

# University of Mumbai

## Examinations Summer 2022

Program: Electronic & Telecommunication Engineering  
SEM-IV (C Scheme) (R2019)

Subject: PCE

Course Code: ECC405

Time: 2hour 30 minutes

Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	Which noise is generated due to random behavior of charge carriers?
Option A:	Shot noise
Option B:	Partition noise
Option C:	Industrial noise
Option D:	Flicker noise
2.	What is the circuit used for producing AM called?
Option A:	Modulator
Option B:	Transmitter
Option C:	Receiver
Option D:	Duplexer
3.	What is special circuit used to generate a Double sideband suppressed carrier signal?
Option A:	Sideband suppressor
Option B:	Anti-modulator
Option C:	Balanced modulator
Option D:	Carrier suppressor
4.	Pre-Emphasis Circuit is used to amplify what kind of frequencies?
Option A:	Low
Option B:	High
Option C:	Moderate
Option D:	Oscillator
5.	According to Sampling Theorem, Sampling frequency is ----- of modulating frequency.
Option A:	Less than or equal to twice of Modulating frequency
Option B:	Greater than or equal to Modulating frequency
Option C:	Greater than or equal to half of Modulating frequency
Option D:	Greater than or equal to twice of Modulating frequency.
6.	Which pulse modulation technique gives comparatively high SNR?
Option A:	PAM
Option B:	PWM
Option C:	PPM
Option D:	WDM
7.	Aliasing refers to
Option A:	Sampling of signals greater than at Nyquist rate
Option B:	Sampling of signals less than at Nyquist rate

Option C:	Sampling of signals at Nyquist rate
Option D:	demodulation
8.	The standard value for Intermediate Frequency (IF) in AM receivers is
Option A:	455 KHz
Option B:	580 KHz
Option C:	10.7 MHz
Option D:	50 MHz
9.	What causes a quantization noise in PCM system?
Option A:	Serial transmission errors
Option B:	The approximation of the quantized signal
Option C:	The synchronization between encoder and decoder
Option D:	Binary coding techniques
10.	The ratio between the modulating signal voltage and the carrier voltage is called?
Option A:	Amplitude modulation
Option B:	Modulation frequency
Option C:	Modulation index
Option D:	Ratio of modulation
11.	What is the BW of DSB-SC signal?
Option A:	$f_m$
Option B:	$2f_m$
Option C:	$f_m/2$
Option D:	$f_c + f_m$
12.	What is the sequence of operations in which PCM is done?
Option A:	Quantizing, encoding, sampling
Option B:	Sampling, quantizing, encoding
Option C:	Quantizing, sampling, encoding
Option D:	Sampling, encoding, quantization
13.	Calculate the side band power in an SSBSC signal when there is 50% modulation and the carrier power is 100W.
Option A:	50 W
Option B:	25 W
Option C:	6.25 W
Option D:	12.5 W
14.	A super heterodyne receiver with an IF of 450 kHz is tuned to a signal at 1250 kHz. The image frequency is
Option A:	1700 kHz
Option B:	2150 kHz
Option C:	1650 kHz
Option D:	2100 kHz
15.	For a three-stage cascade amplifier, calculate the overall noise figure when each stage has a gain of 12 DB and noise figure of 8dB.
Option A:	12
Option B:	24
Option C:	13.55
Option D:	8

