higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

RADIO AND TV THEORY N2

4 APRIL 2016

This marking guideline consists of 7 pages.

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QUESTION 1

1.1
1.1.1 True
1.1.2 True
1.1.3 True
1.1.4 False
1.1.5 False
1.1.6 False
1.1.7 True
1.1.8 True
1.1.9 True
1.1.10 True

(10 × 1) (10)

1.2 1.2.1

$$C = \frac{1}{5} + \frac{1}{10} \quad \surd$$

$$= \frac{2+1}{10}$$

$$= 3.333\ \mu F \quad \surd$$

$$\therefore Q = C \times V$$

$$= 3.333 \times 10^{-6} \times 12 \quad \surd$$

$$= 39.996\ \mu C. \quad \surd$$

(4)

1.2.2 $V_{C1} = \frac{Q}{C1}$

$$= \frac{39.996 \times 10^{-6}}{5 \times 10^{-6}}$$

$$= 7.999\ V\ (8\ V)$$

(2)

1.2.3 $V_{C2} = \frac{Q}{C2}$

$$= \frac{39.996 \times 10^{-6}}{10 \times 10^{-6}}$$

$$= 3.996\ V\ (4\ V).$$

(2)
[18]

QUESTION 2

2.1 2.1.1

- Paper di-electric
- Polystyrene
- Ceramic
- Poly-carbonate
- Polyester film
- Polystyrene

(Any THREE) (3)

2.1.2

- Pass AC.
- Block DC.
- Couple circuits.
- Isolates circuits
- Store an electric charge (smooth the voltage).

(Any TWO) (2)

2.1.3 It is the time required to charge a capacitor to 63.2% of the maximum applied voltage or the time taken to discharge the capacitor to 36.8% of the maximum applied voltage. (3)

2.2 2.2.1 Peak voltage

$$\text{Peak} = \frac{RMS}{0.707}$$

$$= \frac{25}{0.707}$$

$$= 35.360\ V.$$

2.2.2 $\text{RMS} = V_p \times 0.707$

$$= 35.360 \times 0.707$$

$$= 25\ V.$$

2.2.3 Wavelength

$$\lambda = \frac{V}{F}$$

$$\lambda = \frac{3 \times 10^8}{50}$$

$$= 6\,000\,000\ m\ (6 \times 10^6\ m).$$

2.2.4 The generation period

$$t = \frac{1}{frequency}$$

$$= \frac{1}{50}$$

$$= 0.02\ s\ (20\ ms).$$

2.2.5 Propagation

Velocity = frequency × wavelength

$$= 50 \times 6 \times 10^6$$

$$= 300\ 000\ 000 \text{ m/s } (3 \times 10^6).$$

2.2.6 $$f = \frac{wavelength}{velocity}$$

$$= \frac{300\ 000\ 000}{1000}$$

$$= 300\ KHz.$$

(6 × 2) (12)
[20]

QUESTION 3

3.1 3.1.1 $$X_L = 2\pi fl$$

$$= 2\pi \times 100 \times 0.01$$

$$= 6.283\ \Omega$$

3.1.2 $$X_C = \frac{1}{2\pi fc}$$

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

$$= 21.220\ \Omega.$$

3.1.3 $$Z = \sqrt{R^2 + (X_C - X_L)^2}$$

$$= \sqrt{10^2 + (21.220 - 6.283)^2}$$

$$= 17.975\ \Omega.$$

3.1.4 $I = \frac{V}{Z}$

$= \frac{100}{17.975}$

= 5.563 A.

3.1.5 $\Theta = Cos^{-1} \frac{R}{Z}$

$= \frac{10}{17.975}$

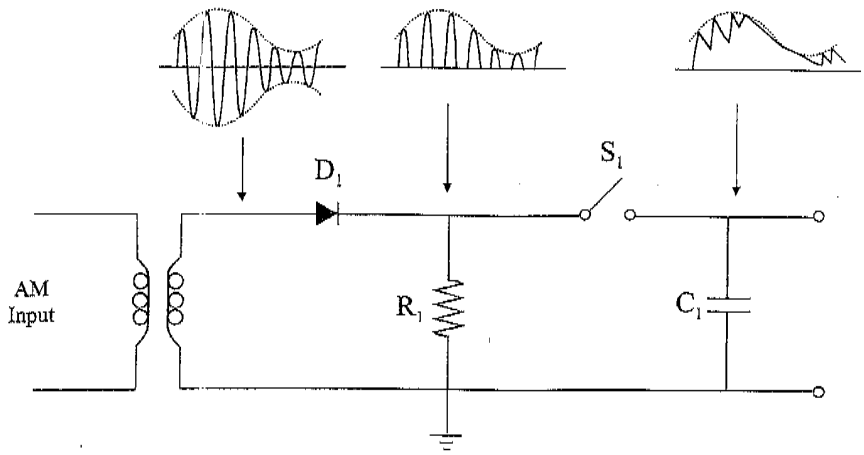
= 0.556

= 56.197º.

