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higher education & training

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REPUBLIC OF SOUTH AFRICA

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NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N1

(11040821)

27 November 2013 (X-Paper)
09:00–12:00

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

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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 must be kept together.
5. Sketches must be neat, large and in proportion.
6. Write neatly and legibly.

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QUESTION 1

The following are stages in the television receiver that are faulty.

Name TWO faults in each stage that can be diagnosed by a television technician.

1.1 The cathode ray tube

1.2 The line output stage

1.3 Power supply

1.4 Line oscillator

1.5 Sync separator

1.6 Video detector

(6 × 2) **[12]**

QUESTION 2

A circuit consists of three resistors connected in series. They are supplied by a 10-volt battery. Resistors values are as follows: 200 ohms (R1), 500 ohms (R2) and 600 ohms (R3)

2.1 Draw the circuit diagram mentioned above. (2)

2.2 Calculate the following:

2.2.1 Total resistance

2.2.2 The total current of the circuit

2.2.3 The voltage drop across R1

2.2.4 Voltage drop across R2

2.2.5 The power dissipated by the circuit

(5 × 2) (10)
[12]

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QUESTION 3

Define the following terms and acronyms:

3.1 CRT

3.2 Modulation

3.3 Demodulation

3.4 Intermediate Frequency

3.5 FM

(5 × 2) [10]

QUESTION 4

Name and state the functions of the FIVE basic elements that make up a 625-line monochrome television receiver. [10]

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QUESTION 5

Oscilloscope is a versatile instrument in workshops.

5.1 Give FIVE measurements that can be done by an oscilloscope. (5)

5.2 Refer to FIGURE 1 below and explain the functions of the following components:

5.2.1 R1 and R2

5.2.2 Cb

5.2.3 Cc

5.2.4 R4

5.2.5 Ce

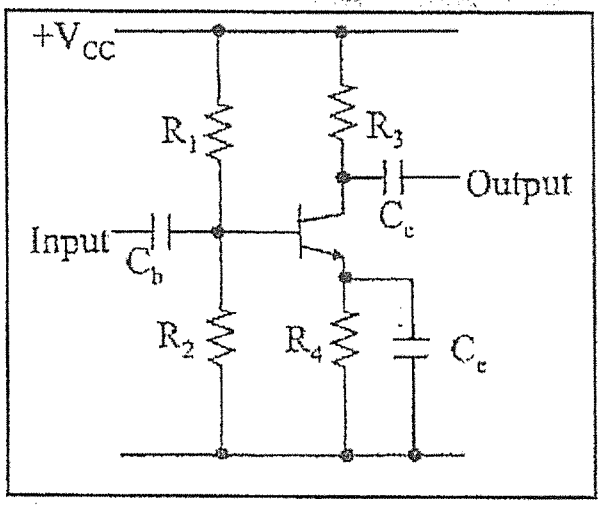


FIGURE 1 (5 × 2) (10)
[15]

QUESTION 6

Explain, by means of a labelled sketch, the interlaced line scanning process of a picture by a television receiver. [12]

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QUESTION 7

Draw the IEC symbols of the following electronic components:

7.1 Fuse

7.2 Variable resistor

7.3 Transformer

7.4 NPN Transistor

7.5 Zener diode

7.6 Lamp

7.7 Microphone

7.8 LED

7.9 Diode

7.10 Double-pole single-throw switch

7.11 Fixed capacitor

7.12 PNP transistor

(12 × 1) **[12]**

QUESTION 8

Explain SEVEN advantages of a digital meter. **[14]**

QUESTION 9

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (9.1–9.3) in the ANSWER BOOK.

9.1 Digital multimeters are more accurate than analog meters.

9.2 The CRT of a monochrome TV has THREE electronic guns.

9.3 A microphone is ONE form of a transducer.

(3 × 1) **[3]**

TOTAL: 100

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RADIO AND TELEVISION THEORY N1

FORMULA SHEET

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

$R_T = R_1 + R_2 + \cdots R_N$

$P = V \times I$

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

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

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

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

$P = I^2 R$

$I = I_M \sin 2\pi ft$

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

$V = I \times R$

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

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

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

$e = E_M \sin 2\pi ft$

$emf = b/v$

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

$c = r \times t$

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