

6E6051

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

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6E6051

**B. Tech. VI-Sem. (Main / Back) Exam., October 2020**  
**Electronics & Communication Engineering**  
**6EC1A Microwave Engineering - II**

Time: 2 Hours

Maximum Marks: 48

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Min. Passing Marks: 16

*Instructions to Candidates:*

*Attempt three questions, selecting one question each from any three unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing 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 micro strip line matching networks. [10]  
(b) Describe the Smith chart. How can it be used to determine an unknown impedance? [6]

**OR**

- Q.1 (a) With neat diagrams, explain the various steps involved in fabrication of MMIC. [12]  
(b) List out the basic materials required for the manufacturing of MMIC. [4]

**UNIT- II**

- Q.2 (a) Explain the principle of working of IMPATT diode with suitable structure and characteristics. [8]  
(b) Write a short note on detector diode. [8]

**OR**

- Q.2 (a) Draw equivalent circuit of varactor diode. Explain in detail its construction and operation. [8]
- (b) Explain the operation, basic modes of operation and oscillating modes in a Gunn diode. [8]

### UNIT- III

- Q.3 (a) List down the steps of MOSFET fabrication with suitable diagrams. [8]
- (b) Explain the principle of operation of n-channel JFET with neat and clean diagram. [8]

**OR**

- Q.3 (a) A certain GaAs MESFET has the following parameters - [8]
- 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.
- (b) Describe structure, operation and layout of microwave BJT. [8]

### UNIT- IV

- Q.4 (a) Explain the operation of Magnetron and write its applications. [8]
- (b) Explain the bunching process of reflex klystron and also derive the equation for efficiency. [8]

**OR**

- Q.4 (a) Derive an expression for cut off magnetic field for a cylindrical magnetron. [8]
- (b) Discuss the problems associated to conventional tubes at microwave frequencies. Explain working of two cavity klystron with necessary diagram and waveforms. [8]

**UNIT- V**

- Q.5 (a) Write a short note on backward wave oscillator. [8]
- (b) Explain the suppression of oscillations in TWT. [8]

**OR**

- Q.5 (a) Draw the structure of TWT and explain its amplification process. [8]
- (b) Derive the expression for Axial Electric field in helix type travelling wave tube. [8]
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