

BE - sem-VII (CBSSGS) EXTc - Microwave and Radar Engg  
 Microwave and Radar Engineering. 15/12/16  
 Q.P. Code : 788802

(3 Hours)

Total Marks : 80

Note : 1. Question No. 1 is compulsory.

2. Out of remaining questions, attempt any three questions.

3. Assume suitable additional data if required.

4. Figures in brackets on the right hand side indicate full marks.

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|-------|--|----|
| 1. a) | What is meant by RADAR range?  | 5  |
| b)    | Explain the working of Hybrid ring.  | 5  |
| c)    | Explain travelling wave tube as an amplifier.  | 5  |
| d)    | Explain working of IMPATT.   | 5  |
| 2. a) | Match a load impedance $Z_L = 60 - j80$ to a $50 \Omega$ line using a double stub tuner. The stubs are open circuited and are spaced $\lambda/8$ apart. The match frequency is 2 GHz.  | 10 |
| b)    | With a neat functional diagram explain the working principle of Cylindrical Magnetron.   | 10 |
| 3. a) | Discuss the various frequency bands and characteristics of microwaves.   | 10 |
| b)    | Explain Doppler Shift and its role in pulsed and CW RADAR.   | 10 |
| 4. a) | Explain instrument landing system for aircraft navigation.   | 10 |
| b)    | Radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and has a range of 100 nmi for objects whose radar cross section is $1 \text{ m}^2$ . If the minimum receivable power of the receiver is $2 \times 10^{-13}$ Watt, what is the smallest diameter of the antenna reflector could have assuming it to be a full paraboloid with $\eta = 0.65$ . | 10 |
| 5. a) | State various modes of Gunn diode and explain any one of them in detail.   | 10 |
| b)    | With block diagram explain the MTI radar system. Give its limitations.   | 10 |
| 6. a) | Give the working principle difference between Two Cavity Klystron and Reflex Klystron.   | 10 |
| b)    | Write a short note on rectangular waveguide.   | 10 |