



COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

**PROGRAMME: CERTIFICATE IN RADIO, ELECTRONICS AND TELEVISION
SERVICEMAN-STAGE 2**

UNIT CODE: EEE282

TITLE: RADIO & TELEVISION SERVICING

FINAL EXAMINATION – QUARTER 3, 2019

**ROOM: AS PER TIMETABLE
TIME: 2 HOURS 10 MINUTES**

INSTRUCTIONS TO STUDENTS

1. You are allowed **10 minutes** extra **reading time** during which you are **NOT** to write.
2. Begin each **SECTION** on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and **ATTACH** these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of programmable calculator(s) is prohibited.
8. **ANSWER ALL QUESTIONS**
9. Show all working where necessary.
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM.**

SECTION A**MULTIPLE CHOICE****(10 MARKS)**

Choose the appropriate answer from each question by writing the alphabet beside the question number:

- 1) The amount of brightness perceived is referred to as:
 - A) Hue
 - B) Luminance
 - C) Saturation
 - D) Chrominance

- 2) When you service TV circuits with test equipment, use _____.
 - A) A non-polarized plug
 - B) A noise generator
 - C) An isolation transformer
 - D) A degaussing coil

- 3) Lack of raster often indicates
 - A) No television signal
 - B) No video signal
 - C) No AGC
 - D) No high voltage

- 4) A signal horizontal line across the middle of the screen indicates trouble in the _____.
 - A) Tuner section
 - B) Vertical section
 - C) Horizontal section
 - D) Video section

- 5) A total of 525 scanning lines represent _____.
 - A) A field
 - B) A frame
 - C) A cycle
 - D) An interlace set

- 6) One set of 262 ½ scanning lines represents _____.
 - A) A field
 - B) A frame
 - C) A cycle
 - D) An interlace set

- 7) Before a convergence setup is performed, one should first perform _____.
- A) Gray tracking
 - B) Degaussing
 - C) Screen setting
 - D) Alignment
- 8) The line frequency for Fiji Television system is :
- A) 15625 Hz
 - B) 15750 Hz
 - C) 15650 Hz
 - D) All of the above
- 9) A silvery, out-of focus picture usually indicates a bad _____.
- A) rectifier
 - B) picture tube
 - C) high-voltage transformer
 - D) filter
- 10) The alignment of all three color guns to a common point is referred to as:
- A) Demodulation
 - B) Confetti
 - C) Blooming
 - D) Convergence

SECTION B

TRUE OR FALSE

[10 MARKS]

Write either **TRUE** or **FALSE** for the correct answer.

1. A zener diode can be used both when it is forward biased or reversed biased.
2. A LCD like a CRT are both display devices in a television system.
3. The components of a cathode ray tube are: the cone, the screen, the electron gun, the deflection and the shadow mask.
4. The radio system consists of two sub-systems in order to convey the intelligence through cable only.
5. There are basically four transducers in a complete radio system namely, antenna, rectifier loudspeakers and microphone.
6. TV monitors usually have a power transformer for isolation, so that the chassis ground can be used as a common connection for the jacks that take coaxial cable input.
7. Electron beam in a television CRT can be said to originate from the phosphor dots.
8. A radio system is established so that it can carry to a distant place audio signals the frequencies of which fall within the range of 20 Hz to 20KHz.
9. The distinguishing feature of the Hartley circuit is that the feedback needed for oscillation is taken from a tap on the coil, or the junction of two coils in series.
10. Positive feedback is a necessity of an oscillator circuit.

SECTION C**FILL IN THE BLANKS****[10 MARKS]***Fill in the Blanks by writing the correct answer.*

Cathode, Cut off frequency, Regulator, Isolation, Capacitive reactance, 1, Inductive reactance, 2, Diode, 4, Filter, Reverse, Generate.

