University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Electronics and Telecommunication**

Curriculum Scheme: Rev2019

Examination: SE Semester IV

Course Code: ECC4405 and Course Name: Principles of Communication Engineering

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following steps is not included in the process of reception?
Option A:	Decoding
Option B:	Encoding
Option C:	Storage
Option D:	Interpretation
2.	A receiver has a noise figure of 2.04dB. What is the equivalent noise temperature of that receiver?
Option A:	154K
Option B:	200K
Option C:	174K
Option D:	300K
3.	Ionospheric propagation is also called as------
Option A:	Sea wave propagation
Option B:	Ground wave propagation
Option C:	Sky wave propagation
Option D:	Line of sight propagation
4.	A 400W carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.
Option A:	512.5W
Option B:	400 W
Option C:	200 W
Option D:	612 W
5.	The Vmax p-p value of an AM signal as observed on DSO as 5.9 divisions and the Vmin p-p is observed as 1.2 divisions. Calculate the modulation index
Option A:	1
Option B:	0.3
Option C:	0.8
Option D:	0.662
6.	The primary benefit of SSB AM is
Option A:	Reduction in the power consumption
Option B:	Reduction in the bandwidth requirement

Option C:	Simple circuit
Option D:	Less costly
7.	The balanced modulator produces which frequencies at its output
Option A:	Carrier frequency
Option B:	Modulating signal frequency
Option C:	Sum and difference of modulating and carrier frequencies
Option D:	Product of modulating and carrier frequencies
8.	The time constant of R & C in diode detector is chosen to be ------ compared to the period of carrier signal
Option A:	Long
Option B:	Short
Option C:	Equal
Option D:	Double
9.	Vestigial sideband modulation is normally used for
Option A:	HF point-to-point communications
Option B:	Satellite broadcasting
Option C:	TV broadcasting
Option D:	stereo broadcasting
10.	The ratio of frequency deviation and modulating signal frequency is called as
Option A:	Deviation ratio
Option B:	Frequency ratio
Option C:	Modulation index
Option D:	Modulation ratio
11.	What is the maximum bandwidth of an FM signal with a deviation of 30 kHz and a maximum modulating signal of 5 kHz using Carson's rule?
Option A:	70 KHz
Option B:	35 KHz
Option C:	80KHz
Option D:	40 KHz
12.	Which of the following is not a disadvantage of FM over AM?
Option A:	Wide bandwidth
Option B:	Complex circuit
Option C:	Noise immunity
Option D:	Less area of reception
13.	_____ is used in entertainment broadcasting, while _____ is employed for communications.
Option A:	Wideband FM, Narrowband FM
Option B:	Narrowband FM, Wideband FM
Option C:	Wideband FM, Wideband FM
Option D:	Narrowband FM, Narrowband FM
14.	A pre-emphasis circuit provides extra noise immunity by
Option A:	boosting the bass frequencies

Option B:	amplifying the higher audio frequencies
Option C:	pre amplifying the whole audio band
Option D:	converting the phase modulation to FM
15.	In a broadcast superheterodyne receiver, if the intermediate frequency is 455 KHz, the image frequency and rejection ratio at 25 MHz is
Option A:	2.59 MHz, 0.72
Option B:	100 MHz, 7.22
Option C:	28 MHz, 0.72
Option D:	25.91 MHz, 7.22
16.	Which of the following is not an effect of high value of intermediate frequency?
Option A:	Poor selectivity
Option B:	Poor adjacent channel rejection
Option C:	Poor image frequency rejection
Option D:	Tracking difficulties
17.	Calculate the Nyquist rate for sampling when a continuous time signal is given by $x(t) = 5 \cos 100\pi t + 10 \cos 200\pi t - 15 \cos 300\pi t$
Option A:	300Hz
Option B:	600Hz
Option C:	150Hz
Option D:	200Hz
18.	In pulse width modulation,
Option A:	Amplitude of the carrier pulse is varied
Option B:	Synchronization is not required between transmitter and receiver
Option C:	Instantaneous power at the transmitter is constant
Option D:	Frequency of the pulse is varied
19.	The digital modulation scheme in which the step size is not fixed is
Option A:	Delta modulation
Option B:	Adaptive delta modulation
Option C:	DPCM
Option D:	PCM
20.	Multiplexers in early TDM/PAM telemetry systems used a form of rotary switch known as a
Option A:	Telemetry
Option B:	Mixer
Option C:	Commutator
Option D:	Rotator

Q2 **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	If an amplifier has bandwidth B=20 KHz and a total noise power N = 2 X 10^{-17} W. determine the total noise power if bandwidth i) increases to 40 KHz ii) decreases to 10 KHz.
B	Explain any four radio receiver characteristics. Why is AFC required in radio receivers?
C	Draw and explain Foster Seeley detector in short
D	Explain pre-emphasis and De-emphasis in detail.
E	Draw the transmitter and receiver of the FDM signal. Also draw the frequency spectrum of FDM signal
F	Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of (a) 100 percent and 50 percent.

Q3 **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	Explain the indirect method of FM generation in detail along with the phasor diagrams
B	Derive the expression of an Amplitude modulated wave. Draw the time domain and frequency domain waveforms. Also derive the bandwidth of AM
C	Explain the generation and detection of PPM waveforms in detail. Mention the advantages and disadvantages of PPM compared to other pulse modulation techniques