

2053

B.E. (Electronics and Communication Engineering)
Sixth Semester
EC-601: Microwave and Radar Engineering

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. Attempt the following:-

- (a) What is the purpose of strapping in Magnetron? (2)
- (b) Differentiate between E plane and H plane Tee. (2)
- (c) An IMPATT diode has $2.5 \mu\text{m}$ drift length. Calculate the operating frequency if drift velocity of charge carriers at saturation is $4 \times 10^6 \text{ cm/s}$. (2)
- (d) Give advantages of using CW radar. (2)
- (e) What are targets? How Doppler fundamentals are useful to track them? (2)

Part A

- 2 (a) What is the role of Isolator? Explain the working of Isolator with the help of suitable diagrams. (5)
- (b) A directional coupler is connected with 100 W power source having coupling factor 20dB and insertion loss 0.5 dB. Find the coupled power, output power and isolated power. (5)
- 3 (a) How high power can be measured using calorimetric method for microwave measurements? (5)
- (b) Explain magic tee with the help of suitable diagram. Also mention its applications. (5)
- 4 (a) Give comparison between IMPATT, TRAPATT and GUNN diodes on the basis of their performance characteristics and applications. Explain their structures to elaborate. (10)

Part B

- 5 (a) Explain the concept of velocity modulation with the help of applegate diagram. How reflex klystron acts as an oscillator? (5)
- (b) What are magnetrons? Explain the mechanism of oscillation in eight cavity magnetron with suitable diagram. (5)
- 6 (a) Derive the maximum range of target using radar equation. Also mention the range of radar frequencies. (5)
- (b) Explain moving target indicator radar with the help of suitable block diagram. (5)
- 7 (a) What are the parameters of radar tracking? With block diagram explain simple tracking radar. Briefly explain radar tracking methods. (6)
- (b) What are the different losses in radar equation? Explain radar cross-section. (4)

x-x-x