

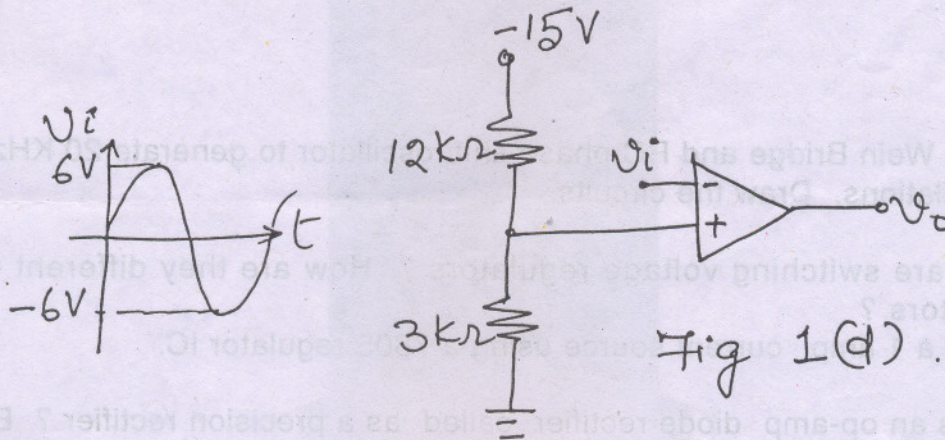
(3 Hours)

[ Total Marks : 100

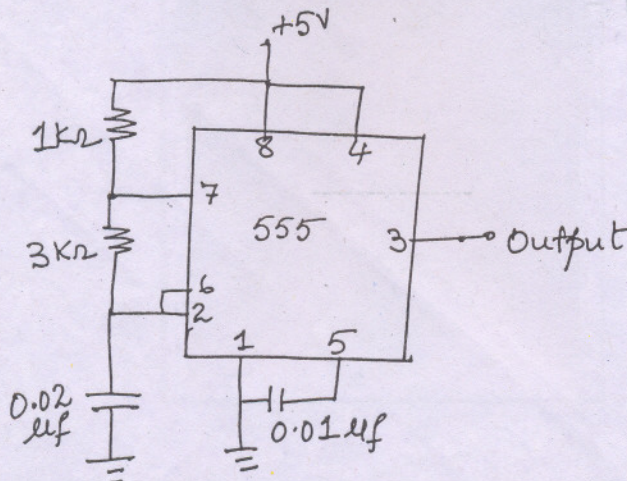
N.B. (1) Question No. 1 is compulsory.

- (2) Attempt any **four** questions from remaining **six** questions.  
(3) Assume suitable data if **required** and state it **clearly**.

1. (a) The 741C is used as an inverting amplifier with a gain of 50. The sinusoidal input signal has a variable frequency and maximum amplitude of 20mV peak. What is the max. frequency of the input at which the output will be undistorted? 5  
 (b) An inverting amplifier using the 741 C must have a flat response upto 40KHz. The gain of the amplifier 10. What maximum peak to peak input signal can be applied without distorting the output? 5  
 (c) Design a differentiator using op-amp to differentiate an input signal that varies in frequency from 10Hz to about 1 KHz. 5  
 (d) Consider the circuit of **Figure** for the sinusoidal voltage shown as input, sketch the output voltage. Assume relatively low frequency operation so that slow rate effects are not apparent assume  $\pm V_{sat} = \pm 13 V$ . 5



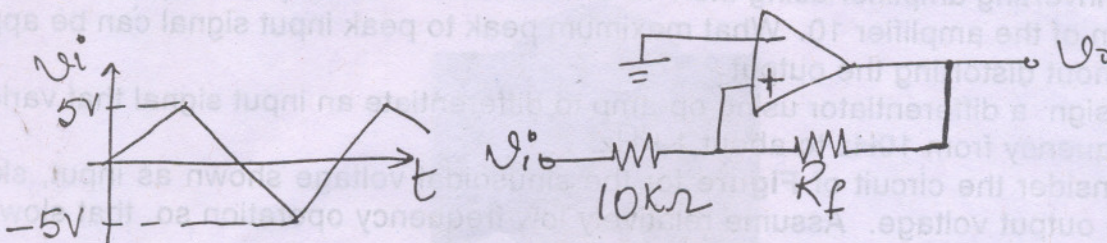
2. (a) Consider the 555 as table circuit in **Figure**. Determine the (i) highstate-time 10  
 interval. (ii) low state-time interval (iii) period (iv) frequency and (v) duty cycle.



- (b) Draw the circuit diagram of three op-amp instrumentation amplifier. Get an-expression 10  
 for the output.

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3. (a) What are switched capacitor filters ? Explain. 10  
 (b) Draw and explain the circuit diagram to generate square and triangular waveform using op-amp. Derive expression for frequency and comment about range of frequency. 10
4. (a) Consider a non inverting Schmitt Trigger as shown. The input is the triangular waveform of **Figure**. Assume that  $\pm V_{sat} = \pm 13$  V. It is desired to produce a square wave in which transitions occur exactly at the peaks of the input ( $\pm 5$ V) (i) Determine the value of  $R_f$  required (ii) Sketch the output waveform. 10



- (b) Design Wein Bridge and RC phase shift oscillator to generate 20 KHz frequency of oscillations. Draw the circuits. 10
5. (a) What are switching voltage regulators ? How are they different from linear regulators ? 10  
 (b) Design a 1 amp. current source using a 7805 regulator IC. 10
6. (a) Why is an op-amp diode rectifier called as a precision rectifier ? Explain with example and waveforms. 10  
 (b) What is a sample and hold circuit ? Explain one type of ADC. 10
7. Write notes on (any two) :- 20  
 (a) IC 723  
 (b) IC 565  
 (c) KRC filter.