DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination –2023

Course: B. Tech. **Branch : Electronics Engineering** **Semester : VI**

Subject Code & Name: BTEXOE604B - Communication Engineering

Max Marks: 60 **Date:19/07/2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve/Answer the following. (ANY TWO)**		
A)	Define Analog Communication and Explain the elements of communication system	**CO 01**	**6**
B)	What is modulation? Also explain necessity of the modulation.	**CO 01**	**6**
C)	Define the following terms : (i) Wavelength, (ii) Bandwidth, (iii) Baseband Signal, (iv) Modulation index	**CO 01**	**6**
Q.2	**Solve/Answer Any Two of the following. (ANY TWO)**		
A)	Explain DSBFC Technique in detail with the help of (i) frequency spectrum (ii) Time domain representation (iii) power relation with carrier wave	**CO 02**	**6**
B)	Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to the depth of (i) 70% and (ii) 65%	**CO 02**	**6**
C)	Explain generation of SSB using the phase shift method.	**CO 03**	**6**
Q. 3	**Solve/Answer the following. (ANY TWO)**		
A)	What is Angle modulation? Derive the mathematical expression for FM with frequency spectrum.	**CO 05**	**6**
B)	Explain Narrowband and Wideband FM Also compare the FM and AM	**CO 05**	**6**
C)	It is required to provide a maximum deviation of 75 kHz for the 88 MHz carrier frequency of a VHP FM. transmitter. A FET is used as a capacitive reactance modulator, and the linear portion of its g-curve lies from 320 µS (at which V= -2V) to 830 µS (at which V= -0.5V). Assuming that R is one-tenth of Xc calculate (a) RMS value of required modulating voltage (b) The value of the fixed capacitance and inductance of the oscillator tuned circuit across which the reactance modulator is connected	**CO 05**	**6**

Q.4 Solve/Answer the following.

A)	Explain the following terms : (i) Sensitivity, (ii) Selectivity, (iii) Fidelity, (iv) Image frequency and its rejection	**CO 07**	**6**
B)	Write a short note on Super heterodyne receiver.	**CO 04**	**6**
C)	A transmitter radiates 10 KW power with the carrier unmodulated, and 10.5 kW when the carrier is modulated by one sinusoidal signal. Calculate the modulation index. It another modulating signal corresponding to 30% modulation is transmitted simultaneously determine the total radiated power	**CO 04**	**6**

Q. 5 Solve/Answer the following.

A)	An FM wave is $v = 9 \sin (7\times10^8 t + 5 \sin(1250)t)$ Calculate : (i) Modulation index (ii) Maximum deviation (iii) Carrier Frequency (iv) Modulating Frequency (v) The power dissipated by this FM wave in a 5 Ω resistor.	**CO 04**	**6**
B)	An amplifier operating over the frequency range from 3 MHz to 10MHz has a 20K input resistance. What is the rms noise voltage at the input to this amplifier at room temperature	**CO 04, 06**	**6**
C)	An amplifier circuit having a noise figure of 9 dB and power gain of 25 dB is followed by a mixer having a noise figure of 16 dB. Calculate overall noise figure and equivalent noise temperature at the input of the combination	**CO 04, 06**	**6**

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