

8E4089

Roll No. \_\_\_\_\_

Total No of Pages: 4

**8E4089**

**B. Tech. VIII Sem. (Main/Back) Exam., April, 2015  
Electronics & Communication Engineering  
8EC2 Radar & TV Engineering**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks: 24**

*Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

1. NIL \_\_\_\_\_

2. NIL \_\_\_\_\_

**UNIT - I**

Q.1 (a) Derive the basic radar range equation, as governed by the minimum receivable echo power  $P_{min}$ . [8]

(b) Calculate the maximum range of a radar system which operates at 3 cm with a peak pulse power of 500 kW, if its minimum receivable power is  $10^{-13}$  W, the capture area of its antenna is  $5m^2$ , and the radar cross-sectional area of the target is  $20m^2$ . [8]

**OR**

- Q.1 (a) With the aid of a block diagram, explain fully the operation of an MTI system using a power amplifier in the transmitter. [8]
- (b) An MTI radar operates at 5GHz, with a pulse repetition frequency of 800 pps. Calculate the lowest three blind speeds of this radar. [8]

**UNIT - II**

- Q.2 (a) Draw the automatic direction finder for aircrafts and explain its working. [8]
- (b) Describe the instrument landing systems. [8]

**OR**

- Q.2 (a) Describe the long range navigation and their classification. [8]
- (b) What is tactical air navigation? Draw the radiation pattern for TACAN and waveform of detector output in the on board TACAN receiver. [8]

**UNIT - III**

- Q.3 (a) What do you understand by interlaced scanning? Show that it reduces flicker and conserve bandwidth. [8]
- (b) What do you understand by active and blanking periods in horizontal and vertical scanning? Give the periods of nominal, active and retrace intervals of horizontal and vertical scanning as used in the 625 line system. [8]

**OR**

Q.3 (a) Sketch the details of horizontal blanking and sync pulses. Label on it-

- (i) front porch
- (ii) horizontal sync pulse
- (iii) back porch
- (iv) active line periods.

Why are the front porch and back porch intervals provided before and after the horizontal sync pulse? Explain why the blanking pulses are not used as sync pulses. [8]

- (b) Sketch the sectional view of a picture tube that employs electrostatic focusing and electromagnetic deflection and label all the electrodes. Also show with a circuit diagram how DC potentials are supplied to the various electrodes of the picture tube. [8]

**UNIT - IV**

- Q.4 (a) Describe the vestigial side band transmission. Sketch and fully label the desired response of a TV receiver that includes necessary correction on account of the discrepancy caused by VSB transmission. Comment on the response curve drawn by you. [8]

- (b) Draw a block diagram to show how the video signal is modulated and processed at the picture transmitter. Why is high level modulation not used in a TV transmitter? [8]

**OR**

- Q.4 (a) What are the special requirements of a fringe area television antenna and how are these achieved? Give constructional details of a typical fringe area antenna and explain the precautions that must be taken while mounting it. [8]
- (b) Describe with suitable sketches various types of lead-in wires used for connecting the antenna to the TV receiver. What is the essential difference between balanced and unbalanced lines and how are they connected to the receiver? Why is a coaxial cable preferred for connecting a UHF antenna? [8]

**UNIT - V**

- Q.5 (a) Draw the functional block diagram of TV receiver and explain it. [8]
- (b) What are the essential requirements that a video amplifier must meet for faithful reproduction of picture details. [8]

**OR**

- Q.5 Write short notes on following: [4×4=16]
- (a) EHT generation
  - (b) HDTV
  - (c) DBS-TV
  - (d) 3D-TV

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