G 1115 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Electronics and Communication Engineering

MICROWAVE AND RADAR ENGINEERING (L)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What is a wavelength ? Explain the propagation of a plane wave through waveguide.
2. What are the applications of magic Tee ?
3. Explain the high frequency limitations of microwave tubes.
4. What is frequency pulling and pushing with reference to a magnetron ? Explain.
5. Explain two-valley model of the Gunn effect.
6. Using energy band diagrams, explain the tunnel diode characteristics.
7. What are multiple time around echoes ? Explain.
8. What is blind speed ? Explain the relation between blind speed and PRF.
9. Explain four methods of navigation.
10. Explain the three segments of the GPS systems.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Explain with neat diagram, Faraday's rotational isolator. (7 marks)

    (b) Explain the constructional details of E-plane Tee and obtain its S-matrix. (5 marks)

Or

12. Derive the expressions for E and H-field in x, y, z co-ordinates for TE modes in a rectangular waveguide.

Turn over

13. Explain the working of TWT. Derive an expression for axial electric field in case of Helix travelling wave tubes.

Or

14. Explain the working of a reflex Klystron with the Applegate diagram and constructional structure. Derive the expression for the exit velocity of the buncher gap of a two-cavity Klystron amplifier.

15. With neat sketches, explain the avalanche transit time devices.

Or

16. (a) With circuit diagram, explain three configurations of microwave bipolar transistor. (4 marks)

(b) Describe the construction, fabrication and encapsulation of Gunn diodes. (8 marks)

17. Derive the relation showing how noise figure affects the maximum radar range. Also discuss the other factors which affect the range.

Or

18. With the aid of block schematics, explain the operation of an MTI radar using range gates and filters.

19. (a) Discuss the limitations and errors associated with loop direction finder. What are the remedies ? (8 marks)

(b) Explain the working of a marker beacon. (4 marks)

Or

20. Explain the principles of working of LORAN-A and LORAN-C.

(5 × 12 = 60 marks)