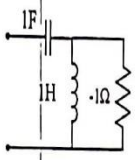
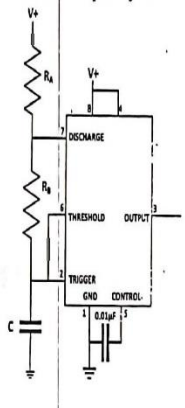


9 Draw the circuit diagram of an RC-phase shift oscillator realized with an opamp and three identical RC sections. Also determine the frequency of oscillation and the required condition of oscillation.

10 Analyze the following circuit which utilizes the 8-pin timer IC 555 to realize a pulse output with a duty cycle which is more than 50 percent. Draw the output waveform as well as the capacitor voltage and therefrom develop an expression for the frequency of the output waveform.



11 Write short notes on any two of the following:

(a) Ideal op-amp characteristic
(b) Realization of astable multivibrator using an OP-amp IC
(c) Operational transconductance amplifier
(d) Wilson current mirror.

No. of Pages 04 Roll No.....

Fifth Semester **B. Tech (EE)**

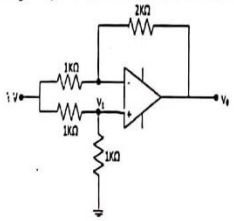
Supplementary Examination Feb.-2019

Time: Three Hours Maximum Marks: 40

EE-313 LINEAR INTEGRATED CIRCUIT

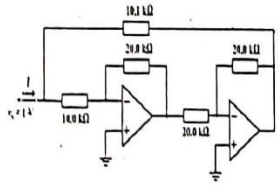
Note: Answer **any EIGHT** questions.
All questions carry equal marks
Assume suitable value for missing data (if any).

1[a] Determine the voltage V_o for the circuit shown below.



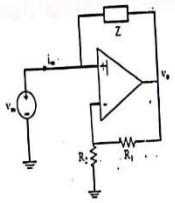
[b] An opamp that is powered from a ± 5V supply is used to build a non-inverting amplifier having a gain of 10. The slew rate of the opamp is 0.5 X 10^6 V/s. For a sinusoidal input with amplitude of 0.2V, determine the maximum frequency (in kHz) up to which it can be operated without any distortion.

2 [a] The circuit shown below uses ideal opamps. Find out the current I (in μA) drawn from the source V_s.

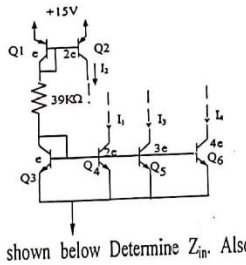


[b] Determine the input impedance of the circuit shown below.

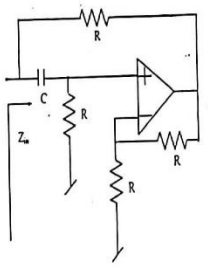
-103-



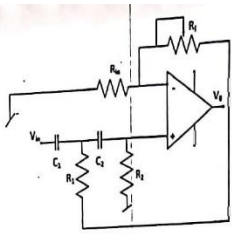
3 For the circuit shown below determine the value of the currents $I_{1\text{-}4}$. The emitter areas of different transistors are scaled in terms of the basic area 'e'. The beta of NPN transistors is equal to 200 while its value for PNP transistors may be taken as 50.



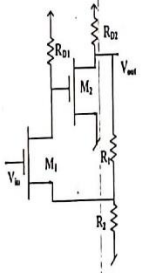
4 For the circuit shown below Determine Z_{in}. Also draw the passive equivalent of this impedance.



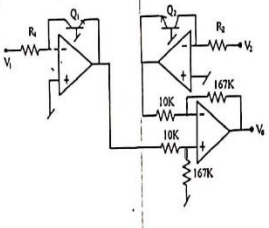
5 Find the transfer function of the circuit shown below and hence identify the type of filter realized by the circuit. Also determine the value of the pole frequency and the quality factor of the poles when $R_1 = R_2 = R$ and $C_1 = C_2 = C$.



6 Identify the different components of the feedback loop present in the amplifier circuit given below and determine the closed loop gain and I/O impedance. You may neglect the channel length modulation effect but include the loading effect of the feedback circuit on the forward path element.



7 For the circuit shown below show that (at room temperature) $V_0 = (1.0)log_{10}\frac{V_2R_1}{V_1R_2}$



8 Draw the opamp based realization of the following passive circuit.