



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

**T1420(E)(M30)T
APRIL EXAMINATION**

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N1

(11040821)

**30 March 2016 (X-Paper)
9:00–12:00**

Scientific calculators may be used.

This question paper consists of 6 pages and 1 formula sheet.

**DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE
RADIO AND TELEVISION THEORY N1**

TIME: 3 HOURS

MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Subsections of questions may NOT be separated.
 5. Sketches must be neat.
 6. Write neatly and legibly.
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QUESTION 1

A circuit consists of parallel resistors of respectively 10 ohms and 20 ohms. The parallel combination is connected with a series resistor of 30 ohms, and supplied with a battery of 12 volts.

- 1.1 Draw the circuit described above. (2)
- 1.2 Calculate the following:
- 1.2.1 Total resistance
 - 1.2.2 The total current of the circuit
 - 1.2.3 The voltage drop across 30 ohms
 - 1.2.4 The total power dissipation of the circuit. (4 × 2) (8) [10]

QUESTION 2

Define the following terms/abbreviations:

- 2.1 CRT
- 2.2 Modulation
- 2.3 Demodulation
- 2.4 Intermediate frequency
- 2.5 FM (5 × 2) [10]

QUESTION 3

- 3.1 Describe in detail the formation of:
- 3.1.1 Primary cells
 - 3.1.2 Secondary cells (2 × 5) (10)
- 3.2 State FOUR disadvantages that secondary cells have over primary cells. (4)
- 3.3 State FOUR advantages that primary cells have over secondary cells. (4) [18]

QUESTION 4

Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–K) next to the question number (4.1–4.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.1	Oscillator	A	intelligence magnification
4.2	RF stage	B	signal heterodyning
4.3	Detector	C	electrical signal to mechanical sound
4.4	Transmitter	D	provided with electrical signal
4.5	Audio amplifier	E	receives electromagnetic waves
4.6	Loudspeaker	F	selection and amplification of RF signal
4.7	Power supply	G	separates sound from the carrier wave
4.8	Mixer stage	H	radiates electromagnetic waves
4.9	Transistor	I	AC to DC
4.10	Antenna (Tr)	J	acts as a switch
		K	current in one direction

(10 × 1)

[10]**QUESTION 5**

Draw a neat, labelled block diagram of an AM superheterodyne receiver. (ALL the directions and interconnections must be indicated.)

[10]**QUESTION 6**

6.1 Draw the following waveforms used in oscillators:

6.1.1 Sine wave

6.1.2 Square wave

6.1.3 Saw tooth

(3 × 2)

[6]

QUESTION 7

The oscilloscope is a versatile instrument used in workshops.

7.1 State FIVE measurements that can be done with an oscilloscope. (5)

7.2

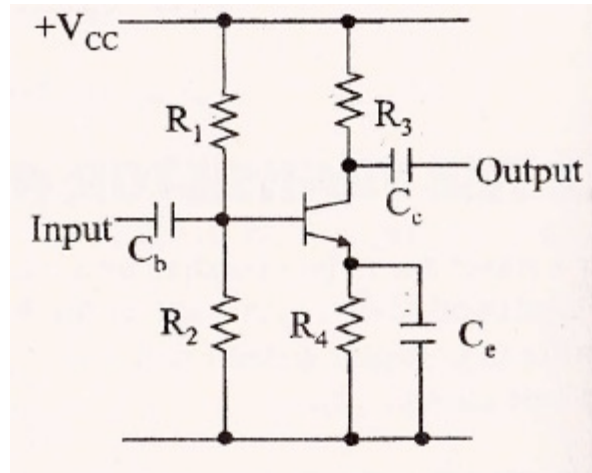


FIGURE 1

Refer to FIGURE 1 above and state what the function is of:

7.2.1 Resistors R_1 and R_2

7.2.2 Component C_b

7.2.3 Component C_c

7.2.4 Component R_4

7.2.5 Component C_e

(5 × 2)

(10)
[15]

QUESTION 8

Explain with the assistance of a sketch, the interlaced line-scanning process of a picture by a television set.

[12]

QUESTION 9

Draw a labelled sketch of a transistor used as a switch.

