

**6E6051**

Roll No. \_\_\_\_\_

Total No of Pages: **3****6E6051****B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016  
Electronics & Communication Engineering  
6EC1A Microwave Engineering-II****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks (Main & Back): 26****Instructions to Candidates:-**

*Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL \_\_\_\_\_2. NIL \_\_\_\_\_**UNIT-I**

- Q.1 (a) Explain the single - stub tuning and double – stub tuning techniques. [8]
- (b) Explain and discuss the L – section matching networks. [8]

**OR**

- Q.1 (a) For quarter wave transformer, show that the characteristic impedance is

$$Z_0' = \sqrt{Z_0 Z_L} . \quad [8]$$

- (b) Design a single – section quarter wave matching transformer to match a  $10 \Omega$  load to a  $50 \Omega$  transmission line at  $f_0 = 3 \text{ GHz}$ . Determine the percent bandwidth for which the  $\text{SWR} = \leq 1.5$  [8]

## UNIT-II

- Q.2 (a) Explain the working principle of Gunn Diode with the help of neat diagrams. [8]
- (b) Explain the construction, operation, equivalent circuit, figure of merit of Varactor Diode. [8]

### OR

- Q.2 (a) Describe construction and working principle of IMPATT Diode. [8]
- (b) Determine conductivity of an n – type GaAs Gunn Diode given electron density  $n = 10^{18} \text{ cm}^{-3}$ , electron density at lower valley  $n_l = 10^{10} \text{ cm}^{-3}$  and upper valley density is  $n_u = 10^8 \text{ cm}^{-3}$  and temperature  $T = 300^\circ\text{K}$ ,  $\mu_l = 8000 \times 10^{-4} \text{ m}$ ,  $\mu_u = 180 \times 10^{-4} \text{ m}$ . [8]

## UNIT-III

- Q.3 (a) Describe structure, operation and layout of microwave BJT. [8]
- (b) Describe the structure, operation principle and fabrication of MESFET. [8]

### OR

- Q.3 (a) Explain the working principle of microwave JEFT in detail. [8]
- (b) A certain GaAs MESFET has the following parameters:-

Channel height =  $a = 0.1 \mu\text{m}$

Electron concentration =  $N_d = 8 \times 10^{17} \text{ cm}^{-3}$

Relative dielectric constant  $\epsilon_r = 13.10$

Calculate pinch off voltage. [8]

## UNIT-IV

- Q.4 (a) Describe the mechanism of operation and modes of oscillation for reflex klystron. [8]
- (b) Explain the resonant modes, operation and mechanism of oscillation of cavity magnetron. [8]

OR

- Q.4 (a) Derive the Hull cut off magnetic field & cut off voltage in cylindrical magnetron. [8]
- (b) With the aid of sketch describe the operation of forward wave amplifier. [8]

## UNIT-V

- Q.5 (a) Discuss the basic schematic and mechanism of operation of two cavity klystron. [8]
- (b) Draw the basic schematic of helix type TWT tube and explain its operation. [8]

OR

- Q.5 (a) Explain CW power pulsed dual mode TWT. [8]
- (b) Explain the multi-cavity klystron and its advantages. [8]
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