

14. (a) (i) Explain the operation and design of constant-K T section band elimination filter with necessary equations and diagrams. (8)
- (ii) Design a constant K band pass filter (both T and π sections) having a design impedance of 600Ω and cut-off frequencies of 1 KHz and 4 KHz. (8)

Or

- (b) (i) Design an m-derived T section low pass filter having cut off frequency of 1 KHz. Design impedance is 400Ω and the resonant frequency is 1100 Hz. (4)
- (ii) Derive the equations for the characteristic impedance of symmetrical T and π networks. (6)
- (iii) Discuss the properties of symmetrical network in terms of characteristic impedance and propagation constant. (6)
15. (a) A rectangular air-filled copper waveguide with dimension $0.9\text{ inch} \times 0.4\text{ inch}$ cross section and 12 inch length is operated at 9.2 GHz with a dominant mode. Find cut-off frequency, guide wave-length, phase velocity, characteristics impedance and the loss. (16)

Or

- (b) (i) ~~Using Bessel function derive the TE wave components in circular wave guides. (10)~~
- (ii) Calculate the resonant frequency of an air filled rectangular resonator of dimensions $a = 2\text{ cm}$, $b = 4\text{ cm}$ and $d = 6\text{ cm}$ operating in TE_{101} mode. (6)