



BBE-003-1204006

Seat No. _____

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

July - 2021

Physics : ET-10

(Pulse & Microwave Electronics)

Faculty Code : 003

Subject Code : 1204006

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) The question paper contains TEN questions carrying 14 marks each.
(2) Attempt any FIVE questions.
(3) The number on the right margin indicates marks.

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(14)

- Define : Duty cycle for a rectangular waveform. Calculate duty cycle of a rectangular waveform of time period 1 millisecond and pulse width 500 micro-second.
- Draw the functional block diagram of timer IC 555.
- When does the Schmitt Trigger circuit exhibit "hysteresis"?
- Distinguish different types of multivibrators.
- Define : RC time constant. Is it possible to charge a capacitor almost fully in one time constant time ? How?
- Calculate values of resistance (R) and capacitor (C) and design and sketch RC differentiating circuit for a good differentiation of input square wave of frequency 100 Hz.
- Define : Rise time for a pulse and show that rise time $t_r = 2.2 RC$

2

14

- Define Resonant antenna and non-resonant antenna?
- Define RADAR.
- What is the full form of RADAR? Who gave the name RADAR? When?
- Name any three solid-state microwave devices?
- What are the different RADAR display methods?
- How TWT is different from other 'linear beam tubes'?
- Why magnetron is known as a cross-field tube? Write a full form of TPOM.

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| 3 | (a) Derive criteria for getting good differentiation and integration of a periodic waveform. | 7 |
| | (b) Discuss in detail diode clipping circuits and applications. | 7 |
| 4 | (a) Write a detailed note on diode clampers. | 7 |
| | (b) Derive expression to relate "rise time" and "fall time" of the input pulse waveform to upper cut-off frequency and lower cut-off frequency of an amplifier, respectively. | 7 |
| 5 | (a) Draw the circuit of IC 555 monostable multivibrator and explain its operation. | 7 |
| | (b) Sketch the circuit of the Schmitt trigger using transistors and explain its operation. | 7 |
| 6 | (a) Draw the circuit of IC 555 Astable multivibrator and explain its operation. | 7 |
| | (b) Draw the circuit of the RC ramp generator using transistor and describe its operation. Explain how the non-linearity in the output waveform is removed ? | 7 |
| 7 | (a) Define Antenna. What are the different types of antenna? Discuss Yagi-Uda antenna in detail. | 7 |
| | (b) Write a note on the antenna with a parabolic reflector. | 7 |
| 8 | (a) Draw block diagram and discuss the working of pulsed RADAR set. | 7 |
| | (b) Derive RADAR range equation. | 7 |
| 9 | (a) Discuss construction and working principle of reflex klystron amplifier. | 7 |
| | (b) Write a short note on Magnetron. | 7 |
| 10 | (a) In what sense solid-state microwave devices are superior to microwave tubes? What are the different groups of solid-state microwave devices ? Discuss in detail. | 7 |
| | (b) Write a note on: Gunn diode. | 7 |