1. The number of diode used in a Full Wave Rectifier that uses center-tapped transformer is _____.
2. Resistance to flow of AC current by capacitor is called _____.
3. The number of diode used in a Bridged Rectifier is _____.
4. An oscillator is to _____ any repetitive or sinusoidal signal.
5. Resistance to flow of AC current by inductor is called _____.
6. One of the requirements of a good power supply is to keep its output voltage constant, which is produced by its stage called _____.
7. Low Pass Filter is a circuit that allow all frequencies below _____.
8. The most important electronic component in a rectifier circuit is called _____.
9. The type of transformer used to reduce shock hazard is called _____ the primary/secondary turns ration is usually one.
10. The two terminals of the zener diode are the anode and the _____.

SECTION D **Briefly describe the function of the following**
Each correct function is worth 2 marks each.

[20 MARKS]

1. Transducer

2. Microphone in a radio system

3. Video Camera in a television system

4. Transmitting Antenna in Radio System

5. Loudspeaker in a Radio System

6. CRT in a Television System

7. Transmitting Antenna in a Television System

8. Receiving Antenna in a Radio System

9. Demodulator or detector in a Radio Receiver

10. Modulator in a Radio System

SECTION E

[50 MARKS]

1. Give the main difference between LCD and LED TV? (3 marks)
2. A LCD Television has various boards. For the following boards, explain the function and the common faults that will occur if the board is faulty. (6 marks)

Name of Board	Function	Common Faults
A. Timing Control Board		
B. Inverter Board		
C. LCD TV Main Board		

3. Briefly explain the functions of the tuner? (3 marks)
4. List 5 factors that help a LED TV to last longer? (5 marks)
5. The television channel 2 occupies the frequencies between 82-88MHz. Determine the following:
 - a. the bandwidth of the channel? (2 marks)
 - b. the sound carrier frequency? (2 marks)
 - c. the picture carrier frequency? (2 marks)
 - d. the intercarrier frequency? (2 marks)

6. Suppose you are working as a technician in an electronic repair shop and you come across a faulty horizontal output transistor with the number 2SC5149. As a technician, how will you test this transistor? Hint: Part of datasheet is shown below. (5 marks)

TOSHIBA **2SC5149**

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

2SC5149

HORIZONTAL DEFLECTION OUTPUT FOR MEDIUM RESOLUTION DISPLAY, COLOR TV
HIGH SPEED SWITCHING APPLICATIONS

- High Speed : $t_f = 0.2 \mu s$ (Typ.)
- High Voltage : $V_{CBO} = 1500 V$
- Low Saturation Voltage : $V_{CE(sat)} = 5 V$ (Max.)
- Built-in Damper Type
- Collector Metal (Pin) is Fully Covered with Mold Resin.

MAXIMUM RATINGS ($T_a = 25^\circ C$)			
CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	1500	V
Collector-Emitter Voltage	V_{CEO}	600	V
Emitter-Base Voltage	V_{EB0}	5	V
Collector Current	DC	8	A
	Pulse	16	A
Base Current	I_B	4	A
Collector Power Dissipation ($T_c = 25^\circ C$)	P_C	50	W
Junction Temperature	T_j	150	$^\circ C$
Storage Temperature Range	T_{stg}	-55-150	$^\circ C$

Unit: in mm

1. BASE
2. COLLECTOR
3. EMITTER

JEDEC —
EIAJ —
TOSHIBA 2-1682A
Weight: 5.5 g (Typ.)

EQUIVALENT CIRCUIT

50 Ω (Typ.)

7. What are the causes of the following faults when you have these symptoms: (10 marks)
- a. Vertical line before screen goes black.
 - b. A dot on the screen.
 - c. Horizontal bars appear across the screen.
 - d. Horizontal lines across the screen.
 - e. No glow on the CRT
8. Describe the meaning of the word impedance and state how the transmission line from the antenna is normally matched to the tuner? (4 marks)
9. Suppose you are working in a television repair center and a customer brings a LCD television complaining that multiple vertical lines appear on the screen. What is the likely fault and solution for the problem? (3 marks)
10. How will you perform purity adjustment in a CRT color television? (3 marks)

*****THE END*****