16.	Which of the following analog modulation schemes requires the minimum transmitted power and minimum channel bandwidth?
Option A:	VSB
Option B:	DSB-SC
Option C:	SSB
Option D:	AM
17.	In PM, the information is transmitted using
Option A:	change in phase of the carrier
Option B:	change in position of the carrier
Option C:	change in amplitude of the carrier
Option D:	change in frequency of the carrier
18.	The process of impressing a low frequency information signals onto a high-frequency carrier signal is called as _____
Option A:	demodulation
Option B:	modulation
Option C:	oscillation
Option D:	amplification
19.	ARMSTRONG method is used for the generation of
Option A:	DSB-SC
Option B:	DSB-FC
Option C:	Direct FM
Option D:	Indirect FM
Q20.	If signal $x(t)$ has maximum frequency of “W” Hz then Nyquist Interval is given by
Option A:	W
Option B:	$1/W$
Option C:	$2W$
Option D:	$1/2W$
Q21.	Pre-emphasis in FM system involves
Option A:	compression of the modulating signal
Option B:	expansion of the modulating signal
Option C:	amplification of lower frequency component of modulating signal
Option D:	amplification of higher frequency component of modulating signal
Q22.	In a radio receiver, the local oscillator is tuned to a frequency
Option A:	lower than the incoming frequency
Option B:	higher than the incoming frequency
Option C:	equal to incoming frequency
Option D:	half of the incoming frequency
Q23.	When two networks are connected in series, its composite noise figure can be given as
Option A:	$F_1 + (F_2 - 1)/G_1$
Option B:	$F_1 - (F_2 - 1)/G_1$
Option C:	$F_2 + (F_1 - 1)/G_1$
Option D:	$F_1 G_1 + (F_2 - 1)$

Q24.	The AM spectrum consists of
Option A:	Carrier frequency
Option B:	Upper side band frequency
Option C:	Lower side band frequency
Option D:	Carrier Frequency, Upper side band frequency and Lower sideband frequency
Q25.	For an AM DSB-FC envelope with $V_{\max} = 20 \text{ V}$ and $V_{\min} = 4 \text{ V}$ , what will be the peak amplitude of carrier
Option A:	20
Option B:	4
Option C:	8
Option D:	12
26.	Noise Factor (F) and Noise Figure (NF) are related as
Option A:	$NF = 10 \log_{10}(F)$
Option B:	$F = 10 \log_{10}(NF)$
Option C:	$NF = 10 (F)$
Option D:	$F = 10 (NF)$
27.	Noise in a communication system originates in:
Option A:	the sender
Option B:	the receiver
Option C:	the channel
Option D:	the sender, the receiver, the channel
28.	Shot noise is generated in:
Option A:	transistors and diodes
Option B:	resistors
Option C:	copper wire
Option D:	Only diodes
29.	VSB modulation is preferred in TV because
Option A:	it reduces the bandwidth requirement to half
Option B:	it avoids phase distortion at low frequencies
Option C:	it results in better reception
Option D:	it saves power
30.	Most of the power in an AM signal is in the
Option A:	Carrier
Option B:	Upper Sideband
Option C:	Lower Sideband
Option D:	Modulating Signal
31.	A 100MHz carrier is frequency modulated by 10 KHz wave. For a frequency deviation of 50 KHz, calculate the modulation index of the FM signal.
Option A:	100
Option B:	50
Option C:	70
Option D:	90
32.	The function of an AM detector circuit is to

Option A:	rectify the input signal
Option B:	discard the carrier
Option C:	provide audio signal
Option D:	rectify the input signal by discarding the carrier to provide audio signal
33.	In Pulse Position Modulation, the drawbacks are
Option A:	Synchronization is required between transmitter and receiver
Option B:	Large bandwidth is required as compared to PAM
Option C:	It doesn't need any synchronization
Option D:	It needs synchronization between transmitter & receiver and requires large bandwidth as compared to PAM
34.	The sampling technique having the minimum noise interference is
Option A:	Instantaneous sampling
Option B:	Natural sampling
Option C:	Flat top sampling
Option D:	Instantaneous, Natural & Flat top sampling
35.	Which of the following is digital multiplexing technique?
Option A:	FDM
Option B:	Asynchronous TDM
Option C:	Synchronous TDM
Option D:	Asynchronous & Synchronous TDM both
36.	When two or more signals share a common channel, it is called:
Option A:	sub-channeling
Option B:	signal switching
Option C:	SINAD
Option D:	multiplexing
37.	Indicate which one of the following is not an advantage of FM over AM:
Option A:	Better noise immunity is provided
Option B:	Lower bandwidth is required
Option C:	The transmitted power is more useful
Option D:	Less modulating power is required
38.	With high-level AM:
Option A:	the RF amplifiers are typically Class A
Option B:	the RF amplifiers are typically Class B
Option C:	the RF amplifiers are typically Class C
Option D:	the RF amplifiers are typically Class AB
39.	Basically, sensitivity measures:
Option A:	the weakest signal that can be usefully received
Option B:	the highest-frequency signal that can be usefully received
Option C:	the dynamic range of the audio amplifier
Option D:	Ratio of input signal to output signal
40.	In delta modulation, "granular noise" is produced when:
Option A:	the signal changes too rapidly
Option B:	the signal does not change
Option C:	the bit rate is too high

