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PW-003-1204006 Seat No. _____

M. Sc. (Sem. IV) Examination

August - 2020

ET - 10 : Physics

(Pulse & Microwave Electronics)

(New Course)

Faculty Code : 003

Subject Code : 1204006

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.

(2) Number on right margin indicates marks.

1 Attempt any **seven** : **14**

(a) Define atenna. What are the different types of antenna ?

(b) Define isotropic antenna and non-resonant antenna.

(c) Define RADAR. Write a full form of RADAR.

(d) List the applications of microwaves in various fields.

(e) List the name of microwave tubes and solid state microwave devices.

(f) Define : Duty cycle for a rectangular waveform. Calculate duty cycle of a rectangular waveform of frequency 1 kHz and pulse width 500 micro-second.

(g) Draw the functional block diagram of timer IC 555.

(h) Define fractional tilt for a square waveform.

(i) Draw the circuit of IC 555 - Astable multi-vibrator.

(j) Draw RC integrating circuit for best integration of input square wave for frequency 10 kHz.

2 Attempt any **two** :

(a) Derive criteria for getting good differentiation and integration of a periodic waveform. Design RC differentiating circuit to produce the best spikes of frequency 1 kHz. **7**

(b) Derive expression to relate 'rise time' and 'fall time' of input waveform to upper cut-off frequency and lower cut-off frequency of an amplifier, respectively. **7**

(c) Write a detailed note on biased clipping and clamping circuits. **7**

3 (a) Draw the circuit of IC 555 monostable multi-vibrator and explain its operation and designing. **7**

(b) Sketch the circuit of Schmitt trigger using transistors. Design the circuit for the following specifications : UTP = 5 Volts, transistor β=100, Ic = 2mA, supply voltage Vcc = 12 volts, speed up capacitor maximum value = 36 pF. **7**

OR

3 (a) Draw and label block diagram of pulsed radar system and discuss its working principle in detail. **7**

(b) Derive necessary equation for maximum range of radar (r_{max}). **7**

4 Attempt any **two** :

(a) Draw schematic diagram of two-cavity Klystron amplifier and discuss its operation with applegate diagram. **7**

(b) Discuss in detail : Antenna with parabolic reflector. **7**

(c) Discuss following display methods **7**
Automatic target and moving target indication.

5 Attempt any **two** : **14**

(a) Reflex Klystron

(b) Gunn diode

(c) RC Ramp waveform generator

(d) Transistorized astable multivibrator.
