higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

RADIO AND TELEVISION THEORY N1

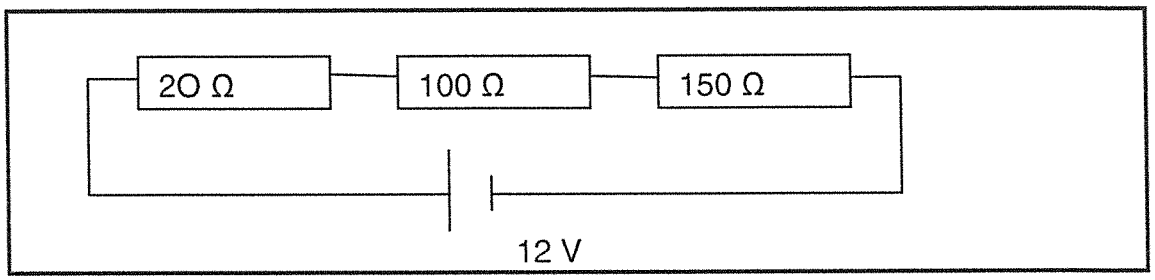
2 APRIL 2013

This marking guideline consists of 9 pages.

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QUESTION 1

1.1



(2)

1.2 1.2.1

$$R_T = R_1 + R_2 + R_2$$
$$= 20 + 100 + 150\surd$$
$$= 270\ \Omega\surd$$

(2)

1.2.2

$$I_T = \frac{V_T}{R_T}$$
$$= \frac{12}{270}$$
$$= 0{,}044\ A$$

(2)

1.2.3

$$V_1 = I_T \times R_1$$
$$= 0{,}044 \times 20\ \surd$$
$$= 0{,}88\ V\ \surd$$

(2)

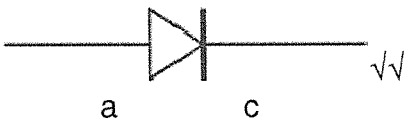
1.2.4

$$P_D = IV$$
$$= 0{,}044 \times 12\ \surd$$
$$= 0{,}528\ W\ \surd$$

(2)
[10]

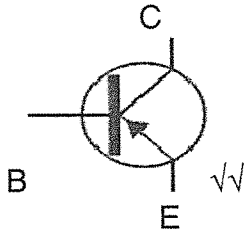
QUESTION 2

2.1 2.1.1 Diode



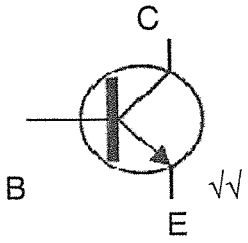
(2)

2.1.2 PNP transistor



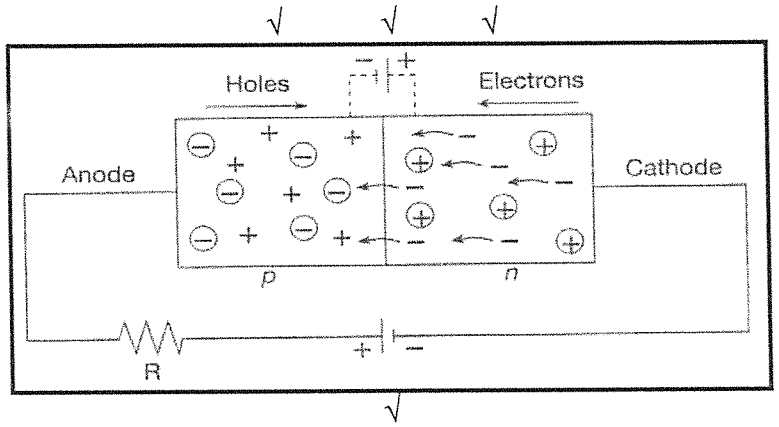
(2)

2.1.3 An NPN transistor



√√ (2)

