



B.E DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U15EIT603 : Communication Systems

COURSE OUTCOMES

- CO1:** Explain the concept of Analog modulation and demodulation techniques
CO2: Explain the various buses used in data acquisition system.
CO3: Equip to analyze linear and digital networks.
CO4: Design of practical communication system at the block diagram level under Certain constraints and requirements.
CO5: Gain knowledge about Standards communication buses.
CO6: Explain the various digital communication systems.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions:-
PART A (10 x 1 = 10 Marks)**

1. Match the following list

CO1 [K₂]

List I(Modulation)	List II(Reception technique)
A. Super heterodyne receiver	i. Threshold effect
B. FM	ii. Granular noise
C. PCM	iii. Image frequency interference
D. Delta modulation	iv. Quantization noise

- | | A | B | C | D |
|----|-----|-----|-----|----|
| a) | i | iii | iv | ii |
| b) | iii | iv | ii | i |
| c) | ii | iv | iii | i |
| d) | iii | i | ii | iv |

2. .QAM stands for:

CO6 [K₂]

- | | |
|------------------------------------|---------------------------------|
| a) Quadrature Amplitude Modulation | b) Quadrature Amplitude Masking |
| c) Quadrature Amplitude Marking | d) Quadrature Amplitude Making |

10. USB is CO5 [K₂]
- a) a serial bus for interconnecting the b) an independent requesting devices
 c) a parallel bus d) a series to parallel converter

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. Classify the following data acquisition buses into serial and parallel bus for communication in embedded systems : RS232,USB, I²C, PCI,PXI,ISA,CAN. CO5 [K₃]
12. If two signals modulate the same carrier with different modulation depths of 0.3 and 0.9, what is the resulting modulation signal modulation depth? CO1 [K₃]
13. A given AM broadcast station transmits an average carrier power output of 40 kW and uses a modulation index of 0.707 for sine wave modulation. What is the maximum (peak) amplitude of the output if the antenna is represented by a 50 Ω resistive load? CO4 [K₃]
14. What is Image frequency? CO1 [K₂]
15. In a FM system, a carrier of 100 MHz is modulated by a sinusoidal signal of 5 KHz. The bandwidth by Carson's approximation is 1MHz. CO4 [K₂]
 If $y(t) = (\text{modulated waveform})^4$, then by using Carson's approximation, the bandwidth of $y(t)$ around 300 MHz and the spacing of spectral components are, respectively.
16. What is Aliasing? CO2 [K₂]
17. What is the purpose of sample and hold circuit? CO2 [K₃]
18. What is the need of Pre-emphasis and de-emphasis in FM transmission? CO3 [K₂]
19. What is M-ray encoding? CO2 [K₂]
20. What is I2C? , explain briefly. CO6 [K₁]

Answer any FIVE Questions: -
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. A. Explain the working of a Armstrong indirect method of FM modulator with appropriate diagrams (6) CO4 [K₄]
- B. Design the block diagram of Armstrong indirect FM generator for the generation of WBFM with frequency deviation of 75KHz and Wide Band FM carrier of 100MHz using narrow band FM carrier as 100 KHz. and second carrier as 9.5MHz. The modulation index of narrow band is given as 0.2 radians. Assume the message signal is defined in the range, 100 Hz – 15 KHz. Find the suitable value of both the multipliers. Then, analyses the frequency deviation and carrier frequency at each point in the design. (8)

22. Given $m(t) = \sin 2000\pi t$, $k_f = 200,000\pi$, and $k_p = 10$ CO4 [K₄]
- a) Estimate the bandwidth of $\varphi_{FM}(t)$ and $\varphi_{PM}(t)$
 - b) Repeat part (a) if the message signal amplitude is doubled.
 - c) Repeat part (a) if the message signal frequency is doubled.
 - d) What's your inference from the above calculations
23. A. Explain the generation of SSB signal using phase discrimination method with appropriate diagrams. (8) CO1 [K₃]
- B. Explain the working of balanced slope detector. (6)
24. Explain the operation of QPSK transmitter and receiver. CO6 [K₃]
25. A. What is Quantizing error? Illustrate with an example. (4) CO3 [K₂]
- B. What is FSK? Explain in detail about FSK transmitter. (8)
- C. What is Nyquist Sampling rate? (2)
26. A. What is meant by RS232 serial interface? Explain the operation and pin diagram. (12) CO2 [K₃]
- B. What is the least number of signals required for RS 232 and what are those? (2)
27. A. Compare FM and AM. (6) CO1 [K₂]
- B. Explain PCI interface. (8) CO5 [K₃]
