

Date:

Registration number:

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

B. SC. ELECTRONICS - VI SEMESTER

SEMESTER EXAMINATION: MAY/JUNE 2024

**EL6123-Electronic Communication**

Time- 2 hr (For current batch students only) Max Marks-60

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

Part A

Answer all the questions **1X10=10**

1.The range of frequency used for optic fibre communication is--------

a.3 -30 THz b.30-300.KHz c.30-300MHz d.30-300GHz

2.Frequencies in the UHF range normally propagate by means of --------

a. ground waves b. sky waves c. surface waves d. space waves

3. If m >1 in the case of amplitude modulation, such modulation is called as -------

a. under modulation b. over modulation c.100% modulation d. ASK modulation

4.For telephone system minimum sampling rate is-----------

a.2000bps b.4000 bps c.5000 bps d.8000 bps

5.One of the following consists of non-resonant antennas------

a. The rhombic antenna b. The folded antenna

c. The end-fire array d. The broadside array

6.The biggest disadvantage of CW Doppler RADAR is----------

a. It does not give the target velocity b. It does not give the target range

c. A transponder is required at the target. d. It does not give the target position

7. The frequency spectrum ranges of high altitude earth orbit is-------

a.2GHz-18GHz b.1.0GHz-2.5GHz c.1.2GHz-1.66GHz d.4GHz-6Ghz

8. Total internal reflection occurs at which of the following angles?

a. Fresnel angle b. Obtuse angle c. Critical angle of incidence d. Right angle

9. The shape of the cellular region for maximum radio coverage is\_\_\_\_\_\_

a. Circular b. Square c. Oval d. Hexagon

10. What is the full form of OSI?

a) optical service implementation b) open service Internet

c) open system interconnection d) operating system interface

**Part B**

Answer any Five Questions 6X5=30

11. a. Give various ranges of electromagnetic spectrum in terms of frequency.

b. Draw the general block diagram of communication System 4+2

12. Derive an expression for instantaneous value of voltage for FM. Write a note on Bessel coefficients. 6

13.With necessary input and output waveforms explain ASK, FSK and BPSK 6

14.a. What are resonant and non-resonant antennas?

b With the block diagram explain the working of CW Doppler RADAR . 2+4

15. With the necessary block diagram explain the working of Uplink, Downlink and C band transponder. 6

16. What are the requirements of light sources optic fiber communication? Explain the working of PIN photo diode. 2+4.

17.a. What is the difference between GSM and CDMA system?

b. Name different layers of open system interconnection. 2+6

**Part C**

Answer any Five Questions 4X5=20

18.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?

19.An FM wave is represented by the voltage equation

V=10sin[2X108 +5 Sin2000t] volt. Find the carrier and modulating frequencies and maximum deviation in FM. Calculate the power dissipated by this FM wave in 10W resistor.

20. 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?

21. Calculate the maximum range of a radar system which operates at 3 cm with a peak pulse power of 500kW, if its minimum receivable power is 10-13W, the capture area of the antenna is 5 m2 and the radar cross sectional area of the target is 20 m2.

22. In a satellite communication system free space condition may be assumed, the satellite at a height of 36,000km above earth, the frequency used is 4,000MHz, the transmitting antenna gain is 15dB, and the receiving antenna gain is 45dB, calculate the free space transmission loss.

23. Prove that a satellite orbiting the earth at a height of 35,880km from the surface of the earth will be stationary (Given the radius of the earth is 6,378km, acceleration due to gravity is 9.81m/s2)

24. 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.

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