



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

CERTIFICATE IV IN ELECTRONIC ENGINEERING

EEE422 – TELEVISION SYSTEM 1.

FINAL EXAMINATION – TRIMESTER 3, 2016

DAY/DATE: as per timetable. TIME: 2 HOURS 10 MINUTES

ROOM: as per timetable. MAXIMUM MARKS: 100

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 string.*
5. *For all sheets of paper on which rough/draft work has been done, cross it though and you MUST ATTACH to your answer scripts.*
6. *Write clearly the number(s) of the question(s) attempted on the top of each sheet.*
7. ANSWER ALL QUESTIONS.
8. *Show all workings where necessary.*
9. *Do not use programmable calculators, especially the ones that does the conversions of number systems.*
10. ***ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM!***

**SECTION A: MULTIPLE CHOICE**

**[15 MARKS]**

1. In an Amplitude Modulation
  - A. Amplitude of the carrier varies
  - B. Frequency of the carrier remains constant
  - C. Phase of the carrier remains constant
  - D. All of the above
  
2. What is the typical anode voltage for a 25-in color picture tube?
  - A. 10 kV
  - B. 30 kV
  - C. 1 kV
  - D. 30 V
  
3. A lens has an 8-cm focal and 4-cm diameter. Its f rating is
  - A. 2
  - B. 4
  - C. 8
  - D. 32
  
4. Lack of raster often indicates
  - A. No television signal
  - B. No video signal
  - C. No AGC
  - D. No high voltage
  
5. 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
  
6. The line frequency for Fiji Television system is :
  - A. 15625 Hz
  - B. 15750 Hz
  - C. 15650 Hz
  - D. All of the above

7. What is the diagonal screen size for the 19CP4 picture tube?
- A. 12 in
  - B. 16 in
  - C. 24 in
  - D. 19 in
8. The R, G, and B screen grid adjustments are set for \_\_\_\_ in the picture.
- A. visual cutoff
  - B. white highlights
  - C. brightness control
  - D. gray-scale tracking
9. In gamma correction the \_\_\_\_\_ is stretched by the picture tube.
- A. Black
  - B. gray
  - C. white
  - D. red
10. The second IF value for color in receivers, for any station, is \_\_\_\_\_.
- A. 0.5 MHz
  - B. 1.3 MHz
  - C. 3.58 MHz
  - D. 4.5 MHz
11. The coils above and below the electron beam of the picture tube are for \_\_\_\_\_.
- A. V scanning
  - B. H scanning
  - C. Either V or H scanning
  - D. None of these
12. Vivid, strong colors are often referred to as
- A. Hue
  - B. Luminance
  - C. Saturation
  - D. Chrominance

13. When the TV set was turned on, full power was applied to the heater and the picture appeared within a fraction of a second.
- A. Ultor
  - B. Instant-on operation
  - C. Implosion
  - D. Screen persistence
14. The sound and video signals are separated at the \_\_\_\_\_.
- A. Intermediate- frequency stage
  - B. Video amplifier
  - C. Burst separator
  - D. Video detector
15. Coaxial cable for distribution systems has an impedance of \_\_\_\_\_.
- A. 50 ohms
  - B. 75 ohms
  - C. 150 ohms
  - D. 300 ohms

**SECTION B**

**FILL IN THE BLANK**

**[30 MARKS]**

**PART 1**

From using theory of TV signal spectrum and frequency allocations, complete the table below by filling each cell with the appropriate figure.

TV Channel No	Minimum Frequency (MHz)	Sound Carrier Frequency (MHz)	Maximum Frequency (MHz)	Picture Carrier Frequency (MHz)	Channel Bandwidth (MHz)	VHF Low VHF High or UHF Band
3	60					
6		87.75				
20				507.25		

[1 mark per cell]

**PART 2**

Complete the statement by filling the space provided with the correct word or number. Write the question number and answer beside it on your answer sheet.

