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BIEL-016

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

00160

Term-End Examination

June, 2015

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 allowed.*

1. Derive the electric and magnetic field equations in wave guides for TE_{mn} mode. *10*

2. (a) An air-filled rectangular waveguide of inside dimensions 7 × 3·5 cm operates in the dominant TE_{10} mode.

(i) Find the cut-off frequency.

(ii) Determine the phase velocity of the wave in the guide at a frequency of 3·5 GHz.

(iii) Determine the guided wavelength at the same frequency. *5*

(b) Explain in brief the various limitations of conventional active devices at microwave frequency. *5*

3. Explain the construction and field pattern for microstripline. *10*

4. With the help of a neat block diagram, explain MT RADAR. *10*

5. Draw a neat schematic diagram of reflex klystron oscillator and explain its principle of operation. Derive an expression for its exit velocity. *10*

6. Explain the procedure for measuring microwave frequency and wavelength with a neat block diagram. *10*

7. Explain the principle of GUNN diode as an oscillator and as an amplifier. Obtain the condition for negative resistance. *10*

8. What is directional coupler ? Explain its types and also explain the coupling factor and directivity of a directional coupler, with the help of neat diagrams. *10*

9. Explain the different types of displays used in Radar systems. *10*

10. (a) What is the difference between isolator and circulator ? *3*

    (b) With a neat schematic diagram of a four-port circulator, explain its principle of operation. *7*
