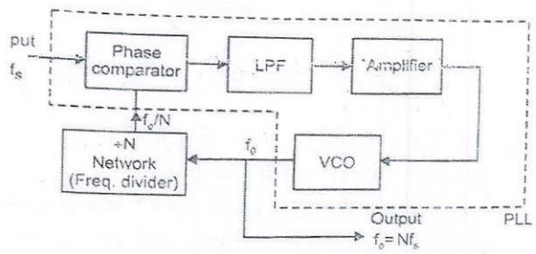
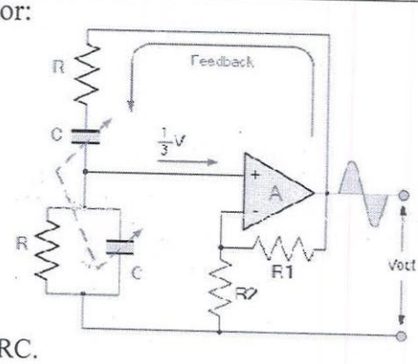
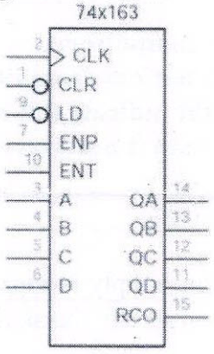
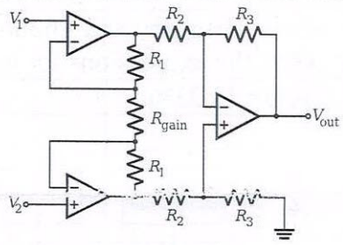
Model Solution

(3 Hours) **[Total Marks: 80]**

N.B.: (1) **Question No. 1 is compulsory.**
(2) **Solve any three questions from the remaining five.**
(3) **Figures to the right indicate full marks.**
(4) **Assume suitable data if necessary and mention the same in answer sheet.**

Q.1		Attempt any 4 questions:	[20]
	(A)	Features of IC 555: Adjustable duty cycle, supply ratings, etc.....	[5]
	(B)	Precision rectifier can rectify the signal below 0.7 V too. Waveforms.	[2+3]
	(C)	$Z_1 - Z_2 = K(X_1 - X_2)(Y_1 - Y_2)$ Substituting the values of voltages at various terminals, $Vo = \frac{(V_x^2 - V_y^2)}{10}$.	[5]
	(D)	Draw a neat circuit diagram and input-output waveforms of an inverting Schmitt trigger. Give the expressions for its threshold levels.	
	(E)	Proof for duty Cycle= 33.33%.	[5]
Q.2	(A)	 **Fig. 9.12** Frequency multiplier using IC PLL Working Principle.	[5+5]
	(B)	AMV: Design of R1, R2, and C for adjustable duty cycle.	[10]
Q.3	(A)	Wien Bridge Oscillator:  Derivation for F = 1/2πRC. Calculation of R and C.	[4+4 +2]
	(B)	Derivation.	[4+6]

P.T.O.

Q.4	(A)	Design of Second order Butterworth non-inverting high pass filter to provide a cut-off frequency of 5 KHz and pass band gain of AF=2.	[10]
	(B)	A=1, B=0, C=1, D=0 RCO is connected to LD through an inverter.  **Fig. 4(B)**	[10]
Q.5	(A)	Functional block diagram of LM317. Explain the working of voltage regulator LM317. Design for an output voltage variable from 5 V to 10 V to handle maximum load current of 500 mA.	[3+3 +4]
	(B)	 Derivation for Vo=(R3/R2)(1+2R1/R_{gain})(V2-V1).	[4+6]
Q.6		Write short notes on: (Attempt any two)	[20]
	(A)	Graph and explanation of Current fold-back protection in IC 723.	[4+6]
	(B)	Sample and Hold Circuit, Working, and waveforms.	[4+4 +2]
	(C)	Circuit of IC74181 Arithmetic Logic Unit and its explanation.	[5+5]
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