

**B.Tech. – VIEP – ELECTRONICS AND
COMMUNICATION ENGINEERING
(BTECVI)**

Term-End Examination

00339

December, 2017

BIEL-016 : MICROWAVE AND RADAR ENGINEERING

Time : 3 hours

Maximum Marks : 70

***Note :** Attempt any **seven** questions. All questions carry equal marks. Missing data may be suitably assumed. Use of scientific calculator is permitted.*

1. Derive the expressions for the field components of TM waves in a circular waveguide. Also define the modes of propagation. 10

2. (a) Describe a method for the measurement of an unknown microwave frequency. 5

(b) What is the basic principle on which a circulator works ? 5

3. Derive the basic radar range equation and discuss the parameters on which maximum range depends. 10

4. What are S-parameters ? Derive the S-parameter of a hybrid tee if all the ports of the tee are matched and power is incident from Port 3 only. 10
 5. Explain the principle of operation and the performance characteristics of a Reflex Klystron. 10
 6. With the help of the two-valley model, explain how negative resistance is created in the Gunn diode. 10
 7. What do you mean by Radar Clutter ? Derive the equation of surface clutter and also explain different factors affecting it. 10
 8. Give the applications of BWO, Tunnel diode and Directional coupler. 10
 9. With a neat schematic diagram of p-i-n diode, explain its principle of operation and characteristics. 10
 10. Write short notes on any **two** of the following : $2 \times 5 = 10$
 - (a) Microstrip Line
 - (b) Isolators
 - (c) Bends, Twists and Waveguide Couplings
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