



COLLEGE OF ENGINEERING SCIENCE & TECHNOLOGY

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

FINAL EXAMINATION-PENSTER 1-2017

CERTIFICATE IV IN E ELECTRONIC ENGINEERING STAGE 5

EEE422 TELEVISION SYSTEMS

DAY/TIME : To be determined. TIME : To be determined

INSTRUCTIONS TO STUDENTS

1. You are allowed 10 minutes EXTRA time during which you are not to write.
2. Write your candidate number on the top of each sheet of the answer booklet.
3. Write all your answers in the ANSWER BOOKLET provided.
4. For all sheet of papers on which rough/draft work has been done, cross it through and attach these to your answer script.
5. There are 7 questions worth a total of 120 MARKS.
6. Attempt all questions within 2 hours

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Section A – Match each term on the RHS to its meaning on the LHS ?

(1 marks each)

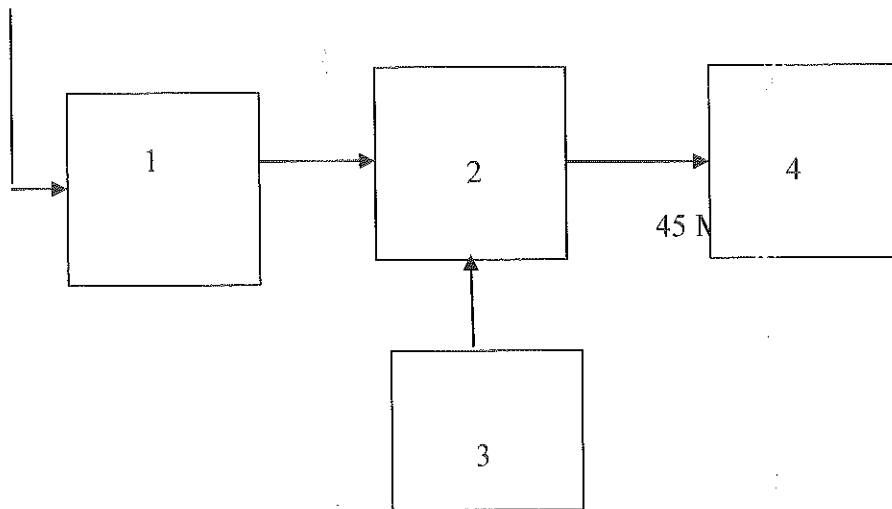
	LHS	RHS	
1	An oscillator that produces output pulses at 59.94 Hz for vertical scanning in response to sync pulses.	Sync pulse separator	A
2	A circuit that attenuates undesired frequencies but passes desired frequencies without change.	Varicap	B
3	An initial signal processing stage that delivers RF, IF, or demodulated information to further processing stages.	Static convergence	C
4	A group of three tiny color areas (red, green and blue) that combine to produce a single color picture element	Dynamic convergence	D
5	To make events occur at the same or proper time.	Gray scale	E
6	The convergence of picture tube electron beams at different distances at the rear of a display screen during scanning.	Triad	F
7	The convergence of picture tube electron beams at the center of the screen	Tuner	G
8	A diode designed to change the capacitance of its depletion region in response to changes in reverse bias voltage, used in tuning circuits.	Trap	H
9	A circuit that removes sync pulses from a detected video signal for amplification	Synchronize	I
10	A chart that includes increasingly non-reflective shades of gray in discrete steps	Vertical oscillator	J
11	The part of a composite video waveform that includes brightness information about the original scene that was imaged.	Luminance amplifier	K
12	A line of separate light and dark picture elements created by horizontal scanning.	Horizontal oscillator	L
13	Video camera	combiner	M
14	An output device of a TV system which convert electrical energy to sound energy	hue	N
15	A unit to allow two carriers to feed the same antenna	Vertical scanning	O
16	A video receiver tuner frequency trap that attenuates unwanted intermediate frequencies (IF) created in the heterodyne process	Trace	P
17	The dominant wavelength of a visible light that distinguishes one specific color from another.	Camcorder	Q
18	An oscillator that produces output horizontal sync signals of 15,734.25 Hz for horizontal scanning.	Speaker	R
19	The process of moving the electron beams in a picture tube downward to scan consecutive horizontal lines.	IF Trap	S
20	A stage in a color video receiver that amplifies video detector output.	Luminance signal	T
	20 marks		

Section B – Analyse the table below and fill the empty space with the correct frequency and channel number to complete ?
1 mark per blank filled

	TV Channel	Maximum frequency	Minimum Frequency	Picture Carrier	Sound Carrier	Bandwidth
1			54 MHz			6 MHz
2	3	66 MHz				6MHz
3	13		210 MHz			
4	10		192MHz		197.75MHz	
5	83	890 MHz			889.75MHz	6MHz

[15 marks]

Section C – Refer to the block diagram below and answer the questions that follow ?



