

**THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION**

083

RADIO AND TELEVISION SERVICING

(For Both School and Private Candidates)

TIME: 3 Hours

Friday 24th October 2008 p.m.

Instructions

This paper consists of sections A, B and C.

Answer all questions in sections A and B, and three (3) questions from section C.

Cellular phones are not allowed in the examination room.

Electronic calculators are not allowed in the examination room.

Write your Examination Number on every page of your answer booklets.

SECTION A (10 marks)

Answer all questions in this section.

1. For each of the items (i)-(x), choose the correct answer among the given alternatives and write its letter beside the item number.
- (i) In electronics the term "LED" stands for
- A Linear electronic devices
 - B Long equipment devices
 - C Light encoding devices
 - D Light emitting diode
 - E Light electrons display.
- (ii) Which of the following is the formula in which power, voltage and current gains are related?
- A $A_v = A_i \times A_p$
 - B $A_p = A_v \times A_i$
 - C $A_i = A_v \times A_p$
 - D $A_p = A_v + A_i$
 - E $A_v = A_i + A_p$
- (iii) Sky wave is returned to the earth by the
- A receiving aerial
 - B earth surface
 - C molecules
 - D high frequency
 - E ionosphere.
- (iv) In the oscillator tuned circuits, the impedance in series resonance is always
- A maximum
 - B minimum
 - C equal to its capacitance
 - D parallel with the inductor
 - E less than its resistance.
- (v) The band width of the tuned amplifier is given by
- A $f_1 - f_2$
 - B $2 f_1$
 - C $\frac{f_r}{Bw}$
 - D $\frac{1}{2\pi\sqrt{LC}}$
 - E $\frac{\beta X_c}{X_c}$

- (vi) The mixer stage of the superhet radio receiver is sometimes known as
- A mixer amplifier
 - B detector stage
 - C AF amplifier
 - D oscillator
 - E frequency changer.
- (vii) What is meant by NTSC as used in television?
- A National television society corporation
 - B National assembly in television colour
 - C National transmission system of communication
 - D National television society cooperation of Japan
 - E National Television systems committee of America.
- (viii) If a radio receiver produces no sound, what would be the possible cause?
- A Poor selectivity
 - B Image frequency
 - C Defective loud speaker
 - D Signal to noise ratio
 - E Fading
- (ix) The voltage at which the electrons start to flow from the cathode to the anode through a diode is called
- A break down voltage
 - B peak inverse voltage
 - C peak voltage
 - D pinch off voltage
 - E cut off voltage.
- (x) The type of radio receiver where the incoming radio frequency signal is changed to another frequency is known as a
- A tuned radio frequency receiver
 - B super heterodyne receiver
 - C continuous wave receiver
 - D frequency modulated receiver
 - E super-regenerative receiver.

$I_c = I_o - I_e$
 I_{in}

SECTION B (30 marks)

Answer **all** questions in this section.

2. What is a d.c loadline?
3. Mention **three (3)** main parts of oscillator.
4. Write a formula for the impedance of a speaker coil having both inductive reactance and resistance.
5. When a carrier wave (f_c) is amplitude modulated by another signal (f_m), **three (3)** separate frequencies are produced. Mention the frequencies.
6. How can the overall gain of a radio receiver be varied automatically with the changing strength of the received signal?
7.
 - (a) When the base - emitter bias is about +0.2 V, electron cross the junction into the base. What material is this transistor made of?
 - (b) If the transistor is operating with $V_{cc} = 9V$, and it is properly biased, calculate the value of V_{CE} .
8. In radio receiver a tuner stage is formed by **three (3)** combined stages. Mention them.
9.
 - (a) One of the qualities of the tuned circuit of a radio receiver is its ability to extract the desired signal and reject all the other unwanted signals. Give the name of that quality.
 - (b) State **three (3)** ways in which radio waves travel.
10. Define the following terms as used in amplitude modulation.
 - (a) Modulation index
 - (b) Modulation depth
11. If your superhet radio receiver produces twice the IF away from the wanted signal, predict the possible problem at the output.

SECTION C (60 marks)

Answer **three (3)** questions from this section.

12. (a) What is the function of the following stages of the superhet radio receiver?
- (i) Local oscillator
 - (ii) IF amplifier
 - (iii) Mixer stage
 - (iv) Detector stage
 - (v) A.F amplifier
- (b) What purpose does AGC line serve in a superhet radio receiver?
13. (a) Name **three (3)** passive components used in electronic circuits.
- (b) (i) A pure inductor L (i.e one possessing negligible resistance) is connected to 230V, 50 Hz domestic supply. A current of 2A flows. Determine the value of the inductance?
- (ii) If the inductor L in 13(b)(i) above has 100 turns of wire and another coil X is wound with 150 turns but having identical dimensions as that of inductor L , calculate the current that will pass if it is connected to the same supply?
14. (a) What is the general function of antennas in electronic systems?
- (b) Mention **four (4)** types of radio receiving antennas.
- (c) If the frequency of the transmitted signal is 1 kHz, what will be the value of its wavelength?
- (d) Draw a neat sketch of a Yagi antenna and show its **three (3)** important elements.
15. (a) Mention **two (2)** types of video tape recorders and state **one (1)** use of each type.
- (b) Make a neat and well labelled sketch of a video tape construction.
- (c) Draw a block diagram of a video cassette recorder (VCR) and label all of its parts.
16. (a) If the emitter terminal of the NPN transistor is blown, what **two (2)** effects will be noted?
- (b) What do you expect if a junction diode at the detector stage of the superhet radio receiver is dead?
- (c) What could be the problem in the superhet radio receiver if the output signal strength is varying either higher or low.
- (d) What will happen if the 3.58 MHz section of a TV receiver is defective?
- (e) State **two (2)** possible causes for a TV to produce a very clear picture with no sound.