****

Register Number:

DATE:

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

B.Sc. – VI SEMESTER

END SEMESTER EXAMINATION- APRIL / MAY 2020

**EL 6115 – COMMUNICATION ELECTRONICS**

**Time: 2 ½ hrs Maximum marks: 70**

This question paper has **TWO** printed pages and **THREE** parts.

**PART-A**

Answer any **FIVE** of the following: 5 x 8 =40

1. a) Give the structure of EM spectrum in terms of frequency and mention the application

of each band.

b) What is the principal of amplitude modulation? Explain with diagram transistor

collector modulator. (4+4)

1. a) What is reactance modulator? Derive an expression for the equivalent capacitance of

a FET reactance modulator.

b) Describe the characteristics of data transmission circuits.

c) Describe ASK and FSK waveforms. (4+2+2)

1. a) Write the block diagram of Digital communication system and explain.

b) Derive an expression for radiation resistance of a radiator. (3+5)

1. a) Explain the Isotropic radiator.

b) Explain the working principal of Doppler radar with block diagram.

c) Give the demerits of placing a satellite in the equatorial orbit. (2+4+2)

1. a) Explain the block diagram of C-band satellite transponder.

b) Explain the block diagram of Fiber Optic Communication system. (4+4)

1. a) Give two requirements of Light detectors? Explain the working principle of PIN

diode.

b) What is CDMA digital cellular telephone system? Explain. (5+3)

1. a) Give the difference between serial and parallel data transmission.

b) Explain the Architecture of Networking. (4+4)

**PART-B**

Answer any **FIVE** of the following. 5 X 4 =20

1. A 25 MHz carrier is modulated by a 400 Hz audio sine wave. If the carrier voltage is

4V and the maximum deviation is 10 KHz write the equation of this modulated wave

for FM. If the modulating frequency is now changed to 25 KHz, all else remaining

constant write a new equation for FM.

1. A voice grade telephone channel has a bandwidth of 3 KHz and signal to noise ratio of

30 dB.Calculate (i) the information carrying capacity of the channel.

(ii) The capacity of the channel if its bandwidth is changed to 6 KHz.

1. A elementary doublet is 10 cm long. If the 10 Mhz current flowing through it is 2A.

What is the field strength 20 km away from the doublet, in a direction of maximum

radiation?

1. A radar operating at 1.25 GHz, uses a peak power of 3 MW. Its radar cross-section is

1 m2, minimum receivable power is 2 x 10-13 W and its capture area is 7.5 m2.

Calculate the maximum range.

1. With the help of necessary expression show that transmission loss in a satellite

communication system is directly proportional to frequency and distance. Also show

that for a geostationary satellite with an uplink frequency of 6 GHz and downlink

frequency of 4 GHz the total transmission loss is 375 dB (distance = 36000 km)

1. 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.

1. Three semiconductor diodes are made using materials that have energy gap of 1.1,

1.2 and 1.9 eV respectively. Find the wavelength and frequencies of light produced

by them.

**PART-C**

Answer any **FIVE** of the following. 5 x 2 =10

15. How many radio stations can be accommodated in a commercial radio FM band.

16. How is PPM obtained from PWM? Write one disadvantage of PPM over PWM?

17. What is a secondary antenna? Give one example.

18. What is a Satellite eclipse? Mention the effects of the same.

19. What is meant by payload of a satellite?

20. Explain the term stimulated emission.

21. What is the difference between a MTSO and a cell-site controller?

-------------------------------------------------------END-----------------------------------------------------------