1 Pulse radar, round trip time

A radar sends a short pulse of microwave electromagnetic energy directed towards an aircraft at a distance R. Some of the energy scatters off of the aircraft's surface and returns to the radar after 1.3333msec. The distance R of the aircraft from the radar

(a) 100 km
(b) 200 km
(c) 300 km
(d) 400 km
(e) none of the above

2 Pulse radar, resolution

A radar transmits a pulse of width of 4 μ sec with pulse repetition interval 4 m sec. The smallest distance between 2 targets that can resolved is

(a) 300 m
(b) 600 m
(c) 300 km
(d) 600 km
(e) none of the above

3 Maximum Unambiguous Range

The maximum unambiguous range that can be measured with a radar with a Pulse Repetition Frequency (PRF) of 1.5 kHz is

(a) 50 km
(b) 100 km
(c) 150 km
(d) 200 km
(e) none of the above

4 Linear FM CW Radar: Beat Frequency and Target Range

Consider a CW radar (Linear FM), with modulation bandwidth 32 MHz and 1 ms modulation period, operating in the presence of a target. If the beat frequency is 2MHz, the target's range is

(a) 9.375 km
(b) 18.750 km
(c) 28.125 km
(d) 37.500 km
(e) none of the above

5 Phased-Array Radar: ULA, Beamsteering 45°

Consider a phased-array radar that operates at a wavelength of $\lambda = 10$cm and employs 9 antennas in a ULA geometry with reference point (Cartesian origin) the 1st antenna and with an inter-antenna spacing $d = 5$ cm. If the main lobe of the array is steered towards $\theta_{steer} = 45°$, the phase shifter of the 9th phase shifter is

(a) 43.1169°;

(b) 149.1169°;

(c) 210.8831°;

(d) 298.2338°;

(e) None of the above.