Sohag University		**4th Year, Elec. Eng. Dept.**
Faculty of Engineering		**Electro. & Comm. Section**
Spring 2023	**Sheet # 7**	**EEE 424: Microwave Circuits**

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1- It a radar receives back the reflected signal from target after 200 μs find the distance of target.

2- It peak power transmitted by a radar is 200 kW, with PRF = 1000 pulse/s; pulse width = 1 μs then find average power in dBW, maximum unambiguous range and minimum range.

3- A receiver at 1 GHz with 1 MW radar requires at least 0.001 W to detect a valid target properly; the target is to be at 100 km range. What is the radar-cross section (RCS) of the target, if the radar is a monostatic radar with: a) a single antenna of 40 gain, b) a transmitting antenna of 40 dB gain and receiving antenna of 50 dB gain. c) single antenna of aperture effective area 4 m^2.

4- A pulsed radar operates at a frequency of 6 GHz with a pulse repetition frequency of 1KHz. Find the first, second- and third-blind speeds of this radar.

5- In a pulsed radar system, the operating frequency is 2 GHz with peak power 500 kW, a modulated square wave of frequency 1.5 kHz is used. If the pulse width is 2 μs, find: a) the duty cycle, b) the average power, c) number of transmitted waves during the on time, d) the radar resolution, and (e) the maximum unambiguous range.

6- A Doppler radar operating at 12 GHz is intended to detect target velocities ranging from 1 to 20 m/sec. What is the required passband of the Doppler filter?

7- A pulse radar operates at 2 GHz and has a per-pulse power of 1 kW. If it is to be used to detect a target with σ = 20 m^2 at a range of 10 km, what should be the minimum isolation between the transmitter and receiver so that the leakage signal from the transmitter is at least 10 dB below the received signal? Assume an antenna gain of 30 dB.
