Printed Pages– 7

Roll No. 5632812041

328652(28)

B. E. (Sixth Semester) Examination, Nov.-Dec. 2015

(New Scheme)

(ET & T Engg. Branch)

ELECTRONIC CIRCUIT DESIGN

Time Allowed : Three hours

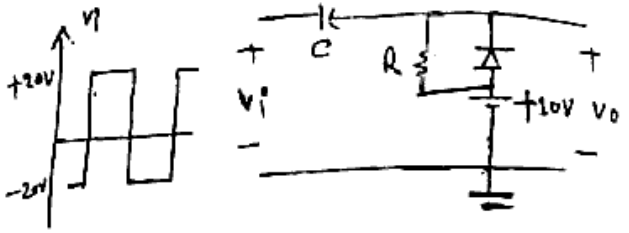
Maximum Marks : 80

Minimum Pass Marks : 28

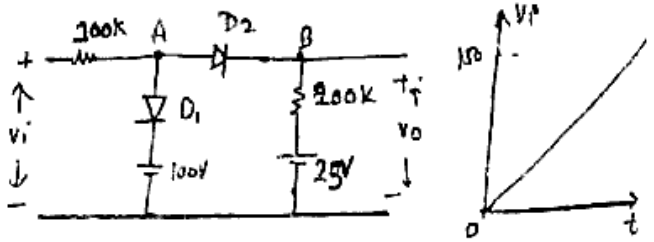
***Note** : All questions are compulsory. Part (a) of each question is compulsory and attempt any two parts from (b), (c) & (d) of each question.*

Unit-I

1. (a) Sketch the out put waveform that you would expect from the circuit shown below, when the input is ± 20 V square wave. 2



(b) Mention the difference between series & shunt clipper. The input to the two level clipper shown in figure varies linearly from 0 V to 150 V. Sketch the output waveform V_0 to the same time scale as input voltage V_i :



(c) With the help of a neat circuit diagram explain the working of a simple current sweep generator. How linearity in corrected through adjustment of the driving waveform for a current time base generator.

(d) Sketch the circuit of a waveform generator that can generate both triangular & square waveforms. Obtain the expression for the frequency of oscillation for triangular wave.

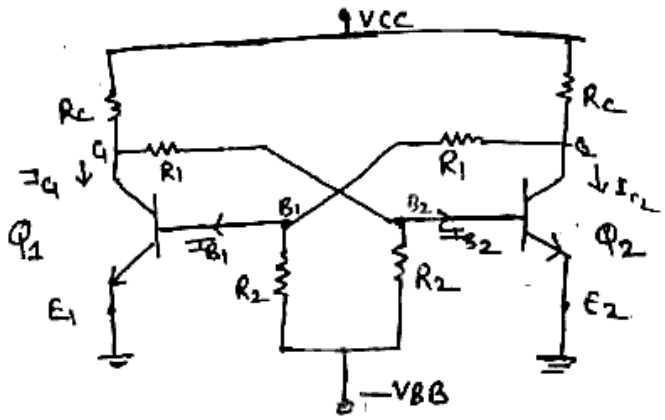
Unit-II

2. (a) Explain the commutating capacitors as short. 3

(b) Compare the collector coupled & emitter coupled astable multivibrator with the help of neat circuit diagram. Derive the expression for frequency of oscillation of an astable multivibrator. 7

(c) With the neat circuit diagram & waveform explain the working of collector coupled monostable multivibrator. Find the expression for gate width for the monostable multivibrator neglecting reverse saturation current I_{CBO}. 7

(d) The fixed biased binary shown in figure below uses n-p-n silicon transistors with $V_{CE\,(sat)} = 0{\cdot}5$ V $V_{BE(sat)} = 1$V, $I_{CBO} = 10\ \mu A$ for 25°C and zero base to emitter voltage at cut off. The circuit parameters are $V_{CC} = V_{BB} = 6$ V, $R_C = 1{\cdot}2\ k\Omega$, $R_1 = 4{\cdot}7\ k\Omega$, $R_2 = 27\ k\Omega$, find $h_{FE(min)}$ and stable state voltages & currents. 7



Unit-III

3. (a) With the help of functional diagram of IC 555 timer explain the working of Reset Pin. 2

(b) With help of neat functional diagram & waveform explain the working of IC 555 timer as astable multivibrator. How circuit is modified to obtain 50% duty cycle? 7

(c) Explain the following using IC555 :

