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Q-2(H) Paper IV

Special P-n junction diode:-

Varactor diode:- It is a device whose reactance can be varied in a controlled way with a bias voltage. The term varactor means variable reactance. As P-n diode has a voltage-dependent junction capacitance, therefore P-n junction diodes find applications as varactors, also called varicaps.

For an abrupt P-n junction junction, capacitance varies inversely as the square root of the reverse bias voltage. For a linearly graded junction, this capacitance varies inversely as the one-third of the reverse bias voltage. The voltage sensitivity of the junction capacitance is thus greater for an abrupt junction than for a linearly graded junction. By using special growth techniques, the junction capacitance may be made to vary inversely as the square of the reverse bias voltage. When such a junction capacitor is used with an inductor in a resonant circuit, the resonant frequency will vary linearly with the parallel applied voltage. Such varactors are useful in

frequency modulation.

This diode may be used to replace the bulky variable capacitors in the tuning stage of a radio receiver or in a TV tuner. This makes the circuit compact and improves its performance. Varactors are also used in self balancing bridge circuits, in special type of amplifiers (called parametric amplifiers), in harmonic generators, in microwave frequency multipliers, and in active filters.

