

M. Sc. 3rd year, 1st Semester (Eve) Examinations 2017
3rd year, 1st Semester (Physics, Eve)

Subject : Electronics II

Time: 2 hours

Full Marks: 40

Paper- PHY/TE/306

Answer any four questions.

1. a) Differentiate between skew rays and meridional rays propagating in optical fibre.
b) Calculate the numerical aperture of a step index optical fiber having $n_1 = 1.48$ and $n_2 = 1.46$. What is the maximum entrance angle for this fibre if the outer medium is air?
c) What is group velocity dispersion in an optical fibre? 3+(2+3)+2
2. What do you mean by attenuation in an optical fibre? How does it limit the performance of optical fibre while using in communication? Discuss the mechanisms by which attenuation is caused in optical signal propagation along fiber. 2+3+5
3. What do you mean by directional coupler? State clearly for the way power exchange from one guide to another guide. 3+7
4. a) Derive voltage and current equations of a transmission line.
b) Calculate impedance of a section of shorted transmission line.
c) What is VSWR? How it is measured? 4+3+3
5. a) Show that a hollow loss less metallic wave guide behaves as a high pass filter.
b) Calculate expressions of phase velocity and group velocity of guided wave propagation.
c) An air filled rectangular wave guide has inside dimension 2.6cm x 1.3cm. Find the cut off frequency of dominant mode. Through how many modes, a signal of frequency 13GHz can be propagated? 4+2+4
6. a) What is characteristic impedance of a transmission line. Determine its value in terms of primary parameters of transmission line.
b) Explain the process of velocity modulation in a klystron and calculate its expression. 5+5