Seventh Semester B.Tech. Degree Examination, July 2019
(2013 Scheme)

13.703 MICROWAVE AND RADAR ENGINEERING (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer all questions Each carries 2 marks :

1. What are the advantages of microwave tubes?
2. Define cyclotron angular frequency of Reflex Klystron.
3. Explain the significance of admittance in reflex klystron.
4. What are slow wave structures?
5. What are the different modes of oscillation in gunn diode?
6. Mention the applications of Tunnel diode.
7. What is the principle of duplexer?
8. How TWT differs from Reflex klystron?
9. What is 'S' matrix?
10. Explain microwave frequency measurement by electronic means.

(10 × 2 = 20 Marks)

P.T.O.
PART - B

Answer any one full question from each Module.

Module - I

11. (a) Derive the expression for velocity modulation of 2 cavity klystron. 10

(b) A two cavity klystron amplifier has the following parameters

\[ V_0 = 1000V \quad R_{sh} = 20k\Omega \quad I_0 = 20mA \quad f = 2GHz \]

gap spacing \( d \) = 1mm, spacing between 2 cavities \( L \)=4 cm, \( R_{sh} = 35k\Omega \)

(i) Find the input gap voltage to give maximum voltage \( V_2 \).

(ii) Find the voltage gain

(iii) Find the efficiency of the amplifier.

Calculate the beam loading conductance. 10

OR

12. Derive the expression for power output and efficiency of reflex klystron. 20

Module - II

13. Derive the expression for wave modes in TWT. 20

OR

14. (a) Draw the diagram and explain the working of magnetron. 10

(b) Derive the expression for Hull cut off voltage and magnetic equation. 10

G – 3784
Module – III

15. (a) Explain the physical structure of microwave bipolar transistor. 10
(b) What are the power frequency limitations. 10

OR

16. Explain the methods of measurement of impedance frequency and gain 20

Module – IV

17. (a) Explain the working of FMCW radar with diagram. 10
(b) Draw the diagram and explain the working of pulse doppler radar. 10

OR

18. Explain on instrument landing system with diagrams. 20