Register Number:

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

**VI SEMESTER EXAMINATION – APRIL – 2018**

**B.Sc. – ELECTRONICS – EL-6115: COMMUNICATION ELECTRONICS**

**Time: 2½ Hrs. Max. Marks: 70**

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

**PART – A**

**Answer any FIVE questions: 5X8= 40**

1a) Describe ground wave propagation. List its advantages and disadvantages.

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

modulator. 4 + 4

2a) What is reactance modulator? Derive an expression for the equivalent capacitance of a FET

Reactance modulator.

b) Give four predominant methods of pulse modulation. Explain with waveforms.

c) Describe ASK, FSK and BPSK with waveforms. 4+2+2

3a) Describe the characteristics of data transmission circuits.

b) What are resonant and non-resonant antennas. Derive an expression for radiation resistance

of a radiator. 3+5

4a) Explain the working principle of CW Doppler RADAR with the block diagram.

b) Give different factors influencing the maximum range of a RADAR.

c) Explain three satellite orbits with the necessary diagram. 3+2+3

5a) Explain ground station with the help of a simplified block diagram.

b) Explain uplink and downlink model of a C band transponder.

c) Give two major types of multiple access systems used in satellite communication. 4+2+2

6a) Derive an expression for acceptance angle and numerical aperture

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

diode. 4+4

7a) Write a note on cell, frequency reuse and hand off with respect to mobile communication.

b) Give Bluetooth standards and its range of frequencies.

c) Give four layer version of TCP/IP. 3+3+2

**PART – B**

**Answer any FIVE questions: 5x4=20**

8. The output current of a 60%modulated AM generator is 1.5A. 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

sidebands are suppressed?

9. In an FM system when the audio frequency (AF) is 500Hz and the AF voltage is 2.4V, the

deviation is 4.8KHz. If the AF Voltage is now increased to 7.2V, what is the new deviation?

If the AF voltage is raised to 10V while the AF is dropped to 200 Hz, what is the deviation?

Find the modulation index in each case.

10. An elementary doublet is 10 cm long. If the 10MHz current flowing through it is 2A. What

is the field strength 20Km away from the doublet, in a direction of maximum radiation?

11. Calculate the maximum range of a radar system which operates at 3cm with a peak pulse

power of 500Kw, if its minimum receivable power is 10-13W, the capture area of its antenna

is 5m2 and the radar cross sectional area of the target is 20m2.

12. In a satellite communication system free space condition may be assumed. The satellite

is at a height of 36000Km above earth. The frequency used is 4GHz, the transmitting

antenna gain is 15dB and the receiving antenna gain is 45dB. Calculate the received power

when the transmitted power is 200 Watts and the free space transmission loss.

13. An optic 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. Launching takes place from air (a) What numerical aperture

does the fiber have? (b) What is the acceptance angle?

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 FIVE questions: 5X2=10**

15. Give the frequency and wave length range of radio waves.

16. Classify MODEM on the basis of modes of operation.

17. What is nautical mile? How it is related to meter?

18. What is micro strip antenna? Give one application.

19. In which frequency range Geosynchronous satellites operate ?

20. What do you mean by lateral core misalignment in the case of optic fiber communication?

21. Give the high speed connections with respect to internet service and telephone cable.