	Utech
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Invigilator's Signature :	

CS/B.TECH(EE)(SEPARATE SUPPLE)/SEM-8/EE-802A/2011 2011

COMMUNICATION ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

I.	Choose the correct alternatives for any ten of the following:						
					$10 \times 1 = 10$		
	i)	i) Thermal noise is independent of					
		a)	Bandwidth	b)	Temperature		
		c)	Centre frequency	d)	Boltzman's constant.		
ii) A carrier is amplitude to a depth of					th of 40%. The increase		
		ın p	ower is				
		a)	40%	b)	20%		
		c)	16%	d)	8%.		
	iii) Am FM signal can be detected by using						
				• .			

LPF b) PLL

a)

c) discriminator

- d) SSB signal.
- The image channel rejection in a superheterodyne receiver comes from
 - IF stage only a)
 - RF stage only b)
 - detector and RF stage only c)
 - detector, RF and IF stage only. d)

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- v) Which one is an advantage of AM over FM
 - a) FM is more immune to noise
 - b) FM has better fidelity
 - c) Probability of noise spike generation is less in AM
 - d) FM has wide bandwidth.
- vi) A liasing occurs when the Nyquist rate is
 - a) 2 fm

b) 3 fm

c) 2.5 fm

- d) 1.2 fm.
- vii) A PAM signal can be detected by using
 - a) an ADC
- b) an integrator
- c) a bandpass filter
- d) high pass filter.
- viii) Which of the following modulation is analog in nature?
 - a) PCM

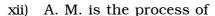
b) DPCM

c) DM

- d) none of these.
- ix) The maximum frequency deviation in commercial FM is
 - a) 88 MHz
- b) 108 MHz
- c) 75 KHz
- d) 15 KHz.
- x) In a communication system, noise is most likely to affect the signal
 - a) at the transmitter
 - b) in the channel
 - c) in the information source
 - d) at the destination.
- xi) Indicate the false statement:

Modulation is used to

- a) Reduce the bandwidth
- b) Ensure that intelligent may be transmitted over long distance
- c) Allow the use of practicable antennas
- d) Separate different transmissions.



- a) Superimposing a low frequency on a high frequency
- b) Carrier interruption
- c) Superimposing a high frequency on a low frequency
- d) Frequency shift & Phase shift.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. Explain the operation of Envelope detector. State the condition for proper envelope detection of AM wave. 4 + 1
- 3. Explain the working principle of a ring modulator. Why it is called double balanced modulator? 4 + 1
- 4. Define modulation. Why do we need modulation? 2 + 3
- 5. Explain the operation of a PWM modulator using necessary waveforms.
- 6. Define the terms sensitivity and image frequency in AM receiver. 5
- 7. What are the similarities and dissimilarities between AM and NBFM? 5

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 8. a) Draw the block diagram of a simple superheterodyne receiver and explain its principle.
 - b) Compare TDM and FDM.
 - c) 24 telephone channels, each band limited to 3·4 KHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and 8 KHz sampling frequency.

5 + 3 + 4 + 3

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- 9. a) How does PLL work as FM demodulator?
 - b) Explain briefly a general structure of satellite communication system. Define deviation ratio in FM.
 - c) What is noise figure? What is its signification?
 - d) Calculate $\frac{S}{N}$ ratio in AM system. 4 + 4 + 2 + 1 + 1 + 3
- 10. a) What is BPSK? Draw and explain how BPSK in non-coherently detected.
 - b) What is coding? Classify different kinds of coding. Explain what is the function modem.
 - c) Beech a amplitude modulator circuit and explain its operation. 5 + (1 + 2 + 2) + 5
- 11. a) Explain the generation of PAM signal with suitable diagram. How is PCM signal generated from PAM signal?
 - b) How does TDM differ from FDM?
 - c) What is DPSK? Explain with a suitable diagram how DPSK is non-coherently detected. (3 + 3) + 4 + 5
- 12. a) What is thermal noise? Give the voltage generator and current generator equivalent circuit for thermal noise and find out RMS noise voltage and current respectively.
 - b) Two resistors of 20 K Ohms and 30 K Ohms are at room temperature. Calculate thermal noise voltage :
 - i) for each resistor
 - ii) for both the resistors in series
 - iii) for both the resistors in parallel

Take bandwidth as 100 KHz & KT = $4 \times 10 - 21$ w/Hz.

- c) Derive the signal-to-noise ratio at the output of the demodulator of a DSB SC receiver. 5 + 5 + 5
- 13. a) What are the advantages of digital communication over analog communication?
 - b) Compare between ASK, FSK and PSK.
 - c) Explain with a suitable diagram the working principle of a PCM transmitter. 3 + 5 + 7

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