



NBW-003-015403 Seat No. _____

M. Sc. (Electronics) (Sem. IV) (CBCS) Examination

April / May - 2017

Microwave Electronics : Paper - XV

(New Course)

Faculty Code : 003

Subject Code : 015403

Time : Hours]

[Total Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Figures on right hand side indicate marks.

- 1 (A) State whether the following statements are true or false. **6**
- (1) Overlay and mesh geometries are used for power transistor.
 - (2) (FETs) at microwaves freqs. are mostly fabricated in GeSi and used as metal-semiconductor Schottky junction for the gate contact.
 - (3) GaAs exhibit a negative differential mobility that is a decrease in the carrier velocity with increase in electric field.
 - (4) TE_{10} mode has the longest operating wavelength and designated as the dominant mode in circular waveguide.
 - (5) The wave of lowest frequency or the dominant mode in the circular wave-guide is the TE_{11} mode.
 - (6) All cavities of a klystron amplifier tube are tuned to the same frequency; this method of tuning is called Synchronous tuning.

- (B) Answer the following : 8
- (1) Which three power sources are used in reflex klystron?
 - (2) Which three cavities are used in multi cavity klystron?
 - (3) Give the full forms of BARITT and TRAPPAT.
 - (4) Which three characteristics of ordinary vacuum tubes become increasingly important as frequency rises?
- 2** Answer the following : (Any **two**)
- (1) Explain the basic principles of microwave tubes and describe the limitation of conventional tubes. 7
 - (2) Give the characteristic features and applications of microwaves. 7
 - (3) Describe the basic principles of velocity modulation. 7
- 3** Answer the following :
- (1) How two cavity klystron amplifier works? 5
 - (2) Explain the basic theory of operation of travelling wave tubes with electron beam and slow wave structure. 5
 - (3) Write note on reflex oscillator : 4
- OR**
- 3** Answer the following :
- (1) Explain the geometries of microwave transistors. 5
 - (2) Describe crossed electric and magnetic field in magnetron. 5
 - (3) Draw and explain the physical structure of MESFET. 4
- 4** Answer the following : (Any **two**)
- (1) Describe the principles of operation of TRAPATT mode of diode. 7
 - (2) Define the terms HMIC and MMIC. List the basic properties required for an ideal MIC material. 7

- (3) Describe the reflection of microwave from a metal surface with illustration. 7

5 Answer the following : (Any **two**)

- (1) Explain gunn oscillator circuits. 7
- (2) Discuss the two valley model theory of TEDs. 7
- (3) Draw and discuss the wave guide tee and magic tee. 7
- (4) Discuss the dielectric properties of material determined at microwave frequencies by dielectric measurement. 7
