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## CS/B.Tech/ICE(O)/SEM-5/IC-505/2012-13

### 2012

## DATA COMMUNICATION AND TELEMETRY

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)

- 1. Choose the correct alternatives for any ten of the following:  $10\times 1=10$  i) Armstrong modulator generates
  - a) AM signals
- b) PM signals
- c) FM signals
- d) both (b) and (c).
- ii) A carrier voltage is simultaneously modulated by two sine waves causing modulation indices of 0.4 and 0.3. The overall modulation index is
  - a) 0.35

b) 0.7

c) 0.5

- d) none of these.
- iii) The most commonly used filter in SSB generation is
  - a) mechanical
- b) RC

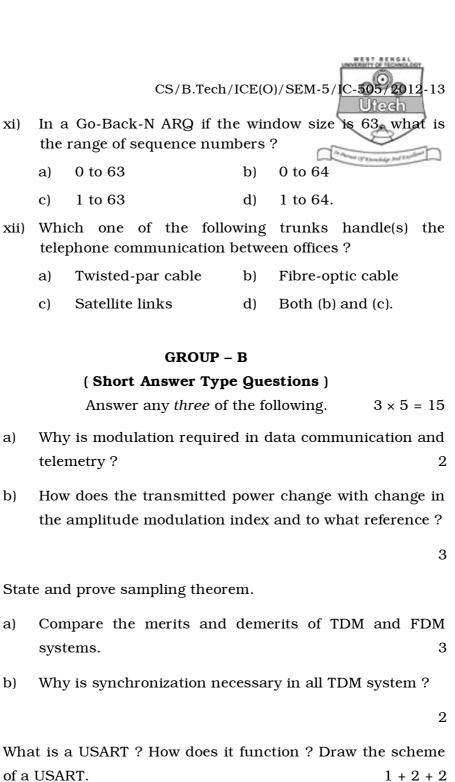
c) LC

d) high-pass.

5463(O) [ Turn over

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iv)		ch of the following will he AM wave itself?	carı	8	on
	a)	DSB	b)	SSB A A A A A A A A A A A A A A A A A A	
	c)	VSB	d)	All of these.	
v)	Which of the following pulse-time midulations does not exist in practice?				
	a)	PWM	b)	PAM	
	c)	PPM	d)	PFM.	
vi)	In PCM, the number of pulses $p$ in code-group for $q$ quantizing levels is given by				
	a)	$\log_2^q$	b)	$\log_q$	
	c)	$\log_{10}^q$	d)	ln p.	
vii)	——————————————————————————————————————				
	a)	PCM	b)	DPCM	
	c)	PWM	d)	DELTA.	
viii)	i) TDM				
	a)	stacks several chanshots.	nels	in adjacent frequen	cy
	b)	interleaves pulses transmissions	bel	longing to differe	nt
	c)	combines 5 groups int	o a s	ingle super group	
	d)	can be used with PCM	only		
ix)	HDI	LC is an acronym for			
	a) high-duplex line communication				
	b) high level data link control				
	c)	half-duplex digital link	con	trol	
	d)	host double-level circu	ıit.		
x)	A bı	ıffer amplifier has a gai	n of		
	a)	infinity			
	b)	zero			
	c)	unity			
	d)	dependent upon the ci	rcuit	parameters.	



2 + 3

xi)

a)

c)

a)

c)

telemetry?

systems.

of a USART.

2.

3.

4.

5.

6.

a)

b)

a)

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What is modem? Describe the functions of modem.



 $3 \times 15 = 45$ 

#### **GROUP - C**

# ( Long Answer Type Questions ) Answer any *three* of the following.

Compare FM and PM system	S.	2
Define FM modulation index	How is it calculated 2 Wh	17.7

- b) Define FM modulation index. How is it calculated ? Why is FM sometimes called the constant bandwidth system ? Explain. 3+3
- c) Why are balanced and double balanced modulators popular in telemetry applications? Draw the circuit of a double balanced modulator and explain its operation briefly. 2+5
- 8. a) What are the methods for generating PAM signals ? Explain the operation of a PAM modulator circuit. 2 + 3
  - b) Describe the operation of a PCM transmitter. How is companding technique useful minimizing quantizing error for low level signals? 5+3
  - c) What are the advantages of DPCM system?
- 9. a) Why is band-pass filter used in a demodulator channel on a receiving side of the FDM telemetry system?
  - b) Draw and explain the block schematic diagram of a FDM/FM telemetry system. 8
  - c) Briefly discuss the power line carrier communication (PLCC). 5
- 10. a) What are three popular ARQ mechanisms? How does ARQ correct an error? 3 + 3
  - b) Stop-and-wait ARQ has two control variables *S* and *R*. What are their functions?
  - c) Discuss the size of the selective repeat ARQ sliding window at both the sender site and the receiver site. 6
- 11. Write short notes on any *three* of the following :  $3 \times 5$ 
  - a) PABX
  - b) Delta modulation (DM)
  - c) Protocols for synchronous communication
  - d) VSB signals
  - e) Standards for serial I/O.

7.

a)