2.2

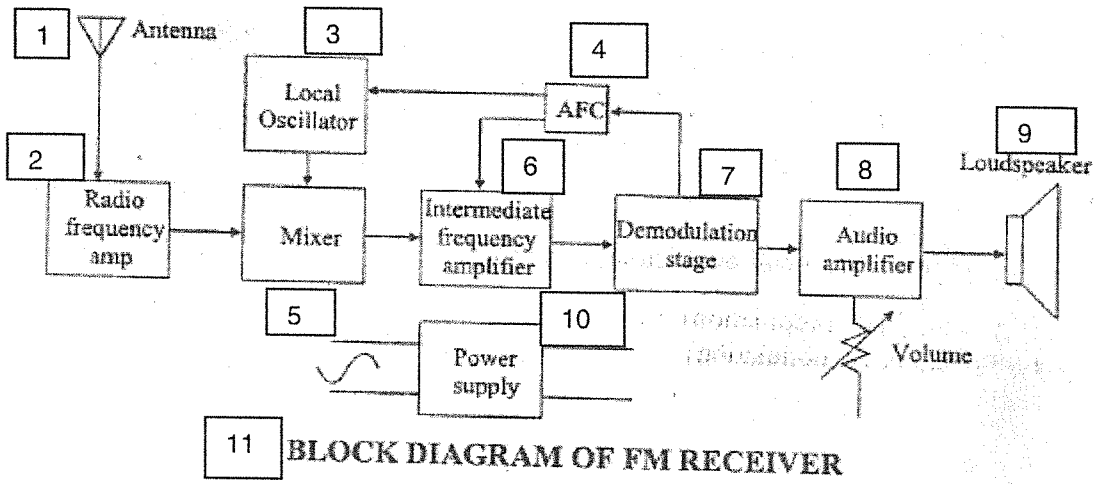


√ √ √ √ (4)

[10]

QUESTION 3

3.1



(10)

1. Antenna
2. Radio frequency amp
3. Local oscillator
4. AFC
5. Mixer
6. Intermediate frequency
7. Demodulation stage
8. Audio amplifier
9. Loudspeaker
10. Power supply
11. BLOCK DIAGRAM OF FM RECEIVER

3.2 3.2.1 Radio freguency amp √√

3.2.2 Mixer √√

3.2.3 Audio amplifier √√

(3 × 2) (6)
[16]

