Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree (S,FE) Examination August 2021 (2015 Scheme)

Course Code: EC208

Course Name: ANALOG COMMUNICATION ENGINEERING (EC)

Max. Marks: 100　　　　　　　　　　　　　　　　　　　　Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

1	a)	Why modulation is necessary in electronic communication?	(4)
	b)	Derive Friiss formula for noise figure in cascade connection of amplifiers.	(6)
	c)	An amplifier circuit having a noise figure of 9dB and power gain of 20dB is followed by a mixer having a noise figure of 16dB. Calculate the overall noise figure and noise temperature. Take the reference temperature as 290K.	(5)
2	a)	Derive the expression for the instantaneous voltage of AM wave. Represent the AM wave in time domain and frequency domain. What is the bandwidth of AM signal?	(8)
	b)	Define noise figure and noise temperature.	(3)
	c)	Write short notes on flicker noise and shot noise	(4)
3	a)	Distinguish between high level and low level AM transmitters.	(4)
	b)	Draw the circuit of diode detector and explain the working.	(5)
	c)	The antenna current of an AM broadcast transmitter modulated to a depth of 60% by an audio sine wave, is 14A. It increases to 15A, as a result of simultaneous modulation by another audio sine wave. Calculate the modulation index due to the second modulating signal?	(6)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Draw the circuit diagram of an FET singly balanced modulator. Prove that balanced modulator suppresses the carrier.	(8)
	b)	Describe the phase shift method of SSB generation with block diagram and write relevant equations.	(7)
5	a)	Define FM. With necessary diagrams derive the expression for frequency modulated signal.	(7)

b) What is deviation ratio? (2)

c) A 400W carrier is simultaneously modulated by two audio waves with modulation indices of 0.58, and 0.68 respectively. What is the total sideband power radiated? What would be the percentage saving in power if the carrier and one of the sidebands were suppressed before transmission? (6)

6 a) Draw the block schematic of a superheterodyne receiver and explain the working. (7)

b) Explain the principle of double conversion receivers. (3)

c) A broadcast superheterodyne receiver tuned to 1000 kHz has a local oscillator at 1455 kHz. The loaded Q of the tuned circuit of the antenna connected to mixer is 80. Calculate image frequency and the image frequency rejection ratio. (5)

PART C
Answer any two full questions, each carries 20 marks.

7 a) Explain the direct method of FM generation with relevant diagram. (10)

b) Explain the working of the dual-slope detector using circuit diagram and response characteristics. (10)

8 a) Explain the concept of amplitude limiting with circuit diagram and response curves. (7)

b) Explain the equivalence between FM and PM. How FM is obtained from PM (7)

c) Describe the working of a Varactor diode FM modulator. (6)

9 a) Describe the working of a standard telephone set with block diagram. (8)

b) Explain the principle of DTMF dialling. (5)

c) Explain the working of a JFET reactance modulator with circuit diagram and relevant equations. (7)

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