

Date:

Registration number:

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

B.Sc. Electronics - VI SEMESTER

SEMESTER EXAMINATION: APRIL 2022

(Examination conducted in July 2022)

**EL 6118 – Communication Electronics**

**Time- 2 ½ hrs Max Marks-70**

This question paper contains **TWO** printed pages and **THREE** parts

**Part A**

**Answer any FIVE of the following questions 5X8=40**

1. (a). Classify various ranges of electromagnetic spectrum in terms of frequency and

mention application of each range.

(b). Give the frequency spectrum of AM. What is the bandwidth of AM? 4+4

1. (a). With the necessary block diagram explain the working of FM transmitter.

(b). With the necessary diagram draw the wave forms for ASK, FSK and BPSK

4+4

1. (a). Explain the working of CW Doppler RADAR with block diagram

(b). Derive an expression for total power radiated by an antenna.

5+3

1. (a). With the necessary diagram, explain different orbits with respect to satellite

communication.

(b). With the necessary block diagram explain the working of C band transponder. 2+6

1. (a). What is multiplexing? Explain how TDMA is employed in Satellite communication

(b). What are the requirements of light sources? Explain the working of LASER.

4+4

1. (a). Explain Rayleigh Scattering and absorption losses in OFC

(b). Give the comparison between GSM and CDMA systems.

4+4

1. (a). Write a note on the following with respect to mobile communication

(i). Frequency reuse (ii). Roaming (iii). Handoff

(b). With the necessary diagram explain how data can be transmitted serially and parallelly. 4+4

**Part B**

**Answer any FIVE questions 5X4=20**

1. The output current of a 60% modulated AM generator is 1.5 A. To what value will this current rise if the generator is modulated additionally by another audio wave whose modulation index is 0.7? What will be the percentage power saving if the carrier and one of the side bands are suppressed?
2. A system has bandwidth of 6 kHz and a signal to noise ratio is 20 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.

1. A dipole antenna of length 10 m has a current of 2A flowing through it. If the frequency of the signal is 10 MHz. Calculate the efficiency if the loss resistance is 10 Ω.
2. A RADAR operating at 1.25x109 Hz uses a peak pulse power of 3 mW and must have a range of 100 nautical mile, for objects whose RADAR cross section area is 1sq.meter. If the Pmin of receiver is 2 mW. What is the smallest diameter the reflector could have? (Given K = 0.65)
3. In a satellite communication system, free space condition may be assumed, what is the power at the receiving antenna in dBW, when the satellite ERP is 25 dBW transmitted at 12000 MHz over a distance of 42,300 km. (Given Gt = 25dBW, Gr = 22dBW).
4. For a glass (n=1.5) and quartz (n=1.41) interface at an angle of incidence 38°, determine the angle of refraction, the critical angle, the acceptance angle and numerical aperture.
5. The three semiconductor diodes are made using materials that have energy band gaps of 1.9eV, 1.2eV and 1eV. Find the wavelengths and frequencies of the light produced by them.

**Part C**

**Answer any FIVE questions 5X2=10**

1. Propagation of ground wave is better over sea water. Justify.
2. What is the bandwidth used for commercial FM radio?
3. Give an expression for information capacity which relates to bandwidth.
4. Draw the radiation pattern for l = λ/2 and 3λ/2.
5. What is Perigee and Apogee in a satellite orbit?
6. What is the relationship between core diameter and numerical aperture?
7. What is protocol in connection with computer networks?

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