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QUESTION 4

4.1 An AF amplifier is used to increase the sound signal current that drives the loud speaker. √√

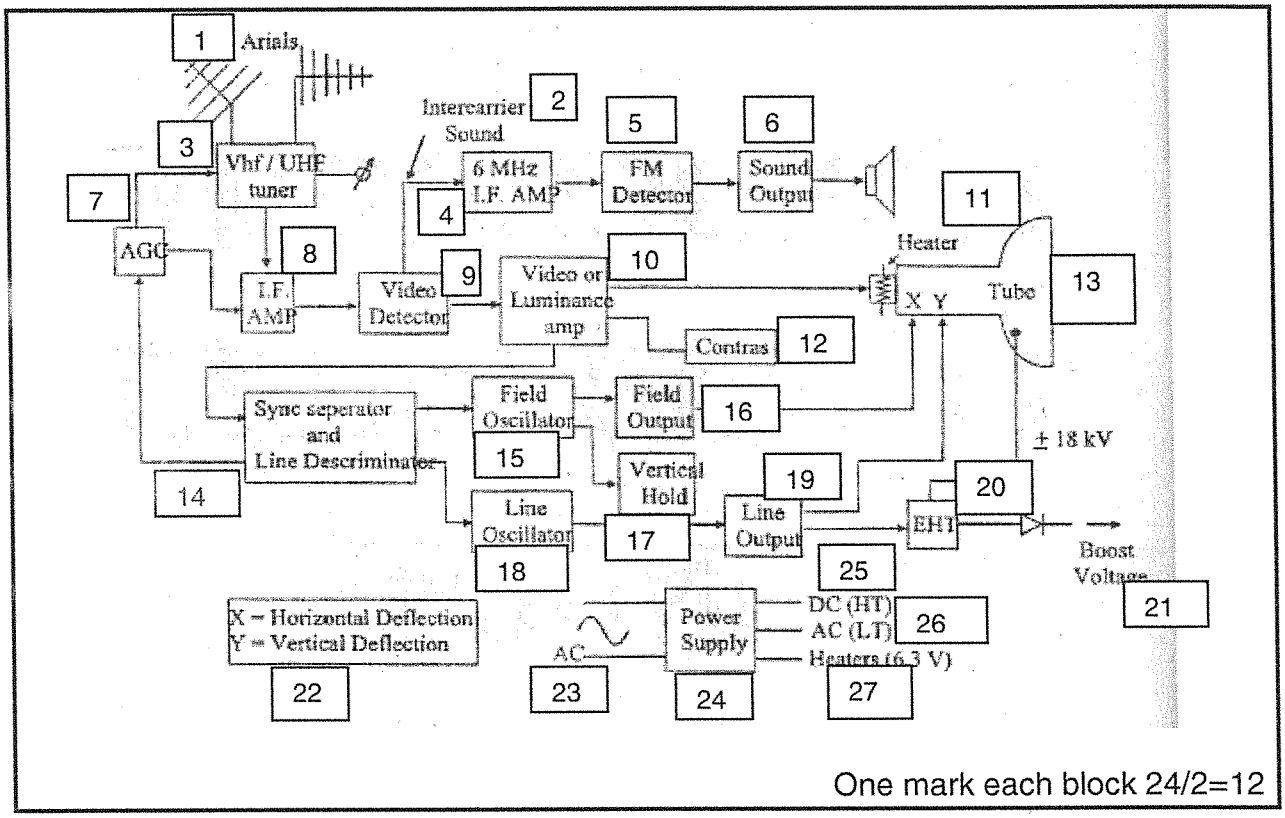
4.2 In a video/luminance amplifier the signal is processed in the video amplifiers, where its voltage is raised from the detected 1 V peak to peak to 150 V peak to peak. This is required to drive the cathode-ray tube from black to peak white. √√

4.3 The loudspeaker changes the signal current to mechanical sound.√

4.4 EHT is used to produce extra high tension voltage to drive the CRT. √√ (4 × 2) **[8]**

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QUESTION 5



One mark each block 24/2=12 **[12]**

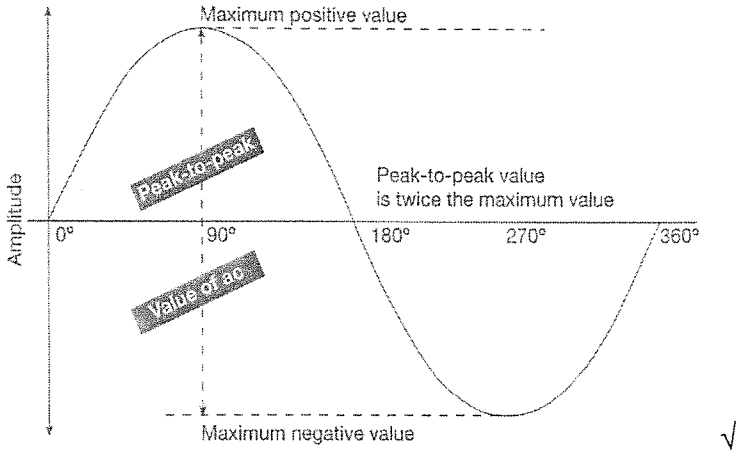
1. Arials
2. Intercarrier sound
3. VHF/UHF tuner
4. 6 MHz I.F. AMP
5. FM detector
6. Sound output
7. AGC
8. I.F. AMP
9. Video detector
10. Video or Luminance amp
11. Heater
12. Contras
13. Tube
14. Sync separator and line discriminator
15. Field oscillator
16. Field output
17. Vertical hold
18. Line oscillator
19. Line output
20. EHT
21. Boost voltage
22. X – Horizontal deflection
    Y – Vertical deflection
23. AC
24. Power supply
25. DC (HT)
26. AC (LT)
27. Heaters (6,3 V)