(i) Linear Ramp generator

(ii) Missing pulse detector

(iii) Schmitt trigger

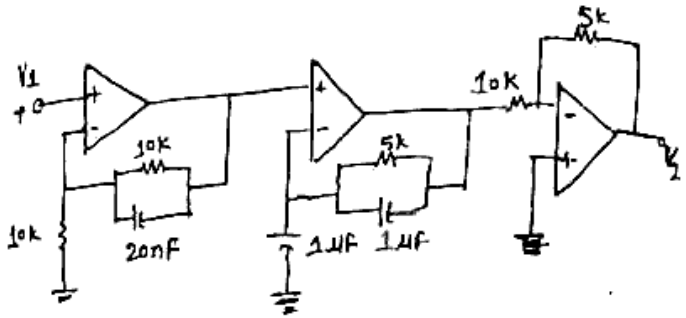
(d) Draw the circuit diagram of IC555 used as astable mode to generate square wave of 1 kHz frequency, giving output equal to 5 V for $\left(\frac{1}{2}\right)$ m sec & output equal to 0 V for next $\left(\frac{1}{2}\right)$ m sec. Connect one red lamp & one green lamp so that for $\left(\frac{1}{2}\right)$ m sec red lamp is ON & green lamp is OFF & for next $\left(\frac{1}{2}\right)$ m sec green lamp is ON and red lamp is OFF. Lamps have rating of 5 V, 50 mA. 7

Unit-IV

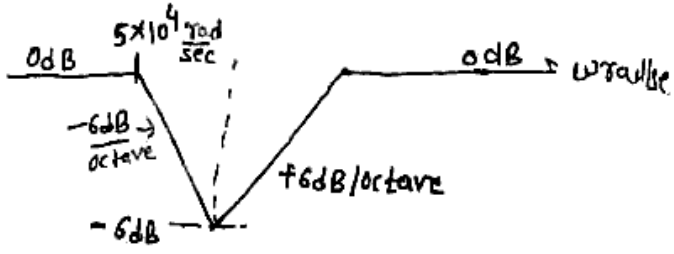
4. (a) Draw the lattice circuit for all pass filter. Also write its transfer function. 2

(b) What is Biquad circuit? Write down the standard transfer function for low pass filter & design the Biquad circuit. Also show that Biquad circuit can be orthogonally tuned. 7

(c) For the circuit shown prepare an asymptotic Bode plot for magnitude of $T(jw)$. Carefully identify the slopes & low and high frequency asymptotes. 7



(d) In the figure shown below we wish to reduce the gain over a band of frequency. Find a circuit that will realise the given specification characteristics. Give schematic for the circuit chosen and also element values. 7



Unit-V

5. (a) What are the properties of Butterworth response? 2

(b) Define Bode sensitivity and derive an expression for sensitivity analysis of the sallen and key circuit. 7

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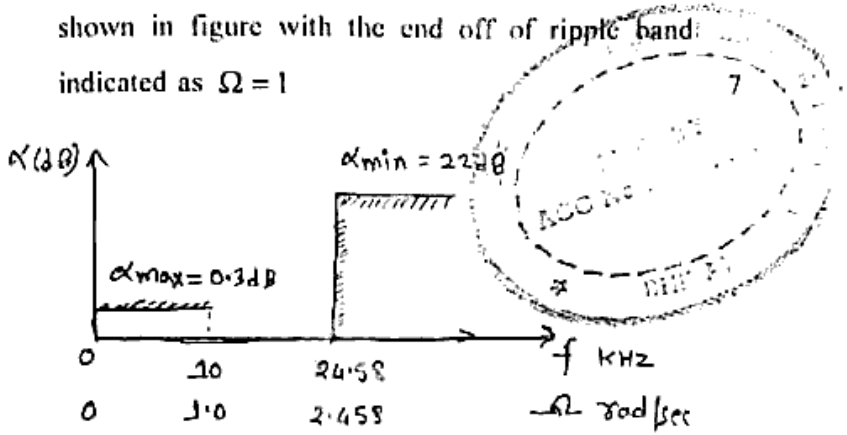
(c) Design a L.P.F. (Low Pass Filter) to satisfy the specification for a Chebyshev low pass filter shown in figure below. The loss in passband to 10 kHz is to be 0·3 dB or less and beyond 24·58 kHz. The loss is to be at least 22 dB. Normalized frequencies are shown in figure with the end off of ripple band indicated as $\Omega = 1$ 7



(d) Design a Butterworth filter with the gain adjusted such that $\alpha(707) = 0$ dB in figure given below. Use all capacitors of value 0·1 μF. 7