(5 × 2) (10)

3.2 3.2.1 Noise
Lack of fidelity or audio quality. (2)

3.2.2



(6)
[18]

Question 4

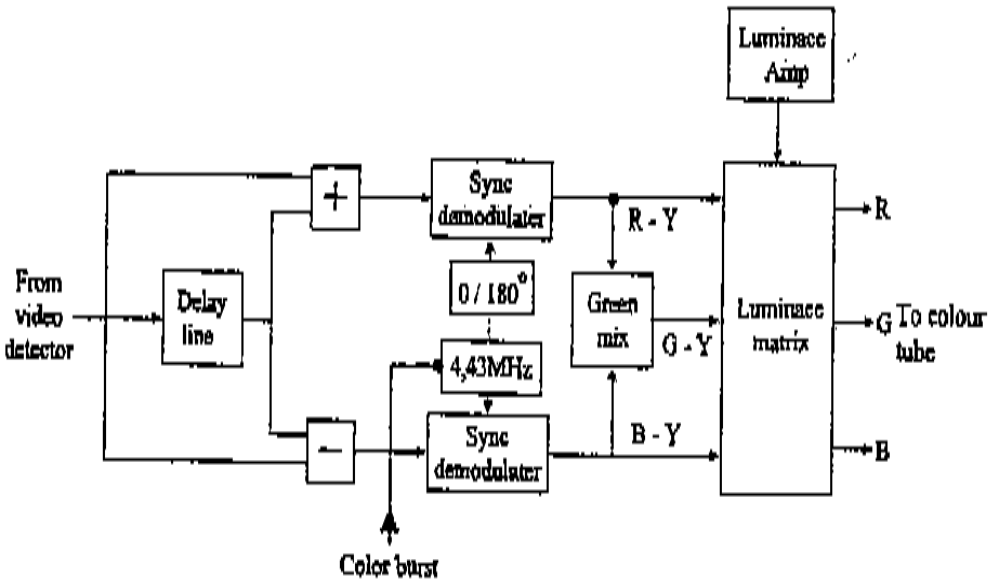
4.1
- High current gain.
- High voltage gain.
- High power gain.
- Medium input impedance.
- Medium output impedance.
- 180° phase shift between input and output. (6)

4.2
- The cathode ray tube. Must display a picture.
- The power supply. Feeds power to different circuits.
- Signal processing circuits. Produce the video, sound and synch pulses from the broadcast signal.
- Scanning circuits. To generate line and field waveforms.
- The loud speaker. To produce audio. (10)

[16]

QUESTION 5

5.1



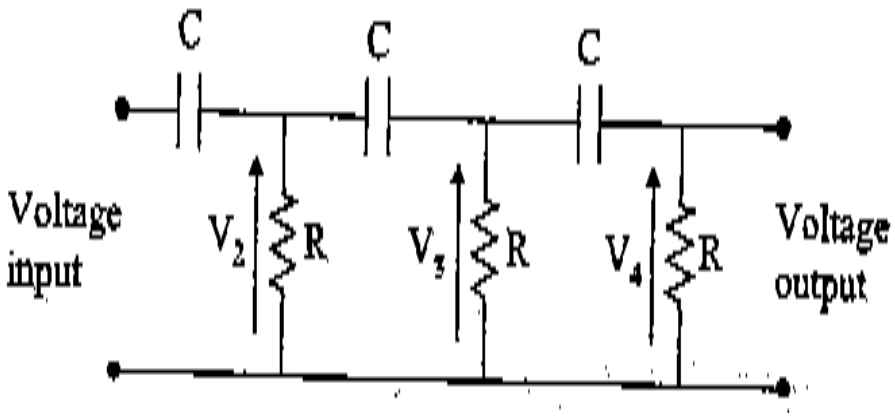
(10)

5.2 To decode the colour difference signals from the chrominance signals (1)

[11]

QUESTION 6

6.1



(7)

6.2 Provides a 180° phase shift between input and output. (1)

6.3 Each RC section introduces attenuation. (1)

[9]

QUESTION 7

7.1
- The oscilloscope.
- The sweep generator.
- The multimeter.
- The pattern bar generator.
- The signal generator.
- Audio generator.

(Any FOUR) (4)

7.2
- More robust against mechanical shock.
- Reversal of probes compensated for.
- Reading immediate.
- Very high sensitivity over the full range.
- No error of parallax.
- Auto ranging facility provided.
- Overload indicated by lamp.

(Any FOUR) (4)
(4 × 2) **[8]**

TOTAL: 100

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