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QUESTION 6

6.1 6.1.1 Sine wave

√



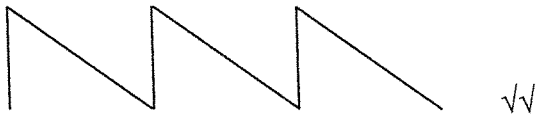
√

6.1.2 Square wave



√ √

6.1.3 Saw tooth



√√

(3 × 2) (6)

6.2 6.2.1 Polarisation: The electric field of an aerial is parallel to the length of the aerial and the magnetic field is at right angle to it. √√

6.2.2 A ground-reflected wave travels from the transmitting aerial to earth and is then reflected to the receiving aerial. It follows the curvature of the earth. √√

6.2.3 A direct reflected wave travels directly in an almost straight line from the transmitter to the receiver. √√

(3 × 2) (6)
[12]

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QUESTION 7

7.1
- A – step-down transmitter √
- B – rectifier diodes √
- C – filter capacitor √
- D – voltage regulators √ (4)

7.2 7.2.1 To step down a 220 V/rms to 15 V/rms √√

7.2.2 To change AC voltage to DC voltage √√

7.2.3 To regulate or stabilise the output voltage √√

(3 × 2) (6)
[10]

QUESTION 8

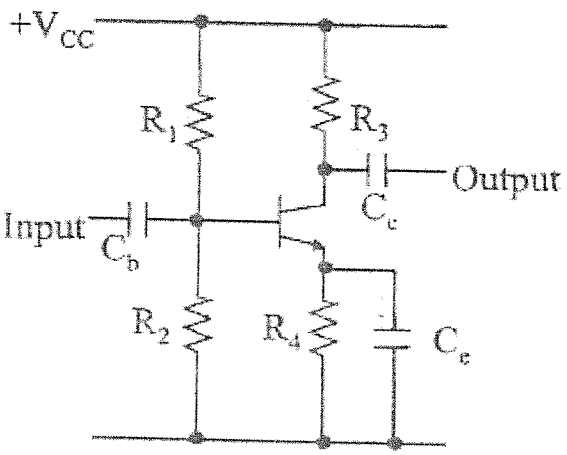
8.1
- Frequency √
- DC voltage √
- AC voltage √
- Time period of waves √
- Phase differences √ (5)

8.2
- An electron gun to emit electron beam √√
- Focusing and accelerating unit to speed up electrons and focus them √√
- Scanning or deflection system to produce image √√
- Phosphor screen which illuminates when electrons strike it √√
- Evacuated glass envelope to remove unwanted particles √√ (10)

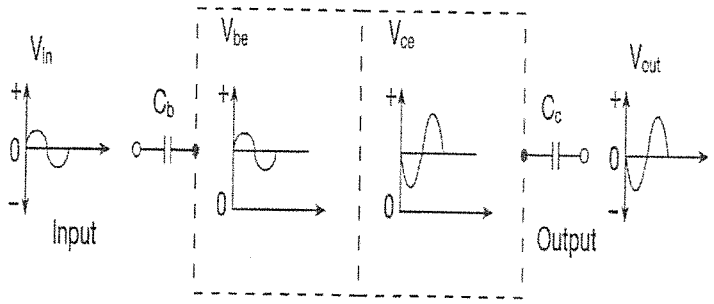
[15]

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QUESTION 9



Six marks for components (6)



One mark input and output wave (1)
[7]

TOTAL: 100

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