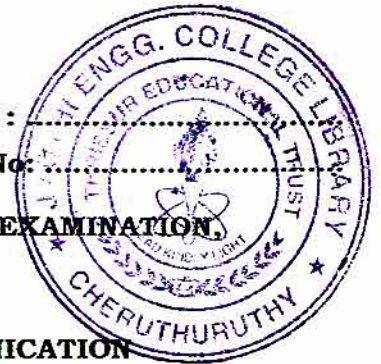29178

SEVENTH SEMESTER B.TECH (ENGINEERING) DEGREE EXAMINATION, NOVEMBER 2012

EC 2K 702 – MICROWAVE DEVICES AND COMMUNICATION

Time : Three Hours   Maximum : 100 Marks

I   (a) What is fading? Explain. Write the types of fading.

     (b) Explain the principle of operation of a Magnetron.

     (c) Explain the characteristics of rectangular waveguides.

     (d) Explain the basic principle   Microwave Links.

     (e) Why reflex klystron is a low power device? Explain. Write its potential applications.

     (f) Write a note on Directional Couplers.

     (g) Explain the characteristics of digital satellite links.

     (h) Distinguish between LSA, InP and Cd Te diodes.

                                                  (8 x 5 = 40 Marks)

II   (a) (i)   Explain in detail about Microwave Relay systems.

         (ii)   Briefly explain the various modulation process used in Microwave communications.

<p align="center">(Or)</p>

     (b) (i)   With neat sketch explain the satellite transponder and its functions.

         (ii)   What is CDMA? Explain in detail.

III   (a) (i)   Derive TE mode field equations of Rectangular Waveguide.

         (ii)   Explain about semi-circular cavity resonators. Derive the frequency of resonance equation.

<p align="center">(Or)</p>

     (b) (i)   Obtain the s matrix of ideal, matched lossless Series Tee.

         (ii)   Explain in detail the types of directional couplers with neat sketches.

IV   (a) (i)   Write a note on :

            1. LOS Range

            2. OTH System

         (ii)   Draw a neat block diagram of terminal receiver and explain its principle.

<p align="center">(Or)</p>

     (b) Give an account on :

            1. Multiple spot beam antenna

            2. Digital modulation schemes.

V   (a) Explain operation of Klystron with velocity modulation process and Bunching process.

(b) A travelling-wave tube (TWT) operates under the following parameters:

Beam Voltage	:	$V_o = 3$ kV
Beam Current	:	$I_o = 30$ mA
Characteristic impedance of helix	:	$Z_o = 10$ ohms
Circuit length	:	$N = 50$
Frequency	:	$f = 10$ GHz

Determine the (i) gain parameter ; (ii) the output power gain in decibels and (iii) all four propagation constants.

(4 x 15 = 60 Marks)

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