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BIEL-016

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B. Tech. IN ELECTRONICS AND COMMUNICATION ENGINEERING

Term-End Examination

June, 2012

BIEL-016 : MICROWAVE AND RADAR ENGINEERING

Time : 3 hours *Maximum Marks : 70*

*Note : (i) Attempt **any seven** questions.*

*(ii) Use of scientific calculator is **allowed.***

1. Determine the cut-off wavelength for the dominant mode in a rectangular waveguide of breadth 10cms. For a 2.5 GHz signal propagated in this waveguide in the dominant mode, calculate the guide wavelength, the group and the phase velocities. **10**

2. Describe in detail the operation of a 2-hole directional coupler. Calculate the coupling factor if the power in the primary waveguide is 72 MW and the power delivered to the directional coupler is 8 MW. **10**

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

4. (a) Briefly describe the factors responsible for making bipolar junction transistors unusable at microwave frequencies. 6

(b) Explain briefly different types of Tee Junctions. 4

5. List the performance characteristics and applications of a typical reflex klystron. 10

6. What is a PIN diode ? Describe the construction of a PIN diode and also its characteristic. 10

7. Name the CW radar type Capable of measuring both target range as well as target velocity. Briefly describe its principle of operation. 10

8. A radar receiver having a gain of 97dB and a Bandwidth of 5 MHz produces an output noise power of - 3dBm. Calculate the equivalent noise temperature of the noise added by the receiver over and above the thermal noise power component assuming T_o = 300° K, Boltzmann constant k = 1.38×10^{-23} J/o K, 10

9. (a) Draw the block diagram of C.W. radar receiver. 5

(b) Why do we call magnetron as cross field device ? Explain. 5

10. Write short notes on ***any two*** of following. **5+5=10**

(a) IMPATT and TRAPATT

(b) Isolators and circulators

(c) Stripline and microstripline