

- (2) Radio wave communication link is to be established through the ionosphere. The maximum virtual height of the layer 100 km at the midpoint of the path and critical frequency is 4 MHz. The distance between stations is 800 km. Determine the maximum usable frequency and angle of elevation for the antenna main beam.
- (3) Write a note on tropospheric scatter propagation.

3 Answer the following : **14**

- (1) Discuss working of FSK-transmitter and receiver with neat diagrams.
- (2) Write a detailed note on Quadrature Amplitude Modulation.

OR

3 Answer the following : **14**

- (1) Enlist primary and secondary constants of transmission line. Explain Importance of it.
- (2) Draw the internal layout of a communication satellite and explain function of each section in detail including uplink & down link models and transponder.

4 (A) Answer Any **Two** : **14**

- (1) Write a brief note on Classification of optical fiber based on number of modes and refractive index,
- (2) Derive transmission line equation.
- (3) Show that how a TE_{10} wave can be formed by superposition of two TEM waves. Prove the relation : $1/\lambda_g^2 = 1/\lambda^2 = 1/2a^2$ for a rectangular wave guide, where 'a' is broader dimension of rectangular waveguide.

5 Answer Any **Two** :

14

- (1) Write a note on geo-stationary satellite.
 - (2) Write a note on BPSK technique of digital modulation.
 - (3) Explain Physics of propagation of light through optical fiber.
 - (4) Enlist types of optical fiber. Also, describe total internal reflection, acceptance angle and cone, Numerical Aperture.
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