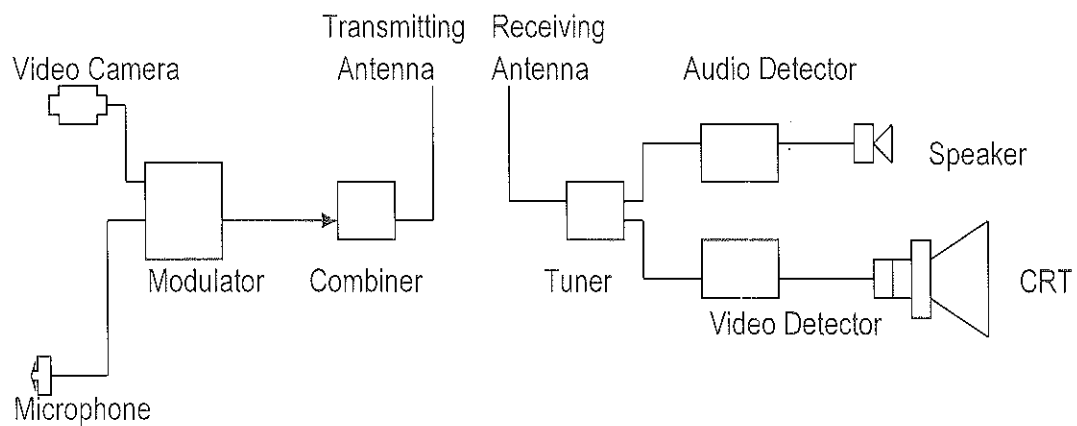
- To reduce flickering, \_\_\_\_\_ scanning is used.
- The band of frequencies used for video and audio signal transmission is called a \_\_\_\_\_ channel.
- The video bandwidth in the PAL system is \_\_\_\_\_ whereas in the NTSC system is \_\_\_\_\_.
- The brightness control usually is located on the \_\_\_\_\_ with the \_\_\_\_\_.
- In the receiving section of a television system the output devices are \_\_\_\_\_ and \_\_\_\_\_.
- Scanning is the movement of the electron beam from \_\_\_\_\_ to \_\_\_\_\_ and \_\_\_\_\_ to \_\_\_\_\_ of the screen.
- Modulation is a process of transmitting sound and picture in a television system. Sound is transmitted using \_\_\_\_\_ modulation while picture uses \_\_\_\_\_ modulation.
- The number of lines in the NTSC system is \_\_\_\_\_.

[1 mark per blank]

**SECTION C**

**[30 MARKS]**

1. Briefly explain the term "*balun transformer*" and state an application of it? [2 marks]
  
2. The PAL TV system uses 625 interlaced scan lines occurring at a rate of 25 frames per second. The horizontal scanning rate is 15,625 Hz. About 80 percent of one complete horizontal scan is devoted to the displayed video, and 20 percent to the horizontal blanking. Assume that the horizontal resolution is about 512 lines. Only about 580 horizontal scan lines are displayed on the screen. Calculate the bandwidth of the system? [3 marks]
  
3. Given is the block diagram of a basic television system. Briefly discuss the functions of at least 5 transducers? [5 marks]



[5 marks]

4. In TV system used in India, total number of scanning lines per frame is 625 and the line lost per field is 20. Calculate vertical and horizontal resolutions? [3 marks]
  
5. In video, the colour spectrum contains three primary colours, namely red, green and blue. By combining these colours, all the other colours of the spectrum can be produced. Determine the output of the following colours.
  - a) red + blue =
  - b) red + cyan =
  - c) green + magenta =[1 mark each]
  
6. Mention some important characteristics of human eye? [2 marks]
  
7. Explain with the aid of a diagram how the ADG operates? [3 marks]

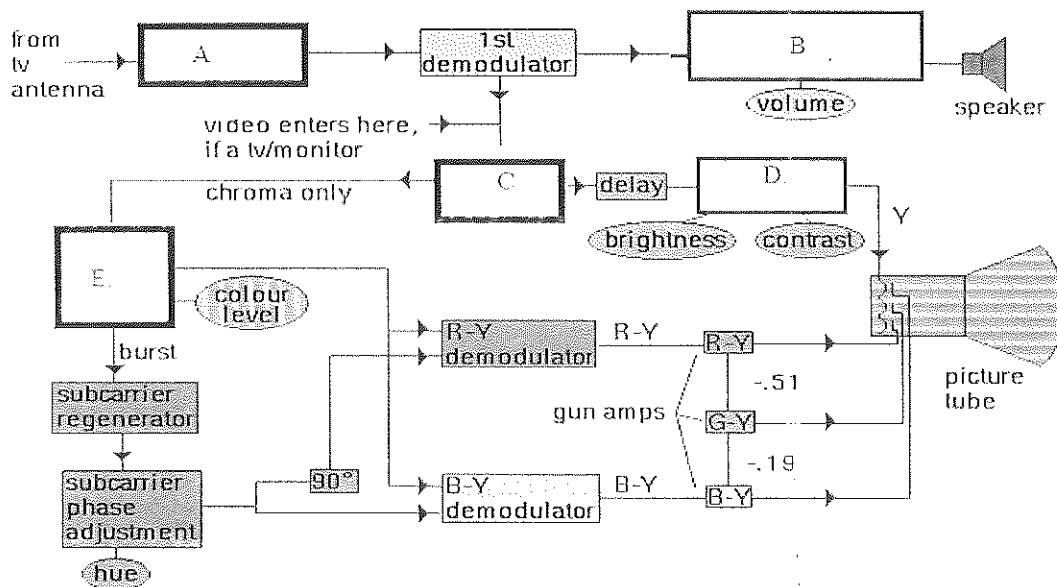
8. List at least three features of the PAL system? [3 marks]
9. In order for a flyback transformer circuit to function well and produce the high voltage, there must be some requirements to be met. Explain at least the five requirements. [5 marks]
10. Differentiate monochrome and colour camera tube? [1 mark]