1	What is the combined name of these blocks of a television receiver?	2m
2	State the name of the block numbered 1 ?	1m
3	State the name of the block numbered 2 ?	1m
4	State the name of the block numbered 3 ?	1m
5	State the name of the block numbered 4 ?	1m
6	How is the frequency in block 3 related to the frequency in block 1 ?	2m
7	State the function of block 2 ?	2m

[10 marks]

Section D

From the list of terms in the last row select the particular one that matches a statement [1-20]. Clearly write the question number in your answer sheet and the answer beside it?

1 mark each

	STATEMENT	ANSWER
1	The type of TV that produces a picture by passing an electrical current through an inert gas sealed between two glass plates	
2	Those off to the side of TV still view without picture degradation	
3	Difference between absolute white and absolute black	
4	Device that converts picture into voltages in a camera	
5	Movement of electron beam from right to left of the screen	
6	A type of gas used in the plasma television	
7	A type of fluorescent light used in LCD television backlight	
8	A component in a degaussing circuit of a CRT television	
9	A circuit that that operates only on the moment of switching the power on in a CRT television receiver	
10	The part that when heated up produces electrons	
11	The impedance of the rf input of the television receiver	
12	Transformer that matches the antenna impedance to the coaxial cable	
13	Cable that carries the signal from antenna to TV receiver input	
14	Antenna usually connected to its input in a television receiver	
15	Causes the electron beam to accelerate to the phosphor dots	
16	Commonly known as luminance signal which causes brightness	
17	Commonly called colour signal for colour information or chroma	
18	Make invisible the retraces required in scanning	
19	Scanning in the camera and that of the CRT to move in step of each other	
20	A LCD display with LED backlighting is called	
T E R M S	ADG, Balun, Blanking pulses, C signal, Cathode, CCF, Transmission line, CCD, LED television, High voltage, Viewing Angle, Posistor, Plasma, Sync pulses, Retrace, Neon, Contrast, Y signal, RF Amplifier, 75 ohm,	
	[20 marks]	

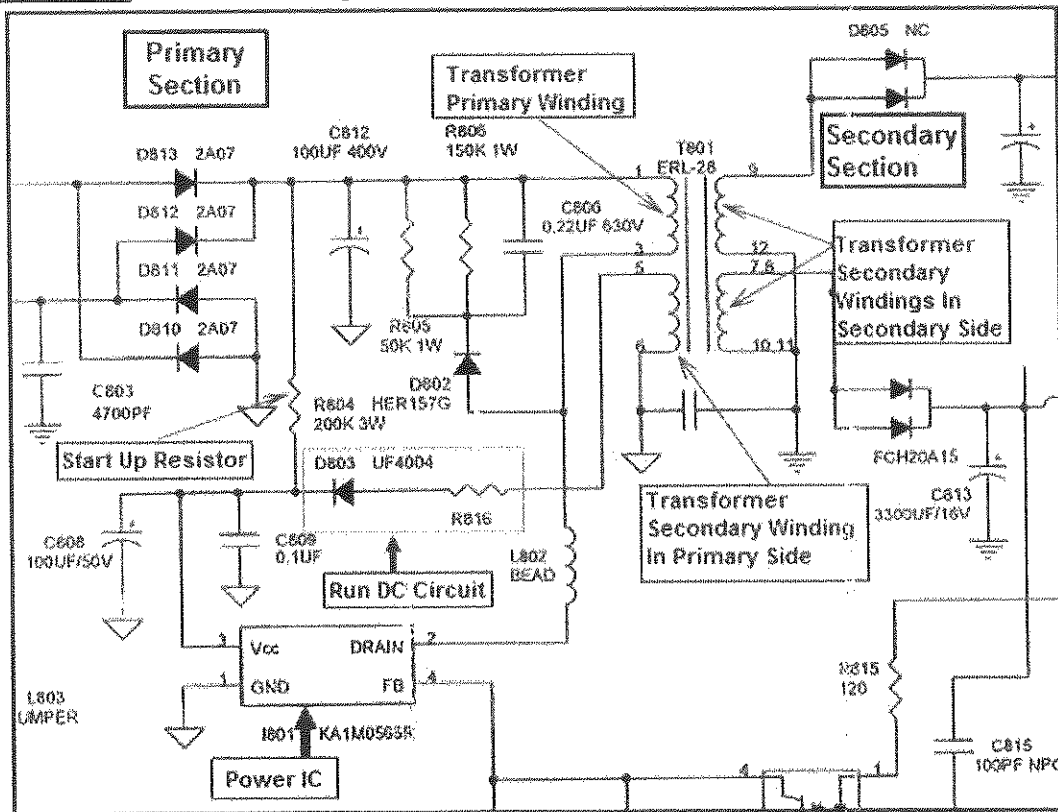
**Section E – Fill each blank with the correct word or number to complete the statement ?
Clearly write the question number in your answer sheet and the answer beside it ? DO IT
RIGHT THE FIRST TIME? [1 mark per blank]**

