

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 3

B. Tech
PEEC 5303

Sixth Semester Regular Examination – 2015

RADAR AND TV ENGINEERING

BRANCH (S) : EC, ETC

QUESTION CODE : J 458

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.



1. Answer the following questions :

2×10

- (a) Write the differences between predetection integration and post-detection integration.
- (b) What is the revisit time ?
- (c) How does the beam width and the antenna gain change with beam scanning ?
- (d) Define time around echoes.
- (e) Distinguish between duplexer and diplexer.
- (f) Name the display used to produce the target position.
- (g) Define the relationship of the radar range with that of the minimum receivable power.
- (h) How clutters are produced in the receivers ?
- (i) Why CCD imagers present no lag ?
- (j) With a 5MHz band width of Radar receiver calculate the highest range resolution.

2. Calculate the no of lines per frame and no of pixels per frame for the TV system shown in Figure1 below . Also calculate the value of Kell factor for setting the no of lines per frame as 625. Assume that the horizontal and vertical resolutions is of same order. 10

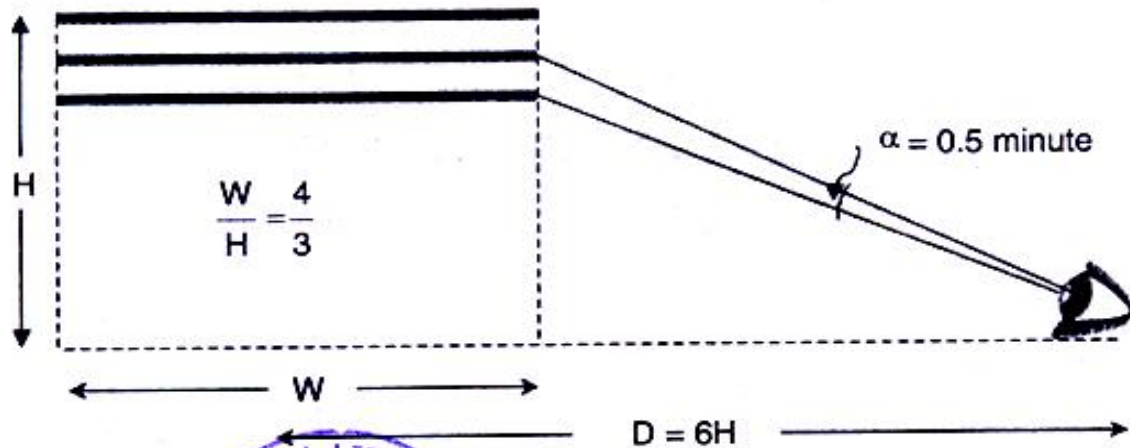


Figure 1

3. With the help of neat sketch plot the block diagram of a monochrome TV receiver and describe the function of each block. 10
4. (a) A guided missile tracking radar has the transmitted power = 400 KW, pulse repetition frequency = 1000 pps and pulse width = 0.8 micro second find out unambiguous range, duty cycle and average power of the radar. 5
- (b) Define pulse repetition frequency. Derive its relationship with maximum unambiguous range and average power of Radar. 5
5. (a) A radar operates at 9 GHz at a peak power of 1 MW. The power gain of its antenna is 5000. The minimum receivable power is 1 PW. Find the maximum range of the radar, given that the effective area of the antenna is 16 m^2 and the radar cross-section is 4 m^2 . 5
- (b) Draw the constructional features of a Vidicon camera tube. Explain its various features. Draw the circuit for signal production in vidicon, comment on tubes spectral response and resolution. 5
6. (a) Explain MTI receiver with delay line canceller and show its filter characteristics. 5
- (b) Explain in detail about non-coherent MTI Radar. 5

7. (a) An FM-CW radar using triangular modulation and operating at a center frequency of 10GHz produces an up sweep and down sweep frequency difference between the transmit and receive signals of 60KHz and 80KHz respectively. Determine the target range and radial velocity in nautical miles per hour if the modulation frequency is 100Hz and the sweep bandwidth is 2MHz. 5
- (b) With the help of neat sketch explain why 7MHz bandwidth is assigned to one channel in the TV system. 5
8. Write short notes on any **two** : 5 × 2
- (a) Vestigial Side Band Transmission
 - (b) Tracking Radars
 - (c) Integration of RADAR pulses
 - (d) Composite Video Signal.

