1.635\ V$ (6)

1.5 It is a parallel resonant circuit where the current flow is at minimum and the impedance is at maximum. (2)

[17]

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2.3.2 $V_C = V\left(1 - e^{\frac{-t}{RC}}\right)$

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

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

$= 9\left(1 - 0.1353\right)$

$= 9\,(0.8647)$

$= \mathbf{7.7823\,V}$ (5)

2.3.3 $V_R = V - V_C$

$= 9 - 7.7823$

$= \mathbf{1.2177\,V}$ (2)

2.3.4 $i = \frac{V}{R}\,e^{\frac{-t}{RC}}$

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

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

$= \mathbf{33.109\,\mu A}$ (3)

2.3.5 $i = \frac{V}{R}\,e^{\frac{-t}{RC}}$

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

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

$= \mathbf{12.18\,\mu A}$ (3)

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$= 1.118\,\Omega$ (2)

3.2.3 $X_L = 2\pi fl$

$= 2\pi \times 3558.8 \times 50 \times 10^{-6}$

$= \mathbf{1.118\,\Omega}$ (2)

3.2.4 $Z = \sqrt{R^2 + (X_L - X_C)^2}$

$= \sqrt{7.5^2 + (1.118 - 1.118)^2}$

$= \mathbf{7.5\,\Omega}$ (2)

3.2.5 $I = \frac{V}{Z}$

$= \frac{50}{7.5}$

$= \mathbf{6.666\,A}$ (2)

3.2.6 $V_R = I \times R$
$= 6.666 \times 7.5$
$= \mathbf{49.995\,V}$

$V_L = I \times X_C$
$= 6.666 \times 1.118$
$= \mathbf{7.452\,V}$

$V_C = I \times X_C$
$= 6.666 \times 1.118$
$= 7.452\,V$ (6)

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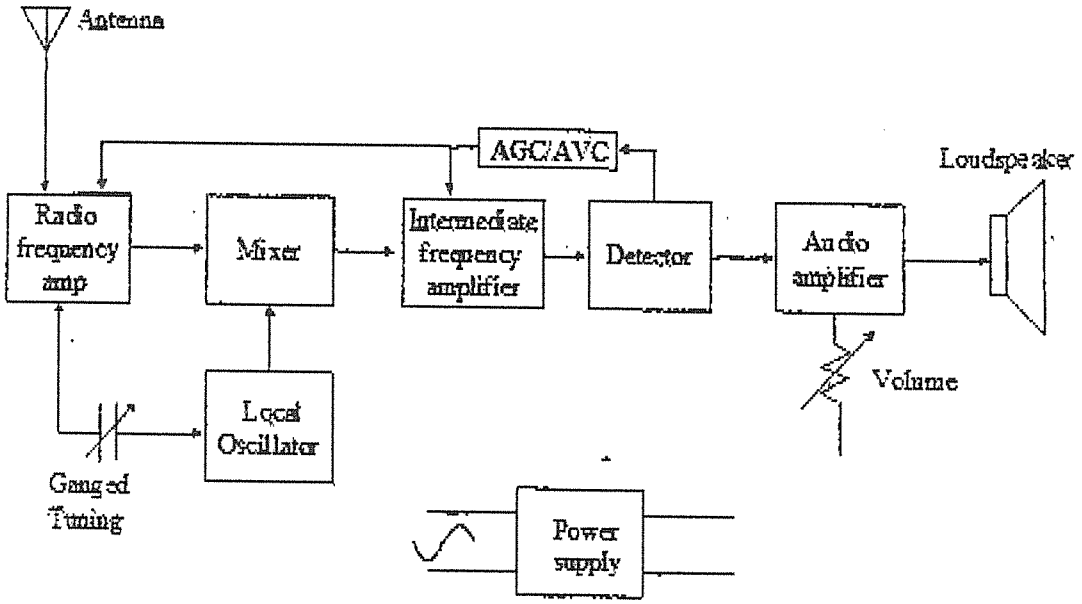
$= 0^{\circ}$

(2)
[20]

QUESTION 4

4.1



(10)

4.1.1 Superheterodyne is a process where **two frequencies <u>oscillate together</u>,** producing **the sum** and **the difference** of the two frequencies.

(4)

4.1.2 AVC circuit control the gain of the IF and RF amplifiers. It prevents drift.

(3)
[17]

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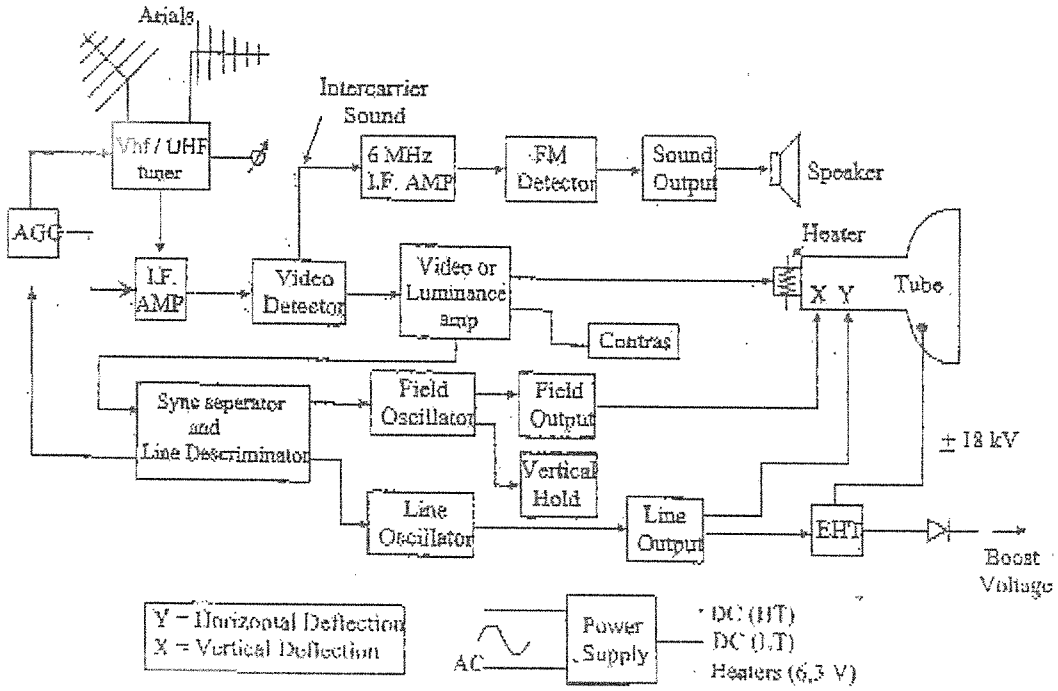
[6]

QUESTION 6



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