

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 6115 – 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). Give various ranges of electromagnetic spectrum in terms of frequency.

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

 4+4

1. (a). Derive an expression for instantaneous value of voltage for FM.

(b). Give four advantages of FM or AM. 4+4

1. (a). Explain four characteristics of data transmission circuits.

(b). Draw the block diagram of pulsed RADAR. Explain each block. 4+4

1. (a). With the help of schematic diagram explain three satellite orbits.

(b). Explain uplink and downlink with the help of necessary block diagram. 4+4

1. (a). What are the conditions for light propagation through fiber?

(b). Explain the construction and working of Avalanche photo diode. 2+6

1. (a). Draw and explain mobile communication block diagram.

(b). Explain any four losses of optic fiber communication. 4+4

1. (a). With the diagram explain the terms of serial and parallel data transmission.

(b). Explain the term cell splitting and frequency reuse with respect to mobile

 communication. 4+4

**Part B**

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

1. Two points on earth are 1500 km apart and are to communicate by means of HF. Given that this is to be a single hop transmission, the critical frequency at that time is 7 MHz and conditions are idealized. Calculate the MUF for those two points if the height of the ionospheric layer is 300 km
2. When the modulation percentage is 75, an AM transmitter produces 10 KW. How much of this is carrier power? What would be the percentage power saving if the carrier and one of the side bands were suppressed before transmission took place?
3. When the modulating frequency in an FM system is 400 Hz and the modulating voltage is 2.4 V the modulation index is 60. Calculate the maximum deviation. What is the modulation index when the modulating frequency is reduced to 250 Hz and the modulating voltage is simultaneously raised to 3.2 V?
4. An elementary doublet is 10 cm long. If the 10 MHz current flowing through it is 2 A, what is the field strength 20 km away from the doublet, in a direction of maximum radiation?
5. A 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 at a distance 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?
6. In a satellite communication system, assume free space conditions, the satellite is at a height of 36000 km above the earth, the frequency used is 4500 MHz and the transmitting antenna gain is 50 dB and the receiving gain is 45 db. Calculate the free space transmission loss.
7. An optical fiber is made of glass with a refractive index of 1.55 and is clad with another glass with a refractive index of 1.51. If the launching takes place from air, calculate incident angle, angle of refraction.

**Part C**

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

1. Differentiate between bit and baud.
2. Define Shannon sampling theorem.
3. What is the difference between simplex and duplex MODEM?
4. What kind of polarization is used in C transponder?
5. In GPS service, what is SPS and PPS.
6. Give two high speed connectors w.r.t internet service.
7. What is the difference between IP and TCP?

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