Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Analog Communication (ELEG 335)
Semester: V
Programme: B.Tech(Electronics Engg)
Time: 03 hrs. **Max. Marks: 100**
Instructions: Attempt ALL Questions

SECTION A

S. No.		Marks	CO
Q1	Find the autocorrelation of periodic function	**05**	**CO1**
Q2	Derive the FM equation for Single Tone Modulation	**05**	**CO3**
Q3	A parallel resonant circuit at 100 MHz has C=20pF & Q-factor =40. Ckt temperature is 17^{o}C. Find the equivalent noise bandwidth of tuned circuit.	**05**	**CO4**
Q4	Explain the operation of Envelope Detector	**05**	**CO2**
	SECTION B		
Q5	Explain the working of Super Heterodyne Receiver with neat sketch of block diagram. Explain the term Selectivity, Fidelity of the receiver.	**10**	**CO2**
Q6.	Calculate the SNR of AM and DSBSC	**10**	**CO4**
Q7.	Explain the various methods of generation of FM.	**10**	**CO3**
Q8.	How will you model mathematically the Second order PLL. Explain the working and detection of FM using Second order PLL	**10**	**CO3**
	SECTION-C		
Q9.	Derive the expression for Noise Figure in terms of Noise temp and also of cascaded system	**20**	**CO4**
Q10a.	Retrieve the message signal from the transmitted DSB-SC through Costas Loop.	**10**	**CO2**
Q10b.	Design FDM mux blocks to generate one frame	**10**	**CO2**

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SECTION A

S. No.		Marks	CO
Q1	State and prove Parseval's Theorem.	**05**	**CO1**
Q2	Input applied to AM modulator 1 is m(t) and AM modulator 2 is –m(t). Both modulators are having the same carrier c(t) =Ac Cos(ω_ct). Output from modulator1 is S1(t) and that of second modulator is S2(t). They are applied to + and – terminals of Summer respectively. Show that the resultant modulated signal S(t) from the summer is DSB-SC signal.	**05**	**CO2**
Q3	Determine the transmission bandwidth and deviation ratio of FM signal with frequency deviation of 75 KHz with modulating signal of 15 KHz.	**05**	**CO4**
Q4	Show that $P_t = P_c(1+m^2/2)$	**05**	**CO2**
	SECTION B		
Q5	Derive the PM equation for Single tone modulation and draw the phasor diagram.	**10**	**CO3**
Q6.	Calculate the SNR of Frequency Modulation.	**10**	**CO4**
Q7.	Explain the various methods of generation of SSB.	**10**	**CO2**
Q8.	An FM signal with a frequency deviation of 10 KHz at the modulation frequency of 5 KHz is applied to two frequency multipliers connected in cascade. First multiplier doubles the frequency and second multiplier triples the frequency. Determine the frequency deviation and modulation index of FM signal obtained at the second multiplier output. What is the frequency separation of adjacent side frequencies of this FM signal. Compare FM & PM with AM for single tone modulation.	**10**	**CO3**
	SECTION-C		
Q9.	Derive the expression for Noise Figure in terms of Noise temp and also of cascaded system	**20**	**CO4**
Q10a.	Retrieve the message signal from the transmitted DSB-SC through Costas Loop.	**10**	**CO2**
Q10b.	Design FDM mux blocks to generate one frame	**10**	**CO2**