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   5
         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   5
         RADAR..

2. (a) The terminating impedance Z_L= 60-j80 Ω. Design two single stub(short   10
         circuited) tuning network to match this load to a 50 Ω line .
    (b) What is need of termination in microwave systems? Explain any two   10
         types of terminations.

3. (a) What is Faraday rotation in ferrites. Explain working of isolator using   10
         Faraday rotation
    (b) How does gyrotron tube differ from klystron and magnetron tubes.   10
         Explain the principle of operation of gyro TWT amplifier.

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   10
         of RADAR clutter. Enumerate the properties of land and sea clutter.

5. (a) Derive an expression for RADAR range. Discuss effect of radar cross   10
         section on range determination.
    (b) Explain the construction and working ofTRAPATT diode.   10

6. (a) Design two lumped element L-section matching network at 1 GHz to   10
         transform Z_L = 10-j10 Ω to a 50Ω transmission line.
    (b) Write a short note on microwave FET.   5
    (c) A radar operating at a wavelength of 0.03m has a maximum range of   5
         50 km. Its antenna gain is 2000and the transmitter power is 250 kW.
         Its minimum detectable signal is 10pW, then find the RCS of the target.