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BIEL-016

01441

B. Tech. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2013

BIEL-016 : MICROWAVE AND RADAR ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any seven** questions.*

1. A rectangular waveguide has dimensions 2.5×5 cms. Determine the guide wavelength,(λ_g), phase constant β and phase velocity Vp at a wavelength of 4.5 cms for the dominant mode. **10**

2. (a) Double minimum method is used to determine the VSWR value on a waveguide. If the separation between two nulls is 3.5cm and that between twice minimum power points is 2.5 mm. Determine the value of VSWR. **5**

   (b) Explain the construction of waveguide twists and bends such that the direction of the propagated energy is gradually changed. **5**

3. Describe the various techniques of measuring unknown frequency of a microwave device. **10**

4. What is velocity modulation? How is it different from normal modulation ? Explain how velocity modulation is utilised in Klystron amplifier ? **10**

5. Explain the tunnel diode characteristics with the aid of energy band diagram. **10**

6. (a) Differentiate between MTI and Pulse doppler radars. **5**
   (b) Briefly describe the principle of operation of CW radar. **5**

7. What are the limitations of conventional tubes at microwave frequencies ? Explain how these limitations can be overcome ? **10**

8. A Radar transmitter has a peak pulse power of 400 kw. A PRF of 1500 PPS and a pulse width of 0.8. Calculate **10**
   (a) The maximum unambiguous range.
   (b) The duty cycle.
   (c) The average transmitted power.

9. (a) Mention the applications of Radar. **5**
   (b) Discuss briefly Duplexers Radar antennas. **5**

10. Write short notes on **any two** of the following : **2x5=10**
   (a) Varactor diode.
   (b) Isolators and circulators.
   (c) Stripline and micros tripline.