higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1380(E)(A16)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N1

(11040821)

16 April 2015 (Y-Paper)
13:00–16:00

This question paper consists of 5 pages and 1 formula sheet.

ENGINEERING

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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 may NOT be separated.
5. Sketches must be neat and fully labelled.
6. Write neatly and legibly.

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QUESTION 1

Two cells, each with an EMF of 1,5 V and internal resistance of 0,2 ohms are connected in series across an external load resistor of 5 ohms.

1.1 Draw a labelled sketch of the circuit. (2)

1.2 Calculate the following from the circuit:

1.2.1 The total EMF of the circuit without the load resistor

1.2.2 The internal resistance of the cells

1.2.3 The current in the circuit

1.2.4 The voltage drop of the battery or cells

(4 x 2) (8)

[10]

QUESTION 2

Draw a neat, labelled block diagram of a 625-line television receiver.

ALL the directions and interconnections must be indicated. **[12]**

QUESTION 3

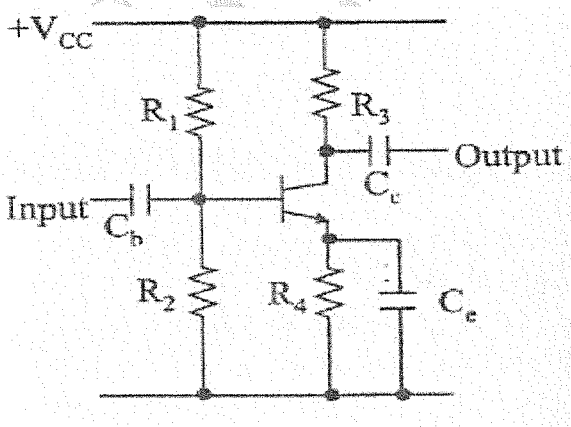


FIGURE 1

Refer to the FIGURE 1 above and answer the following questions:

3.1 State the functions of R1 and R2.

3.2 State the function of Cb.

3.3 State the function of Cc.

3.4 State the function of R4.

3.5 State the function of Ce.

(5 × 2) **[10]**

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QUESTION 4

With reference to radio waves, make a neat labelled sketch which indicates the following:

- The earth
- The ionosphere
- The path of a sky-wave
- The path of a direct wave
- The path of a ground wave
- The transmitter and receiver

(6 × 1) **[6]**

QUESTION 5

Write the following abbreviations in full:

5.1 LDR

5.2 VHF

5.3 UHF

5.4 Hd

5.5 LCD

(5 × 1) **[5]**

QUESTION 6

Draw a neat labelled block diagram of an FM radio receiver. **[7]**

QUESTION 7

A black and white TV set is made up of FIVE basic elements.

Name the FIVE elements and briefly explain the function of each element. (5 × 2) **[10]**

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QUESTION 8

The TV receiver stages listed below are faulty.

Name TWO types of faults in each stage that can be diagnosed by a TV technician.

8.1 The cathode ray tube

8.2 The line output stage

(2 × 2) **[4]**

QUESTION 9

Fully define the following television receiver stages:

9.1 AGC

9.2 Video amp

9.3 Tuner (front-end)

9.4 Sync separator

9.5 The line oscillator

(5 × 2) **[10]**

QUESTION 10

Draw a neat labelled sketch of a CRT of an oscilloscope. **[12]**

QUESTION 11

Explain SEVEN advantages of a digital meter as compared to an analog meter. **[14]**

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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