Option D:	the sample is too large
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Sr. No.	Q.1 or Q2 or Q3	5 marks each
1	Define modulation and advantages of modulation.	
2	Explain block diagram of basic communication system.	
3	Explain different types of communication channels.	
4	Define noise, noise factor, noise figure, noise temperature	
5	Explain different types of noise.	
6	Compare different modulation techniques of AM	
7	Compare different modulation techniques of FM	
8	Calculate power saving in DSBSC/SSB AM.	
9	Explain Ring Modulator.	
10	Compare AM, FM and PM.	
11	Compare narrowband and wideband FM.	
12	Compare AM and FM receivers.	
13	Compare Delta and Adaptive delta modulation.	
14	Explain with block diagram TDM.	
15	Explain with block diagram FDM.	
16	Compare TDM and FDM.	
17	Explain different types of AGC.	
18	Explain Sampling theorem.	
19	Explain aliasing error and aperture effect.	
20	Explain Nyquist criteria.	

Sr. No.	Q.1 or Q2 or Q3	10 marks each
1	Draw and explain frequency allocation table of international communication standards.	
2	Derive Friss transmission formula	
3	Explain with applications ISB and VSB	
4	Explain different methods for generation of DSBFC/DSBSC/SSB	
5	Explain Foster Seeley discriminator.	
6	Explain ARMSTRONG method of FM generation.	

7	Explain noise triangle in FM and pre-emphasis and De-emphasis
8	Explain SHR (Super heterodyne receiver) with its advantages over TRF.
9	Explain performance parameters (characteristics) of receivers.
10	Why IF of AM is 455KHZ? Also explain AGC and its different types.
11	Determine noise figure using Friss formula if $G_1=15\text{dB}$ , $F_1=10\text{db}$ and $F_2=20\text{db}$ . Also calculate noise voltage and noise power at temperature $290^0\text{K}$ , Bandwidth 5MHz and resistor 50ohm.
12	One input to AM modulation is 500 KHz carries with an amplitude of 20Vp. The second input is 10 KHz modulating signal that is of sufficient amplitude to cause a change in o/p wave of $\pm 7.5 \text{ Vp}$ . Determine: <ol style="list-style-type: none"> <li>1. Upper and Lower side frequencies</li> <li>2. Modulation co-efficient and % modulation</li> <li>3. Expression of modulated wave</li> <li>4. Draw o/p spectrum</li> <li>5. Total transmitted power and power saving in SSB</li> </ol>
13	In an FM system if the maximum value of deviation is 75KHz and the maximum modulating frequency is 10KHz. calculate the deviation ratio and bandwidth of the system.
14	Explain FM receivers.
15	Explain PAM /PWM/PPM modulator and demodulator, also give its advantages, disadvantages and applications.
16	Explain Delta and adaptive delta modulation with its advantages and disadvantages and applications.
17	Explain PCM and DPCM.
18	Explain Sampling theorem and Nyquist criteria.
19	Explain aliasing error and aperture effect.
20	Explain advantages, disadvantages and applications of TDM and FDM with receiver block diagram.