

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

B. SC. ELECTRONICS - VI SEMESTER

SEMESTER EXAMINATION: MAY/JUNE 2023

**EL6118- COMMUNICATION ELECTRONICS**

Time- 2 ½ hrs Max Marks-70

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

**Part A**

**Answer any 5 questions**  5 × 8 = 40

 1 a) Give the frequency spectrum of FM and explain the same with Bessel function.

 b) Give the two basic techniques to perform the sampling function. Explain each of them

 with waveforms. (4+4)

2 a) Give the brief explanation of the equivalent circuit of an Antenna.

 b) Derive the RADAR range equation. (3+5)

 3 a) With a block diagram explain the Pulsed RADAR.

 b) Explain the components of earth station. (4+4)

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

 b) Give the demerits of placing a satellite in the equatorial orbit. (4+4)

 5 a) With the necessary diagram, explain different orbits with respect to satellite

 communication.

 b) Explain the construction and working of a PIN diode. (4+4)

 6 a) Explain Rayleigh Scattering and absorption losses in OFC.

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

 communication system. (4+4)

 7 a) Explain CDMA with respect to digital cellular telephone system.

 b) Mention and explain the cellular standards.

 c) Give the layers of data communication circuits. (3+3+2)

 **Part B**

**Answer any 5 questions**  5 × 4 = 20

 8 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 now suppressed?

 9 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.

 10 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.

 11 The RADAR antenna has a power gain of 60 and a captive area of 5 m2. If it transmits

 120 kW what is the power density at the target distant 5 km from the antenna. If the

 effective area of the target is 20 m2 what is the power received by the antenna from the

 target.

 12 In a Satellite communication system, calculate the path losses for:

 (i) Signal of frequency 4 GHz at a distance of 36000 km.

 (ii)Signal of frequency 10 GHz at a distance of 40000 km.

 13 In a satellite communication system, free space condition may be assumed. What is the

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

 14000 Mhz over a distance of 36000 Km (Given Gt= 36 dbw and Gr=20 dbw).

 14 The three semiconductor diodes are made using materials that have energy band gaps of

 1.9, 1.2 and 1eV. Find the wavelengths and frequencies of the light produced by them.

 **Part C**

**Answer any 5 questions**  5 × 2 = 10

 15 For a Commercial FM radio broadcasting range, how many radio stations can be

 accommodated.

1. Differentiate between flat top sampling and natural sampling.

 17 Draw the radiation pattern for an antenna when l = λ/2 and l = λ/4.

1. Name the high-altitude earth orbit Satellite and mark the frequency spectrum range.
2. Name the band and the range of wavelength used for OFC system.

 20 Mention the two major kinds of interferences produced within cellular telephone system.

 21 List any four topologies used in local area network.

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