

QP Code : 31407

(3 Hours)

[ Total Marks : 80

- N. B. : (1) Question no. 1 is compulsory.  
 (2) Answer any **three** questions from remaining **five** questions.  
 (3) Use Smith chart wherever necessary.  
 (4) **Figures to the right** indicate **full marks**.

1. (a) What are slow wave structures. Draw various structures and give their significance
- (b) Explain any two modes of operation Gunn diodes with schematics. 5
- (c) What is mode jumping in magnetron. How is it taken care of? 5
- (d) Explain the factors which govern the pulse repetition frequency in RADAR. 5
2. (a) The terminating impedance  $Z_L = 60 - j80 \Omega$ . Design two single stub (short circuited) tuning network to match this load to a  $50 \Omega$  line. 10
- (b) What is need of termination in microwave systems? Explain any two types of terminations. 10
3. (a) What is Faraday rotation in ferrites. Explain working of isolator using Faraday rotation 10
- (b) How does gyrotron tube differ from klystron and magnetron tubes. Explain the principle of operation of gyro TWT amplifier. 10
4. (a) Explain the working of a parametric amplifier and explain its application. 10
- (b) What do you understand by the term clutter. Explain the different types of RADAR clutter. Enumerate the properties of land and sea clutter. 10
5. (a) Derive an expression for RADAR range. Discuss effect of radar cross section on range determination. 10
- (b) Explain the construction and working of TRAPATT diode. 10
6. (a) Design two lumped element L-section matching network at 1 GHz to transform  $Z_L = 10 - j10 \Omega$  to a  $50 \Omega$  transmission line. 10
- (b) Write a short note on microwave FET. 5
- (c) A radar operating at a wavelength of 0.03m has a maximum range of 50 km. Its antenna gain is 2000 and the transmitter power is 250 kW. Its minimum detectable signal is 10pW, then find the RCS of the target. 5