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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27** | | | | | | |
| **B. Sc. - VI SEMESTER** | | | | | | |
| **SEMESTER EXAMINATION: APRIL 2018** | | | | | | |
| **EL 6115 – Communication Electronics** | | | | | | |
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| **Time- 2 1/2 hrs** | |  | **Max Marks-70** | | |  |
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**This paper contains TWO printed pages and THREE parts**

**PART- A**

Answer any **FIVE** of the following 5×8= 40

1 a) Broadly classify various ranges of e. m. spectrum interms of wavelength.

b) Explain the working of Collector modulator circuit with various waveforms. (2+6)

2 a) Explain the four predominant methods of pulse modulation with relevant waveforms.

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

with waveforms. (4+4)

3 a) Define any two antenna paprameters.

b) Derive the RADAR range equation. (2+6)

4 a) With the help of a schematic diagram explain three types of satellite orbits. What are the

advantages of a geostationary satellite?

b) Give the demerits of placing a satellite in the equatorial orbit. (6+2)

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

b) Explain Rayleigh Scattering, absorption and bending losses in OFC. (4+4)

6 a) Explain the working of a Semiconductor LASER diode.

b) Give the difference between GSM and CDMA technologies. (4+4)

7 a) Mention the Bluetooth standards.

b) Give the different layers and functions in data communication circuits. (2+6)

**PART- B**

Answer any **FIVE** of the following 5×4= 20

8. A transmitter radiates 9 kW with an unmodulated carrier and 10 kW when the carrier is simultaneously modulated. Calculate the modulation index. If another sine wave corresponding to 40% modulation is transmitted simultaneously determine the total radiated power.

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 2 A flowing through it. If the frequency

of the signal is 10 Mhz calculate the radiation resistance, total power radiated and the

antenna 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, 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).

13 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.

14 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 × 2= 10

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

accommodated.

16 What are the two techniques to increase the information transfer rates.

17 What is nonresonant antenna? Give example.

18 How the two bodies in space interact. Also name the two bodies.

19 What is Numerical aperture? What is its importance?

20 What is the need for networking? Explain.

21 Give one advantage of serial and parallel data transmission.

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