

University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

Examination: SE Semester IV

Course Code: ELC404 and Course Name: Principles of Communication Engineering

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Emitter modulator amplifier for Amplitude Modulation
Option A:	Operates in class B mode
Option B:	Has a high efficiency
Option C:	Output power is very high
Option D:	Operates in class A mode
2.	A carrier is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4. The total modulation index will be
Option A:	0.5
Option B:	0.7
Option C:	1
Option D:	Data is not sufficient
3.	For a 100% AM modulated wave with carrier suppressed, the percentage power saving will be
Option A:	100
Option B:	50
Option C:	55.55
Option D:	66.66
4.	Neutralization is used in RF amplifier to
Option A:	Improve stability
Option B:	Increase bandwidth
Option C:	Improve selectivity
Option D:	Improve gain
5.	Which is not necessarily an advantage of FM over AM
Option A:	Bandwidth saving
Option B:	Less modulating power
Option C:	Better noise immunity
Option D:	Transmitter power is more useful
6.	In FM frequency deviation is
Option A:	Proportional to modulating frequency
Option B:	Proportional to amplitude of modulating signal

Option C:	Constant
Option D:	Zero
7.	In an AM wave, the majority of the power is in
Option A:	Lower sideband
Option B:	Upper sideband
Option C:	Carrier
Option D:	Single side band
8.	Overmodulation results in
Option A:	Weakening of the signal
Option B:	Excessive carrier power
Option C:	Distortion
Option D:	Better efficiency
9.	Demodulation is done in
Option A:	Receiving antenna
Option B:	Transmitter
Option C:	Radio receiver
Option D:	Transmitting antenna
10.	Superhertodyne principle refers to
Option A:	Using a large number of amplifier stages
Option B:	Using a push-pull circuit
Option C:	Obtaining lower fixed intermediate frequency
Option D:	Using a large number of oscillators
11.	For the transmission of normal speech signal, the PCM channel needs a bandwidth of
Option A:	64 KHz
Option B:	16 KHz
Option C:	8 KHz
Option D:	4 KHz
12.	The Nyquist rate of signal samples/sec
Option A:	Fm
Option B:	2 fm
Option C:	N fm
Option D:	2N fm
13.	Advantage of using direct method for generation of FM signal is
Option A:	It gives high stability to FM signal frequency
Option B:	It gives high deviation to FM signal frequency
Option C:	High power FM generation is possible
Option D:	Good noise immunity
14.	Sensitivity is defined as
Option A:	Ability of receiver to amplify weak signals
Option B:	Ability to reject unwanted signals
Option C:	Ability to convert incoming signal into Image Frequency

Option D:	Ability to reject noise
15.	Quantization noise occurs in
Option A:	PCM
Option B:	PAM
Option C:	PPM
Option D:	PWM
16.	DM is a special case of
Option A:	PAM
Option B:	PPM
Option C:	PWM
Option D:	PCM
17.	Modulation is done in
Option A:	Transmitter
Option B:	Radio receiver
Option C:	Between transmitter and radio receiver
Option D:	Multiplexer
18.	The function of multiplexing is
Option A:	To reduce the bandwidth of the signal to be transmitted
Option B:	To combine multiple data streams over a single data channel
Option C:	To allow multiple data streams over multiple channels in a prescribed format
Option D:	To match the frequencies of the signal at the transmitter as well as the receiver
19.	In a transmitter oscillator is used
Option A:	Hartley
Option B:	RC phase-shift
Option C:	Wien-bridge
Option D:	Crystal
20.	Pre- emphasis is required to
Option A:	To convert PM to FM
Option B:	Amplifying lower audio frequencies
Option C:	Boosting the bass frequencies
Option D:	Provide better noise immunity

Q2 (20 Marks)	Solve any Four out of Six (5 marks each.)
A	Define modulation index and percentage modulation.
B	Why SSB is preferred for transmission of good quality of signal?
C	Write short note on delayed AGC.
D	What is double spotting explain in brief.
E	What is pre- emphasis and de- emphasis.
F	Draw the circuit diagram for Lattice type balanced modulator and discuss its operation.

Q3. (20 Marks)	Solve any Two Questions out of Three (10 marks each.)
A	<p>A sinusoidal carrier has an amplitude of 20V and frequency 200KHz. It is amplitude modulated of amplitude 6V and frequency 1KHz. Modulated voltage is developed across 80-ohm resistance.</p> <ol style="list-style-type: none"> 1. Write the equation of modulated wave 2. Determine modulation index 3. Draw the spectrum of modulated wave 4. Calculate total average power
B	State advantages of FM over AM. Why AM detector principle is not suitable to demodulate FM signal?
C	What is compandor and why it is used in a PCM system.

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Q1:

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	D
Q2.	A
Q3.	D
Q4.	A
Q5.	D
Q6.	B
Q7.	C
Q8.	C
Q9.	C
Q10.	C
Q11.	D
Q12.	C
Q13.	C
Q14.	A
Q15.	A
Q16.	D
Q17.	A
Q18.	B
Q19.	D
Q20.	D

Important steps and final answer for the questions involving numerical example

Q3 (A):

$E_c = 20 \text{ V}$
 $f_c = 200 \text{ kHz}$
 $E_m = 6 \text{ V}$
 $f_m = 1 \text{ kHz}$
 $R = 80 \Omega$

1) modulated wave

$$e_m = E_m \sin 2\pi f_m t$$

$$e_m = 6 \sin 2\pi \times 1 \times 10^3 \times t$$

2)

$$m = \frac{E_m}{E_c} = \frac{6}{20} = 0.3$$

3) Emf

4) Average power = $\frac{I^2 R}{2}$

$$= \frac{\left(\frac{20}{80}\right)^2 \times 80}{2}$$

$$= \frac{(0.25)^2 \times 80}{2}$$