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**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc. Electronics – VI Semester**

**Semester End Examination – April 2017**

**EL 6112: Communication II**

Time: 3 Hours Max. Marks: 100

**This question paper has two pages and three parts**

**Part – A**

Answer any **FIVE** questions. 5 x 12 = 60

1 a) Explain the PCM transmission system with the help of a block diagram.

 b) Explain ASK, FSK and PSK with necessary waveforms. What is the relationship between

 bit rate and baud rate. (6+6)

2 a) Write the block diagram of digital communication system and explain.

 b) What are synchronous and Asynchronous orbits? Give examples for each.

 c) What are the advantages and disadvantages of geostationary orbits? (4+4+4)

3 a) Give the demerits of placing a satellite in the equatorial orbit.

 b) Draw the block diagram of a satellite uplink model. Mark the blocks.

 c) What is meant by Multiplexing? Explain how TDMA is employed in satellite

 communication. (3+3+6)

4 a) Discuss the principles of light transmission in a fiber and derive the expression for

 acceptance angle in terms of refractive indices of the fiber core and cladding.

 b) Explain the modes of propagation in Fiber optic communication.

 c) Explain the working of a PIN diode. (6+3+3)

5 a) Explain the Rayleigh scattering and absorption losses.

 b) Derive an expression for the maximum range of RADAR. (6+6)

6 a) Give the RADAR classification.

 b) Explain bluetooth standards.

 c) With the help of a simplified block diagram explain the operation of cellular mobile

 communication system. (3+3+6)

7 a) What is CDMA digital cellular telephone system? Explain.

 b) Mention and explain the cellular standards.

 c) Describe frequency reuse. Why is it useful in cellular telephone system? (4+4+4)

**EL-6112-B-17**

**Part – B**

Answer any **FIVE** questions. 5 x 6 = 30

8 A system has bandwidth of 6 kHz and a signal to noise ratio is 200 db at the input

 to the receiver, calculate a) its information capacity and b) the capacity of the channel, if

 its bandwidth is doubled, while the transmitted signal power remains constant.

9 The v(t) defined by the relation v(t) = 10 Cos (100 π t ) Cos (200 π t) is required to

 be transmitted using digital modulation technique. Determine the Nyquist rate of

 sampling. Also calculate the signal to noise ratio in db which would be required

 for an ideal channel with a bandwidth of 4 kHz.

10 In a Satellite Communication system, assume free space conditions. The Satellite

 is at a height of 36×103 km above the earth, the frequency used is 4000 MHz,

 and the transmitting antenna gain is 15 db and the receiving gain is 45 db.

 Calculate a) the free space transmission loss and b) the received power with the

 transmitted power is 200 watts.

11 In a satellite communication system, free space condition may be assumed. What

 is the power at receiving antenna (dbw), when the satellite ERP is + 24 dbw

 transmitted at 14000 MHz over a distance of 36000 km. ( Given Gt = 36 dbw and

 Gr = 20 dbw)

12 A step index optical fiber of 50 µm core diameter and 125 µm cladding diameter

 supports 320 modes at 352.9 THz frequency. Calculate the refractive index of the

 cladding of this step index fiber if the refractive index of its core is 1.485. Also

 calculate the acceptance angle.

13 The frequency of light produced by the three semiconductor diodes are 459 THz,

 290 THz and 241 THz respectively. Calculate the wavelength and energy gap of

 the materials used for the three diodes.

14 Calculate the maximum range of a RADAR system which operates at 4 cm wavelength

 and a peak value of pulse power at 750 kw, if its minimum receivable power is 10 -13 w,

 the capture area of its antenna is 5 m2 and radar cross- sectional area of the target

 is 15 m2.

**Part – C**

Answer any **FIVE** questions. 5 x 2 = 10

15 Differentiate between natural sampling and flat sampling using waveforms

.

16 What are the two techniques to increase the information transfer rate?

17 Name the high altitude earth orbit satellite and mark the frequency spectrum

 range.

18 How the two bodies in space interact. Also name the two bodies.

19 Write the band and bandwidth used for Fiber optic communication.

20 What type of electromagnetic waves are used in RADAR? Explain.

21 Mention the two major kinds of interference produced within cellular telephone

 system.

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