**SECTION D**

**TROUBLESHOOTING AND IDENTIFICATION**

**[23 MARKS]**

1. 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? [2 marks]
2. A technician is troubleshooting a television which has normal picture but a distorted sound. As a technician, what would you do to remedy the problem? [2 marks]
3. A CRT television displays the picture which is squashed vertically and a part of it may be flipped over and distorted. Indicate the cause of the fault? [2 marks]
4. A CRT screen displays one horizontal line in the center when turned-on. What is the likely fault and solution for the problem? [2 marks]
5. Answer the following question relating to the block diagram below.

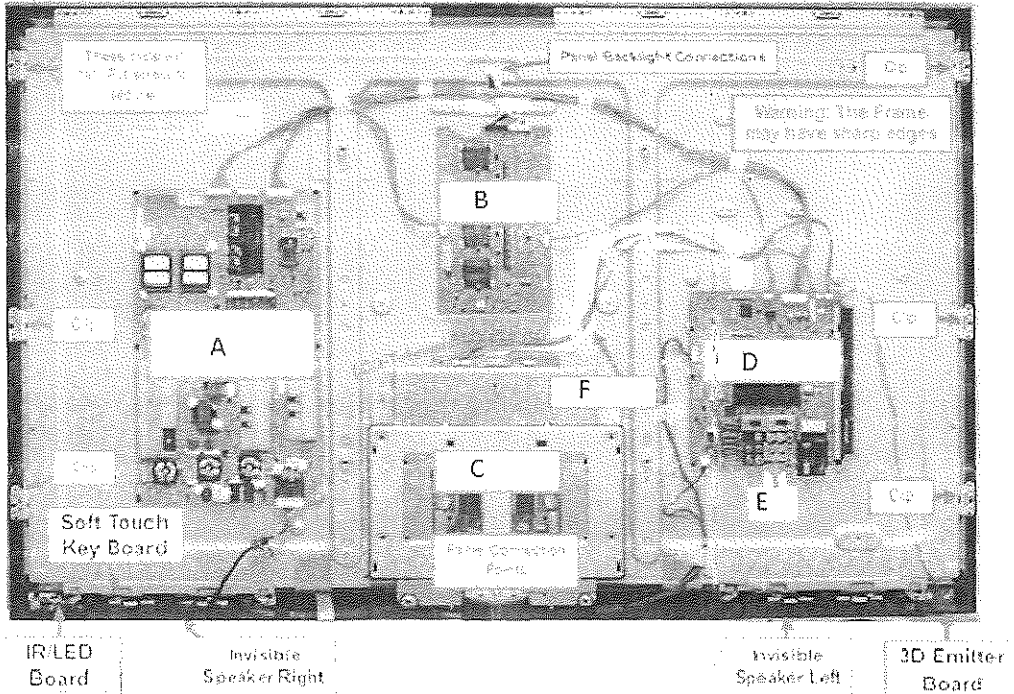


- a. What block diagram is shown above?
- b. Identify the missing blocks from A to E.

[1 mark]  
[5 marks]

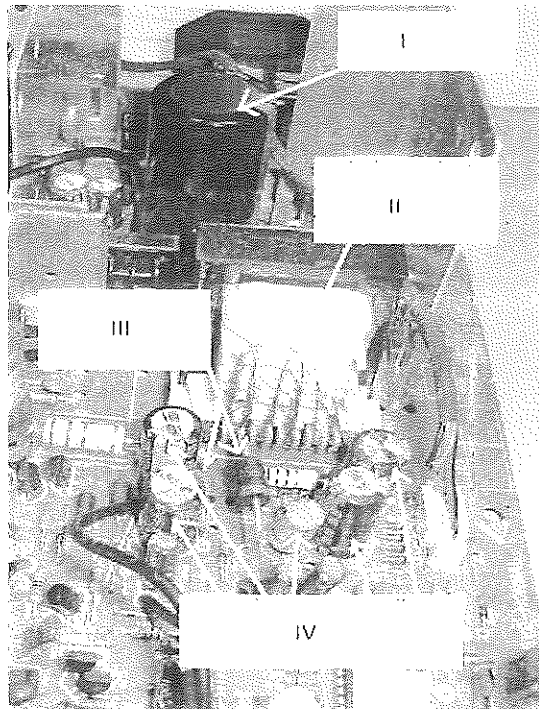


6. Identify the parts labeled from A to E of the LCD television given below?



[5 marks]

7. Identify the parts labeled from I to IV of the CRT main board given below?



[4 marks]

-----THE END-----

