BE. sem. VII (EXTC) (Rev) Microwave & Device & Circuits.

May 2008

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Con. 3198–08. (REVISED COURSE) CO–3493

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume any **suitable** data whenever **required**.

1. Explain in brief (any **four**) :– 20
   (a) Attenuators
   (b) Helix TWT
   (c) Forward Wave Crossed Field Amplifier [FWCFA]
   (d) Rectangular Cavity Resonator
   (e) Microwave Hazards.

2. (a) Explain the working of two hole directional coupler with neat diagram and derive its S Matrix. 10
   (b) Explain waveguide terminations in detail. 10

3. (a) Distinguish between the characteristic impedance and the input impedance of a transmission line. Under what conditions will they be the same ? In a lossless line how can be the input impedance made purely inductive, capacitive, infinite and zero ? 10
   (b) Explain why matched termination is required in transmission line and hence, explain single stub matching in detail. 10

4. (a) A rectangular air-filled waveguide of inside dimensions 7 x 3·5 cm operates in the dominant mode at 3·5 GHz frequency. 10
   Find : (i) Cut-off frequncy
   (ii) Phase velocity
   (iii) Guide wavelength
   (iv) Characteristic wave impedance.
   (b) Derive the expression for the field in TE modes of circular waveguide. 10

5. (a) Draw the schematic diagram of cylindrical mode of magnetron and explain its principle of operation. 10
   (b) What is velocity modulation in a reflex klystron ? Explain with suitable equations. 10

6. (a) Tunnel diode is used as switch at microwave frequencies. Justify the above statement with the working and block diagram of Tunnel diode. 10
   (b) Explain basic principle of parametric amplifier. Explain how it can operate as a degenerative negative resistance amplifier. 10

7. (a) Describe in detail the principles of following terms :– 10
   (i) Gunn effect
   (ii) Two valley theory
   (iii) High field domain theory.
   (b) Explain in brief the measurement setup for :– 10
   (i) Wavelength and
   (ii) Antenna Gain.

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