higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N3

(11040843)

4 August 2021 (X-paper)
09:00–12:00

Scientific calculators and drawing instruments may be used.

This question paper consists of 6 pages.

177Q1G2104

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
RADIO AND TELEVISION THEORY N3
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. Work neatly.

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QUESTION 1

Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Component used for signal amplification in a circuit:

A Resistor
B Transistor
C Zener diode
D Capacitor

1.2 Component with low resistance to AC current:

A Inductor
B Capacitor
C Resistor
D Diode

1.3 Causing brightness:

A Hue
B Magenta
C Red
D Luminance

1.4 Component receiving transmitted signals:

A Detector
B AM detector
C FM detector
D Antenna

1.5 Doping of atoms for semiconductor:

A Negation ion
B Positive ion
C Neutral ion
D Acceptor

(5 × 1) **[5]**

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QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.5) in the ANSWER BOOK:

2.1 A Zener diode is connected in reverse direction in a circuit.

2.2 A transistor can also be used as a voltage regulator.

2.3 A capacitor offers high reactance at low frequency.

2.4 Inductors are semiconductors in electronic circuits.

2.5 Shadow mask television uses colour matrix circuits.

(5 × 1) **[5]**

QUESTION 3

Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–L) next to the question number (3.1–3.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1	Shadow mask	A	transmits radio waves
3.2	LED	B	receives radio waves
3.3	Triad	C	broadcaster
3.4	Doping	D	crow-bar protection
3.5	Operational amps	E	the differentiator
3.6	Transistor	F	impurity mixing
3.7	Thyristor control	G	three colours
3.8	SABC	H	alphanumeric display
3.9	Tx antenna	I	rectifier
3.10	Rx antenna	J	switch
		K	CRT
		L	transformer

(10 × 1) **[10]**

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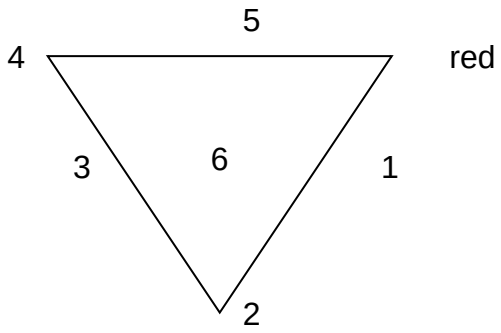
QUESTION 4

4.1 Redraw the triangle in the ANSWER BOOK and indicate the missing colours from 1–6.



TRIANGLE (6 × 1) (6)

4.2 Name THREE primary colours and their voltages as used in a colour television. (3 × 2) (6)

[12]

QUESTION 5

Explain each of the following colour TV stages:

5.1 Chrominance amp drives

5.2 Notch filter

5.3 Luminance delay

5.4 Limiter stage

5.5 Audio amplifier

(5 × 2) **[10]**

QUESTION 6

Draw a fully labelled unijunction transistor-relaxation oscillator circuit. Show the input and output waveforms. **[10]**

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QUESTION 7

Describe each of the following faults in a colour TV:

7.1 Luminance delay line

7.2 Herringbone pattern

7.3 Overall colour cast

(3 × 3) **[9]**

QUESTION 8

8.1 Antenna plays an important role in the radio and television communication process.

Draw a neat, labelled sketch of a LOG periodic antenna to show the receiving of radio transmitted signals. (4)

8.2 Name any FOUR advantages of using a LOG periodic antenna in your colour television receiver. (4)
[8]

QUESTION 9

9.1 SABC (South African Broadcasting Corporation) uses different video cameras in the studio to capture scenes in the process of broadcasting.

Draw a labelled sketch of a vidicon camera tube to show these processes. (12)

9.2 Define *secondary electrons* as used in camera tubes. (2)
[14]

QUESTION 10

10.1 List FIVE static-convergence adjustment procedures. (5)

10.2 Explain the main objective of static convergence. (2)
[7]

QUESTION 11

11.1 Define each of the following antenna terms:

11.1.1 Beam width (2)

11.1.2 Gain (2)

11.2 Draw a neat, labelled frequency response curve to illustrate the concept of a bandwidth of a television aerial. (6)
[10]

TOTAL: 100

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