

Annexure A

University of Mumbai
Examination First Half 2022

Program: **Information Technology**

Curriculum Scheme: R2016

Examination: SE

Semester III

Course Code: ITC305

Course Name: Principle of Communications

Time:

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The acoustic channel is used for which of the following?
Option A:	UHF communications
Option B:	single-sideband communication
Option C:	television communications
Option D:	person-to-person voice communications
2.	Indicate the noise whose source is in a category different from that of the other three.
Option A:	Solar noise
Option B:	Cosmic noise
Option C:	Atmospheric noise
Option D:	Galactic noise
3.	Indicate the false statement . The square of the thermal noise voltage generated by the resistor is proportional to its
Option A:	its temperature
Option B:	its resistance
Option C:	Boltzmann's constant
Option D:	Bandwidth over which is is measured
4.	If the plate supply voltage for the plate modulated class C amplifier is V.The max plate cathode voltage could be as high as
Option A:	4V
Option B:	3V
Option C:	2V
Option D:	1V
5.	The modulation index of AM is changed from 0 to 1. The transmitted power is
Option A:	Unchanged
Option B:	halved
Option C:	doubled
Option D:	increase by 50 percent
6.	The difference between phase and frequency modulation
Option A:	is purely theoretical because they are the same in practice
Option B:	is too great to make the two system compatible
Option C:	lies in the poorer audio response of phase modulation
Option D:	lies in the different definitions of the modulation index
7.	One of the following is an indirect way of generating FM. This is the
Option A:	Reactance FET modulator
Option B:	Diode modulator
Option C:	Armstrong modulator
Option D:	Reactance bipolar transistor modulator
8.	Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by $x(t) = 5 \cos 400\pi t$
Option A:	100 Hz
Option B:	200 Hz
Option C:	400 Hz

Option D:	250 Hz
9.	Quantizing noise occurs in
Option A:	Time-division multiplex
Option B:	Frequency division multiplex
Option C:	Pulse-code modulation
Option D:	Pulse-width modulation
10.	Companding is used
Option A:	To overcome quantizing noise in PCM
Option B:	In PCM transmitters, to allow amplitude limited in the receivers
Option C:	To protect small signals in PCM from quantizing distortion
Option D:	In PCM receivers, to overcome impulse noise

Q2 (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Define the following terms SNR, Temperature equivalent, Modulation, Noise Factor and Noise figure. Two resistors $10K\Omega$ and $25 K\Omega$ are at room temperature ($290^{\circ}K$) for a bandwidth of 150 KHz. Calculate Thermal noise for each resistor, if two resistors are in series and if two resistors are in parallel.	
B	State and prove the Time shifting and frequency shifting property of Fourier Transform.	
C	Differentiate between ASK, FSK & PSK	

Q3 (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	The AM Transmitter develops an unmodulated power output of 400 Watts across a 50Ω resistive load. The carrier is modulated by a sinusoidal signal with a modulation index of 0.8. Assuming $f_m = 5KHz$ and $f_c = 1MHz$. (10M) (i) Obtain the value of carrier amplitude V_c and hence write the expression for AM signal. (ii) Find the total side-band power. (iii) Draw the AM wave for the given modulation index.	
B	What is FDM. Explain in brief transmitter and Receiver of FDM.	
C	Explain Foster Seeley discriminator with neat block diagram	

Q4. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Explain generation and demodulation of PWM.	
B	The binary data 11010101 is transmitted over a base-band channel. Draw the waveform for transmitted data using the following data formats. (10M) (i) Unipolar NRZ (ii) Unipolar RZ (iii) Bipolar RZ (iv) Split phase Manchester (v) Polar quaternary NRZ.	
C	Compare sky wave, ground wave and tropospheric scatter waves.	