



**DQ-003-1204006**

Seat No. \_\_\_\_\_

**M. Sc. (Sem. IV) Examination**

**March / April - 2022**

**Physics : ET-10**

*(Pulse and Microwave Electronics)*

*(New Course)*

**Faculty Code : 003**

**Subject Code : 1204006**

Time : **2.5** Hours]

[Total Marks : **70**

- Instruction :** (1) All questions carry equal marks.  
(2) Attempt all questions.

- 1** Answer any seven of the following. **14**
- (a) Define directional antenna and isotropic antenna.
  - (b) Define RADAR, write a full form of RADAR.
  - (c) List the linear beam tubes and cross field tubes.
  - (d) Define Blind speed.
  - (e) List the solid state microwave devices.
  - (f) Draw the circuit of diode noise clipper.
  - (g) Calculate duty cycle of a rectangular wave form of frequency 1 kHz and pulse width 400 microseconds.
  - (h) Define : RC time constant. Is it possible to charge a capacitor almost fully in one time constant time ? How ?
  - (i) Sketch the internal circuit diagram of IC-555.
  - (j) Distinguish different types of multivibrators.
- 2** Answer any two of the following :
- (a) Define antenna. What are the different types of antenna ? **7**  
Discuss with clean diagram ant two main and sub-type of antennas.
  - (b) Discuss with neat diagram construction and working **7**  
principle of travelling wave tube.
  - (c) Derive Radar range equation. **7**

- 3 Answer the following.
- (a) Draw two valley model fo n-type Ga As. What are the necessary conditions for the transferred electron effect to occur ? 7
  - (b) Write a detailed note on : Yagi-Uda antenna. 7

**OR**

- 3 Answer the following.
- (a) Draw the circuit of astable multivibrator using transistors explain its operation with wave form diagram. 7
  - (b) Sketch the circuit of schmitt trigger using transistors and explain its working and input and output characteristics in detail. Explain when does the circuit exhibit 'hysteresis' ? 7
- 4 Attempt any two.
- (a) Derive expression to relate 'rise time' and 'fall time' of input pulse waveform to upper cut-off frequency and lower cut-off frequency of an amplifier, respectively. 7
  - (b) Write criteria for getting good differentiation and integration of a periodic waveform, Design integrating circuit for good integration of a square wave of frequency 100 kHz. 7
  - (c) Explain operation of the circuit of monostable multivibrator using timer IC-555 with neat diagram. 7

- 5 Write notes on : (any two) 14
- (a) Display methods of RADAR.
  - (b) Steping and Zoning of lens antenna.
  - (c) Discuss with circuit diagrams : RC Ramp waveform generator.
  - (d) Draw the circuits of positive and negative clampers using diodes and explain circuit operation.