

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2018 - 19 Examination**

**Semester: 7**  
**Subject Code: 03107402**  
**Subject Name: Microwave Engineering**

**Date: 10/05/2019**  
**Time: 10:30am to 1:00pm**  
**Total Marks: 60**

---

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions****(15)**

1. Power dividers and couplers are \_\_\_\_\_ microwave components used for power division or power combining.
  - (a) Passive
  - (b) Active
  - (c) Linear
  - (d) Non Linear
2. To get an admittance chart from an impedance chart, Smith chart has to be rotated by \_\_\_\_\_
3. The symbol of Tunnel Diode is \_\_\_\_\_
4. For transverse electromagnetic wave propagation, we need a minimum of \_\_\_\_\_ conductor.
5. Transmission line is a \_\_\_\_\_ parameter network
  - (a) Lumped
  - (b) Distributed
  - (c) active
  - (d) None of the mentioned
6. Scattering matrix for a reciprocal network is
  - (a) Symmetric
  - (b) Unitary
  - (c) Skew symmetric
  - (d) Identity matrix
7. \_\_\_\_\_ Mode is not supported by rectangular waveguide
8. Normalized impedance of  $0.4 - 0.6j$  lies in the:
  - (a) Upper half of the impedance smith chart
  - (b) Lower half of the impedance smith chart
  - (c) Horizontal line of the chart
  - (d) None of the mentioned
9. In shunt stub matching, the key parameter used for matching is
  - (a) Admittance of the line at a point
  - (b) Admittance of the load
  - (c) Impedance of the stub
  - (d) Impedance of the load
10. What is magic Tee?
11. What are the applications of reflex klystron?
12. Define coupling factor for directional coupler
13. On which principle does Klystron operates?
14. Reflection coefficient of a transmission line in its polar form can be represented as \_\_\_\_\_
15. What do you mean by S parameter?

**Q.2 Answer the following questions. (Attempt any three)****(15)**

- A) Explain advantages and application of microwave
- B) Sketch rectangular waveguide and circular waveguide. Also compare their dominant mode, advantages and disadvantages

C) What are the limitations of conventional tube over UHF?

D) A transmission line has a characteristic impedance of  $50 + j0.01$  and is terminated in a load impedance  $73 - j42.5$ . Calculate reflection coefficient and SWR

**Q.3** A) Write voltage and current equation of transmission line. (07)

B) Find characteristic impedance of TEM modes in rectangular waveguide (08)

**OR**

B) Write application of magic tee and explain any one application with diagram. (08)

**Q.4** A) Write short note on Two Cavity Klystron (07)

**OR**

A) What is MMIC? Which materials are used for MMIC fabrication? Explain any one fabrication technique of MMIC. (07)

B) Explain working principles of Tunnel Diode with Energy-Band diagrams. Also Write Application of Tunnel diode. (08)