

MBY-003-1204007 Seat No. _____

M. Sc. (Physics) (Sem. IV) (CBCS) Examination April / May - 2018

ET - 11: Electronics Communications

Faculty Code: 003

Subject Code: 1204007

Time : $2\frac{1}{2}$ Hours]

[Total Marks: 70

Instructions: (1) All questions carry equal marks and compulsory.

> (2)Figures to the right indicate marks.

1 Answers the following Any Seven: 14

- What are the normal modes of radio wave propagation?
- For a carrier frequency of 8 GHz and a distance of 100 km, calculate the transmission path loss in dB.
- (c) Determine power density for a radiated power of I kW` at distance of 20 km from an isotropic antenna.
- Define look angels for a satellite: Angle of elevation (d) and Azimuth
- Define: radio horizon for space wave propagation (e)
- What is meant by "Baud" in digital modulation? (f)
- What is transmission line? Enlist different types of (g) lines with it's uses.
- (h) Enlist different types of losses in optical fiber system.
- What do you mean by modes in context of wave guide? (i) Explain TM mode
- What do you mean by transmission line? Why is it call (j) wireless link?
- Answer Any Two: 2

14

Discuss HF radio wave communication through earth ionosphere hence define plasma frequency and critical frequency.

- (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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