

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Voc. (Electronics & Information Technology) (Sem.-3)

PRINCIPLES OF COMMUNICATION

Subject Code : BVET303-20

M.Code : 90725

Date of Examination : 16-12-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Write briefly :

- What is the need of modulation in a communication system?
- Determine the efficiency η and the percentage of the total power carried by the sidebands of the AM wave for modulation index $\mu = 0.5$.
- Explain sampling theorem and Nyquist rate.
- If the carrier frequency is 20 MHz, maximum frequency deviation is 100 KHz then determine the bandwidth of FM signal for input signal 1 KHz and 100 KHz
- Draw the block diagram of delta modulator.
- What is the difference between Tuned Radio frequency receiver (TRF) and super heterodyne receiver?
- Define Pre-emphasis and De-emphasis.
- Define SSB-SC and its advantages over AM.
- What is the difference between narrow band and wide band FM?
- Define ring modulator and, draw-its block diagram.

SECTION-B

2. Explain how FM wave can be generated using Armstrong (indirect) method.
3. With the help of proper mathematical expressions and block diagram, explain the operation of synchronous demodulation of SSB-SC- signal.
4. Explain with waveforms how the PPM is generated from PWM? Also, explain the operation of PPM receiver.
5. How phase modulation is related to frequency modulation? Explain with proper mathematical expressions.
6. With a neat block diagram, explain the operation of AM super heterodyne receiver. Also explain the function of each block.

SECTION-C

7. With the help of proper mathematical expressions, show that FM can be generated using phase modulator and PM can be generated using frequency modulator. Discuss the performance of FM system in the presence of noise. Compare amplitude modulation and frequency modulation system.
8. Consider an envelope detector with single tone AM waveform $s(t) = A (1 + \mu \cos(\omega_m t)) \cos(\omega_c t)$, where μ lies between 0 and 1 and $\omega_c > \omega_m$. Show that if the detector output is to follow the envelope of $s(t)$ at all the times, it is required that

$$RC \leq \left(\frac{1}{\omega_m} \right) \frac{\sqrt{1-\mu^2}}{\mu}$$

9. Write short notes on the following:

- a. Ratio detector for FM demodulation.
- b. Balanced Modulator
- c. Pulse Code Modulation and Delta Modulation.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.