[5]

QUESTION 10

Sketch the IEC symbols of the following:

10.1 Microphone

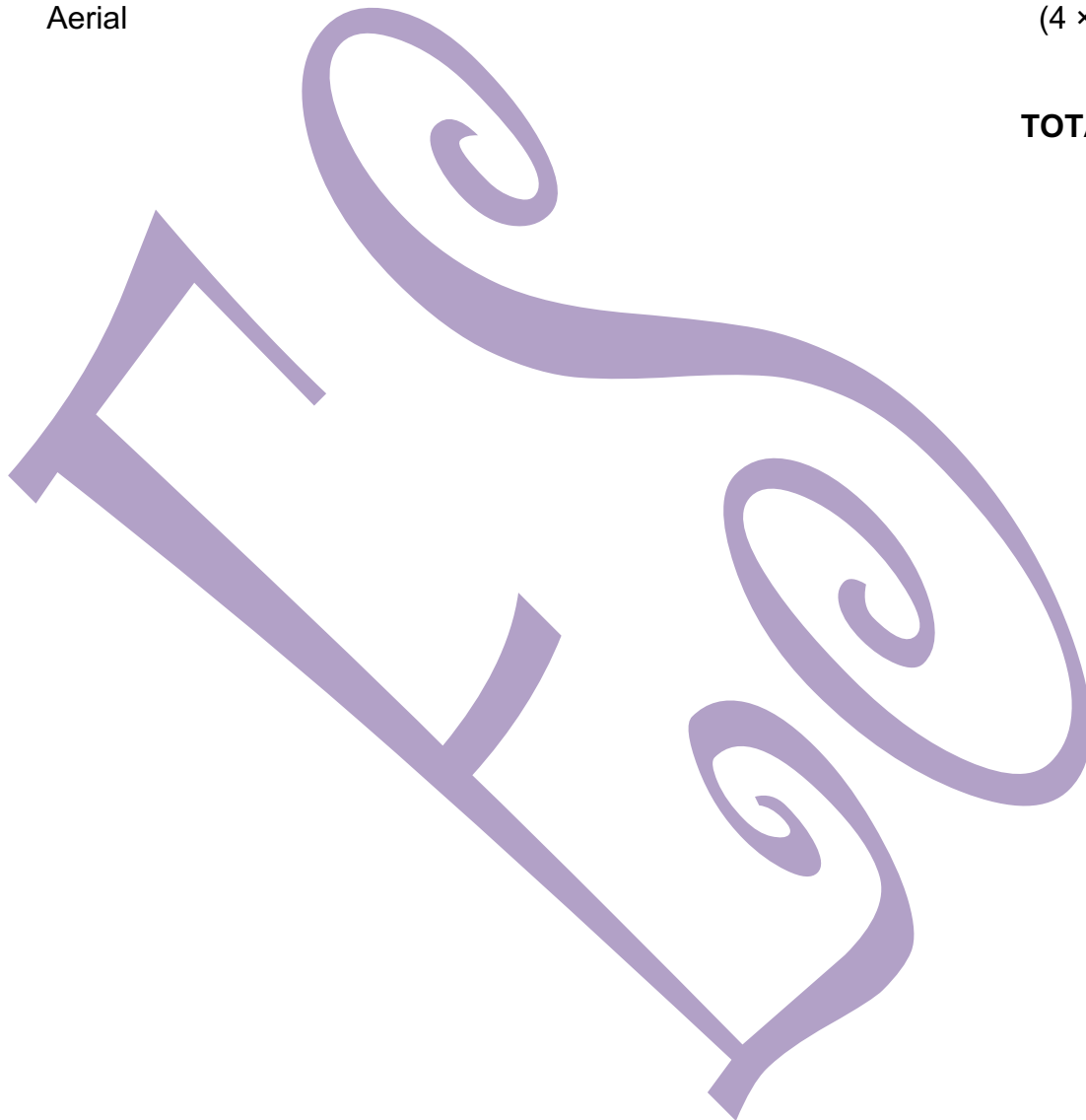
10.2 Loudspeaker

10.3 Amplifier

10.4 Aerial

(4 × 1) **[4]**

TOTAL: 100



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FORMULA SHEET

$$V = 3 \times 10^8 m/s$$

$$m\% = \frac{A-B}{A+B} \times \frac{100}{1}$$

$$R_T = R_1 + R_2 + \dots R_N$$

$$e = E_M \sin 2\pi f t$$

$$P = V \times I$$

$$emf = b/v$$

$$V = \frac{P}{I}$$

$$I = \sqrt{\frac{P}{R}}$$

$$F = \frac{1}{T}$$

$$c = r \times t$$

$$I = \frac{E}{R+r}$$

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

$$P = I^2 R$$

$$I = I_M \sin 2\pi f t$$

$$R = \frac{P}{I^2}$$

$$V = I \times R$$

$$R = \frac{V^2}{P}$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \dots \frac{1}{R_N}$$