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Total No. of Questions : 09] [Total No. of Pages : 03

B.Tech. (Sem. - 5th)

PULSE AND DIGITAL SWITCHING CIRCUITS

SUBJECT CODE : EC - 309

Paper ID : [A0315]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1) ***(10 × 2 = 20)***

a) For high pass filter circuit, Draw voltage response across capacitor (V_c) and Resistor (V_o) for single input pulse under following conditions :

(i) When RC<<T

(ii) When RC>>T of the circuit diagram shown below (fig.a).

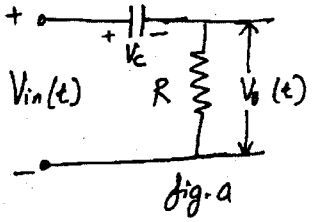

fig.a

b) What do you mean by under damped, critically damped and overdamped circuit?

c) What is the significance of attenuation?

d) Draw the compensated network for the following circuit (fig.b)?

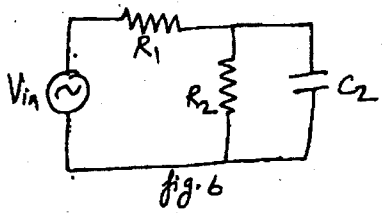

fig.b

For perfect compensation, but essential conditions to be require from this compensated network.

e) The RC time constant of high pass filter is made smaller in comparison of duration of input waveform, what will be the effect on width of the output pulse? Elaborate your answer?

f) Draw the output waveform of the following circuit (fig.c) with respect to input shown in (fig.d.). Assume that diode is ideal and R_s is zero.

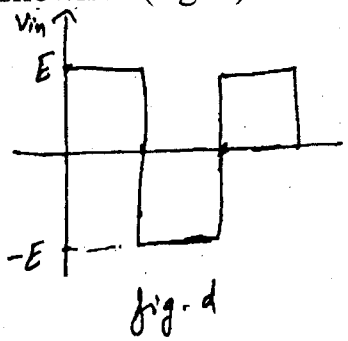

fig. d

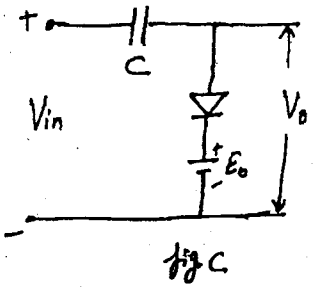

fig c

g) What is Clipper circuit; explain with the help of circuit diagram?

h) What are the applications of astable multivibrator?

i) What is shunt compensation in wide band amplifiers?

j) Why monostable multivibrator is known as one shot multivibrator? Explain with help of its waveform response?

Section - B

(4 × 5 = 20)

Q2) What is linear wave shaping? Draw the output response of low pass RC circuit for standard waveforms?

Q3) Draw the output response of an attenuator when a step voltage is applied to it, under the following conditions (a) Ci > Cp (b) Ci < Cp, where Cp is perfect capacitance. Give comments on the output response.

Q4) A silicon diode has Io = 0.01nA and V_T = 25mV.

(a) Find Id when V_d = 0.5V, Find V_d when Id = 50mA.

(b) If a resistance of 2Ω connected in series with diode, then calculate drop at Id = 50mA.

Q5) Explain the working of astable multivibrator with the help of circuit diagram and also draw its input and output waveforms?

Q6)

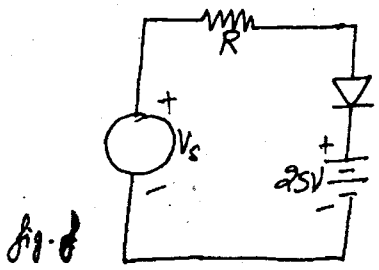

fig.f

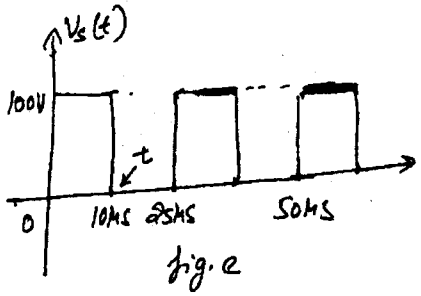

fig.e

The input waveform for the above circuit (fig.e) is given in (fig.f). The circuit contains a non-ideal diode with following parameters.

r_f = 1 kohm, r_r = 1 Mohm and C_d = 5pF. The input is a repetitive waveform with a period of 25μs. Obtain the output waveform.

Section - C

(2 × 10 = 20)

Q7) Explain in detail with the help of circuit diagram, any two methods of generating the ramp waveforms?

Q8) Explain the Ebers-Moll model of a transistor in the following modes :

(a) Cut-off mode.

(b) Normal operation mode (i.e. active region mode).

(c) Reverse transistor operation mode.

(d) Saturation mode.

Q9) In the clamping circuit, shown in figure (fig.g) Rf = 1000 ohms, Rr = infinity. The input is a symmetrical square wave of frequency 1 kHz operating between –150 V and –100 V. Assuming zero initial conditions, calculate and sketch the output waveform for first three cycles of the input waveform.

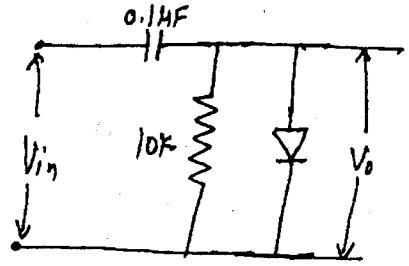

fig.g

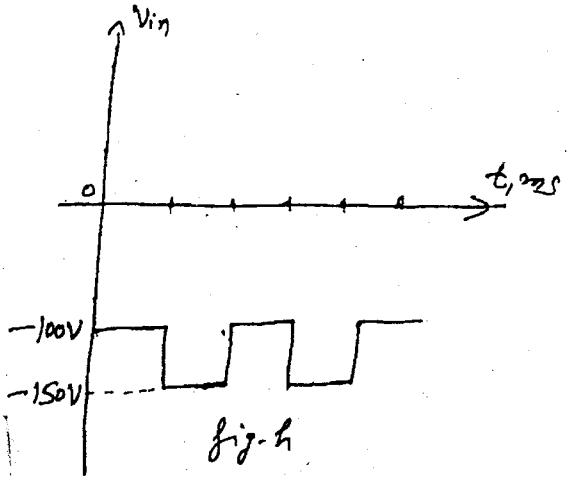

fig.h

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