1	In a television system there are two carriers in one channel. One carrier is for the _____ and the other one is for _____.
2	A television system could be identified by the number of lines scanned in a frame of picture; and for NTSC system there are _____ lines and for the PAL system there are _____ lines.
3	Intercarrier Frequency is the difference between the _____ carrier frequency and the _____ carrier frequency.
4	A simple television system usually consists of two sub-systems namely the _____ and the _____.
5	A transducer is an electronic device that _____ a form of energy from one form to another form.
6	In a television transmitter system there are three transducers used; namely _____, _____, and _____.
7	In a television receiver system the transducers used are the _____, the _____, and the _____.
8	The input into the television receiver is the _____ and the input device is the _____.
9	One output of the television receiver is the picture and its output device is the _____.
10	One output of the television receiver is the sound and its output device is the _____.
11	The function of the television transmitting antenna is to convert _____ energy into _____ energy.
12	The function of the television receiving antenna is to convert _____ energy into _____ energy.
13	The two types of modulation used in a television transmission are _____ and _____.
14	The front end of a television receiver usually consists of _____, _____, and _____.
15	The function of the mixer is to _____ the signal received to _____.
	[30 marks]

Section F – Briefly explain the answer to each of the following questions ?Clearly write the question number in your answer sheet and the answer beside it ?

1	Differentiate between a colour and monochrome television ?	1.5 marks
2	Describe how the colour is obtained in television receiver?	1.5marks
3	Describe how the CYAN color is produced in a television receiver ?	0.5 mark
4	Describe how the YELLOW color is produced in a television receiver ?	0.5mark
5	Describe how the MAGENTA color is produced in a television receiver ?	0.5mark
6	Describe how WHITE is produced in a television receiver ?	0.5mark
7	Describe the formula which is used to calculate the length of an efficient antenna ?	0.5 marks
8	Calculate the length of a dipole to receive the TV signal sent by Fiji One channel, the frequency of which is 200 MHz ?	2.5marks
9	Briefly explain the term “bidirectional” in relation to antenna ?	0.5mark
10	Briefly explain the term “omnidirectional” in relation to antenna ?	0.5mark
11	Explain the term aspect ratio in television ?	0.5mark
12	State the aspect ratio of the PAL system ?	0.5mark
13	Describe the cause of ghost image in television reception ?	1 mark
14	What is “ Line Of Sight” in television transmission ?	1 mark
15	Why is it required to place a balun between the RF input to a TV receiver and the coaxial cable that runs to the antenna ?	1 mark
16	Briefly explain horizontal polarization ?	1 mark
17	Briefly explain circular polarization ?	1 mark
	[15 marks]	

Section G-Refer to the diagram below and answer the questions that follow;



- (i) Identify the above circuit ? 1m
- (ii) Which type of equipment this circuit would be located ? 1m
- (iii) How many windings in the primary side of the transformer ? 2m
- (iv) Identify the terminals of all the windings of the secondary windings ? 2m
- (v) Estimate the voltage that should be present in pin 3 of the power IC? 2m
- (vi) Explain how you are to confirm that the transformer is faulty or not ? 2m

[10 marks]