

**18P406**

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Name: .....

Reg. No.....

**FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2020**

(CUCSS - PG)

(Regular/Improvement/Supplementary)

**CC15P PHY4 E14 – COMMUNICATION ELECTRONICS**

(Physics)

(2015 Admission onwards)

Time: Three Hours

Maximum: 36 Weightage

**Section A.**

Answer *all* questions. Each question carries 1 weightage.

1. With help of a diagram explain amplitude of modulation for  $m > 1$ .
2. Explain the significance of balance modulators.
3. State and explain sampling theorem.
4. What do you mean by OOK?
5. Explain frequency selectivity in super heterodyne receivers.
6. Explain advantages of AGC.
7. Describe the quantization process in PCM.
8. Distinguish between continuous-time and discrete –time signals.
9. Explain the significance of LTI systems.
10. Explain basic principle behind the extra terrestrial communication system.
11. What do you understand by radiation resistance of a short dipole?
12. What is a space wave?

**(12 x 1 = 12 Weightage)**

**Section B.**

Answer any *two* questions. Each question carries 6 weightage.

13. Explain with suitable diagram, the principle of amplitude demodulation circuits and discuss the different types of distortion that occur during demodulation.
14. Derive the Fourier series for the modulated and un-modulated pulse train for natural PAM. Explain with diagram, the spectrum for the modulating signal and natural PAM wave.
15. Discuss the different types of antenna arrays with suitable diagram.
16. Briefly explain the principle of D/A and A/D convertors and mention their significance in sampling process.

**(2 x 6 = 12 Weightage)**

### Section C.

Answer any *four* questions. Each question carries 3 weightage.

17. RMS antenna current of an AM radio transmitter is 10 A when un-modulated and 12 A when sinusoidally modulated. Calculate the modulation index.
18. Derive the  $\mu$  - law and show that if  $\mu = 0$ , the compression is zero.
19. Determine the minimum capacitor value for a receiver which tunes between 300 - 3000 kHz with an IF of 200 kHz. Given  $C_{\max} = 100\mu\text{F}$ .
20. An AM broadcast receiver has an IF of 465 kHz and its tune to 1000kHz. Find the image frequency and image rejection if it has a single RF stage with  $Q = 50$ .
21. Show that two discrete time sinusoids whose frequencies are separated by integral multiples of  $2\pi$  are identical.
22. Calculate the minimum electron density required in the ionosphere for the reflection of high frequency wave.

**(4 x 3 = 12 Weightage)**

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