

**Course Name: Ab Initio**

**Subject Code: 1.1.1**

**Subject Name: Radar and Microwave Theory**

**Question Type: Application**

--- Short Answer Questions (1) ---

Here's a short answer question that requires practical application and problem-solving:

**\*\*Question:\*\*** In designing a radar system, you need to decide whether to use a power amplifier or a power oscillator as the transmitter. Which one would you choose and why?

**\*\*Answer:\*\***

Based on the text, I would recommend using a power amplifier as the transmitter in this case. The text states that a power amplifier is preferred when high average power is necessary, which suggests that it can handle more energy than a power oscillator. Additionally, the text mentions that a power amplifier is indicated in Fig. 1.4, implying that it is a suitable choice for this type of radar system.

Furthermore, the text notes that a power oscillator is typically used when simple pulse waveforms are required, which may not be the case here. The text also mentions that a power amplifier is needed when detecting moving targets in the midst of larger clutter echoes based on the Doppler frequency shift (the subject of Chap. 3), which suggests that this type of radar system requires more advanced capabilities.

Overall, considering the requirements and characteristics of the radar system described in the text, I believe that a power amplifier would be a better choice than a power oscillator as the transmitter.

**\*\*Note:\*\*** This answer is based on the information provided in the text and does not require external data.

--- Very Short Answer Questions (1) ---

Here are 5 Very Short Answer questions that require practical application and problem-solving:

**\*\*Question 1\*\***

If I want to increase the range of a radar system, what should I do with the antenna?

**\*\*Answer\*\*:** To increase the range of a radar system, you would need to use an antenna with an effective aperture independent of wavelength (as implied by Eq. (1.10)). This means that the antenna gain should remain constant as the wavelength changes.

**\*\*Question 2\*\***

What happens if I increase the pulsewidth of a radar signal?

**\*\*Answer\*\*:** If I increase the pulsewidth of a radar signal, it will affect both the bandwidth and range of the system. The increased pulsewidth will result in a decrease in bandwidth (as implied by Eq. (1.8)) and an increase in range (as implied by Eq. (1.9) or (1.10)).