

D 90262

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Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE
EXAMINATION, NOVEMBER 2015

EC/PTEC 09 702—MICROWAVE ENGINEERING

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. What are the applications of microwave Engineering ?
2. Define transit time.
3. What do you mean by an applegate diagram ?
4. List down the various modes of transferred electron oscillators.
5. What are the losses in microstrip lines ?

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. State and prove S-matrix properties for the lossless junction.
7. Explain the behaviour of ferrites in non-reciprocal phase shifters.
8. Discuss the operation of TWT with its cross sectional diagram.
9. Write short notes on Millimeter wave tubes.
10. Explain the working principle of Schottky barrier diode.
11. Discuss the concept of microwave communication in detail.

(4 × 5 = 20 marks)

Part C

Answer all questions.

12. (a) (i) Explain the operation of a two hole directional coupler with a neat sketch. (7 marks)
(ii) A 20 dB coupler has a directivity of 30 dB. Calculate the coupling factor and isolation. (3 marks)

Or

- (b) (i) What is magic tee ? Explain the properties of magic tee, with its S-matrix. (5 marks)
(ii) Explain the operation of a microwave circulator. (5 marks)

Turn over

13. (a) Discuss the working principle of two cavity klystron amplifier. Derive the velocity modulation equation, bunching parameters and efficiency.

Or

- (b) Explain the working principle of cylindrical magnetron with neat diagram. Derive its power output and efficiency.

14. (a) (i) Explain the process of Gunn effect with two valley model theory. (5 marks)
 (ii) Discuss the working principle and characteristics of PIN diode. (5 marks)

Or

- (b) (i) Give the physical structure of IMPATT diode and derive its power output and efficiency. (5 marks)
 (ii) Discuss the working principle of parametric amplifiers. (5 marks)

15. (a) Explain in detail the measurement of VSWR through return loss measurements.

Or

- (b) Discuss the techniques behind monolithic and hybrid MICs.

(4 × 10 = 40 marks)