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328652(28)

B. E. (Sixth Semester) Examination, April-May 2021

(New Scheme)

(Et & T Branch)

ELECTRONIC CIRCUIT DESIGN

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) is compulsory and carries 2 marks and, attempt any two from part (b), (c) & (d) and carries 7 marks.*

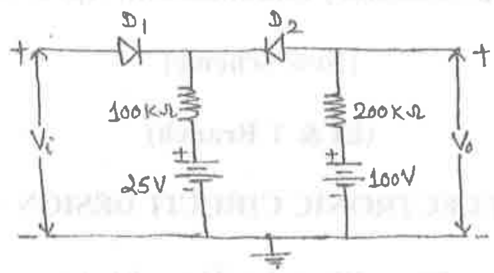
Unit - I

1. (a) Calculate oscillation frequency of the square wave generator whare $R = 10\,k\Omega$ and $C = 0{\cdot}01\ \mu F$.

(b) Draw the circuit of Triangular wave generator using

OPAMP and explain its operation.

(c) The input voltage V_i to the two level clipper shown in figure varies linearly from 0 to 150 volt. Sketch the output voltage V_o to the same time scale as the input voltage. Assume ideal diodes.



(d) Draw and explain current sweep generator in details.

Unit - II

2. (a) What is a multivibrator? Give the names of different types of multivibrator.

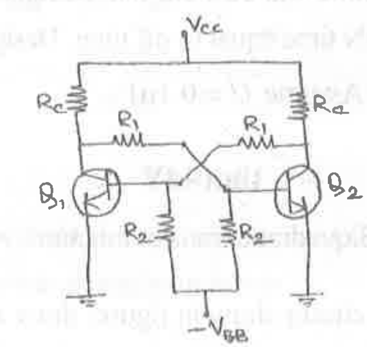
(b) With the help of a schematic diagram explain how the commutating capacitor reduces the transition time.

(c) The fixed-bias binary shown in figure uses n-p-n

silicon transistor with $V_{CE(sat)} = 0{\cdot}5V$, $V_{BE(sat)} = 1V$, $I_{CBO} = 10\,nA$ at 25°C and zero base to emitter voltage at cut-off. The circuit parameters are $V_{CC} = V_{BB} = 6V$, $R_C = 1{\cdot}2\,k\Omega$, $R_1 = 4{\cdot}7\,k\Omega$, $R_2 = 27\,k\Omega$. Find :

(i) h_{FE}(min) and stable state voltages and currents.

(ii) If the reverse saturation current doubles for every 10°C rise in temperature, what is the maximum temperature at which the circuit can operate properly with one device remaining off?



(d) Draw and explain schmitt trigger circuit. Write some applications of this circuit.

Unit - III

3. (a) Why normally control terminal of IC-255 timer is connected to ground through $0{\cdot}01\,\mu F$ by pass capacitor?

(b) With neat circuit diagram explain astable multivibrator using IC-555. Also derive the relation for its duty cycle.

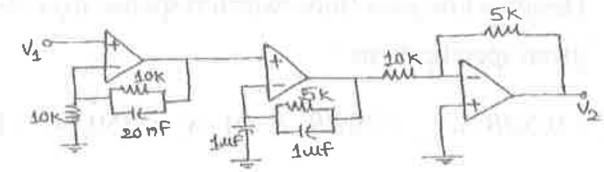
(c) Discuss how monoshot can be used as missing pulse detector?

(d) Design an astable multivibrator which will flash an electric bulb such that its on time will be 3 second and off time will be 1 second. Modify the circuit to get ON time equal to off time. Design both the circuits. Assume $C = 0{\cdot}1\mu F$.

Unit - IV

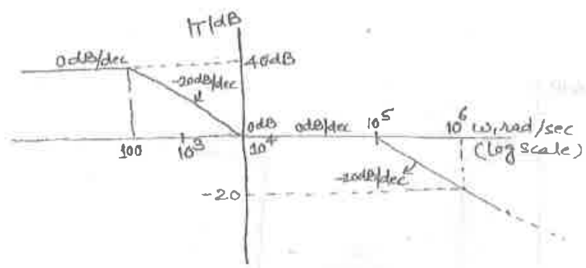
4. (a) Define Biquadratic transfer function.

(b) For the circuit show in figure, draw asymptotic Bode plot for magnitude $T(3w)$.



(c) Explain Biquad circuit with circuit diagram and also derive an expression for frequency response.

(d) The accompanying figure shows the asymptotic Bode plot for a desired magnitude response. Design an amplifier filter using a minimum number of OPAMP. Give the schematic and indicate the element values for your design.



Unit - V

5. (a) Differentiate Butterworth filter and Chebyshev filter relative to attenuation factor.

(b) Define sensitivity. Explain the sensitivity analysis of sallen and key circuit.

(c) Design a low pass Butterworth response from the given specifications :

$\alpha_{max} = 0.5\,dB,\ \alpha_{min} = 30\,dB,\ K = 1,\ w_p = 750,\ w_s = 1750$

use scaling in final design.

(d) Design a bandpass filter to meet the specification shown in figure with the added requirement that the response be Butterworth. It is required that $\alpha(2000) = 0$. Show steps in the Geffe algorithm carefully. In your final design, at least one capacitor should have the value of $0{\cdot}1\ \mu F$.