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SF-6525

B. E. - II (Sem. - IV) (I.C.) Examination

May / June – 2011

Pulse & Switching Circuit

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (Sem. - 4) (I.C.)**

Name of the Subject :

☛ **Pulse & Switching Circuit**

☛ Subject Code No. : **6 5 2 5** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to the right inidcate full marks.

(4) Assume suitable data, wherever necessary.

1 (a) Answer the following : **10**

(1) The process where by the form of a non-sinusoidal signal is altered by transmission through a linear network is called _____.

(2) The frequency at which the gain is _____ of its maximum value is called the cut-off frequency.

(3) The capacitor _____ the dc signal.

(4) The process of converting pulses into pips by means of a circuit of very short time constant is called _____.

(5) For a perfectly compensated attenuator, $V_o(O^+)$ _____ $V_o(\infty)$.

(6) _____ is the process of cutting and removing a part of the waveform.

(7) _____ circuits may be used as comparators.

(8) In _____ clamping, the positive extremity of a waveform is fixed at the reference level and the entire waveform appears below the reference.

(9) The clamping circuit theorem states that _____.

(10) The low-pass RC circuit is called a _____ circuit.

(b) Derive an expression for the rise time of the output of a RC low-pass circuit excited by a step imput. **6**

(c) Distinguish between comparators and clipping circuits. **4**

2 (a) The periodic waveform shown in Fig.1 is applied to an RC low-pass network whose time constant is 10 μs. sketch the output waveform. Calculate the maximum and minimum values of the output voltage with respect to ground under steady-state conditions. **10**

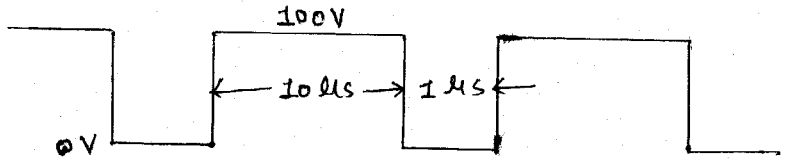

Fig.1

(b) For sinewave input to the clipper circuit shown in Fig.2 and Fig.3. Plot output voltage waveform. **6**

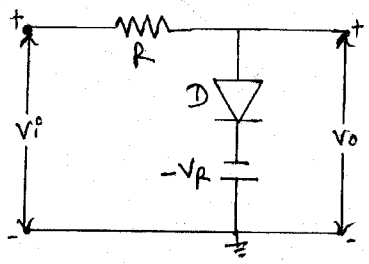

Fig.2

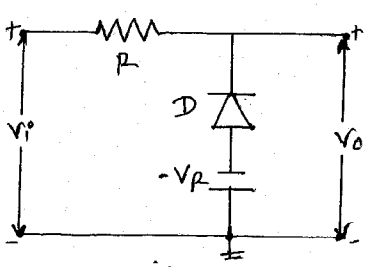

Fig.3

OR

2 (a) Compute and draw to scale the output waveform for (a) $C_1 = 50pF$, (b) $C_1 = 75pF$ and (c) $C_1 = 25pF$ respectively for the circuit shown in Fig. 4. The input is a 20V step. **8**

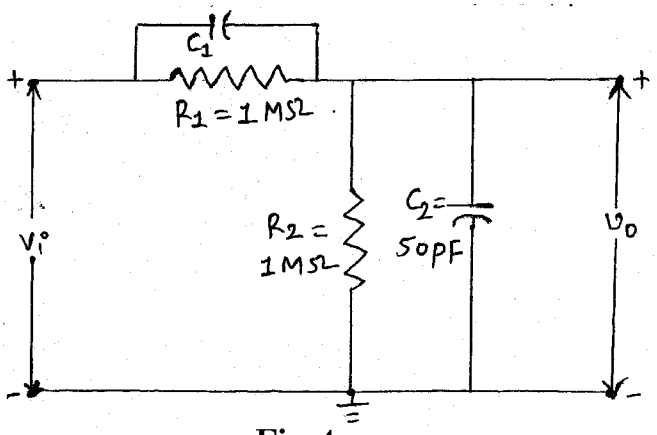

Fig.4

(b) Derive an expression for the output of a RC low-pass circuit excited by a step input. 8

3 Attempt any **two** : 14

(a) A100V peak square wave with a period of 20ms shown in Fig. 5 is to be negatively clamped at 25V. Draw the circuit diagram necessary for this purpose. Draw the output waveform.

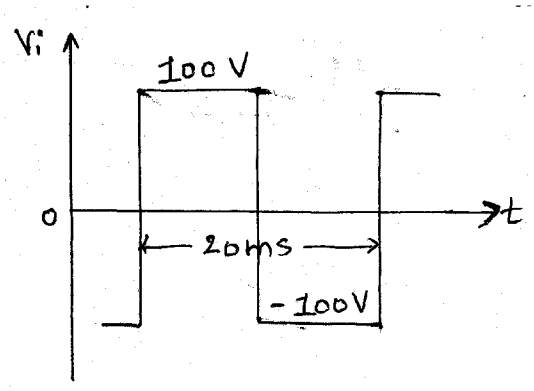

Fig.5

(b) Derive an expression for the output of a RC high pass circuit excited by an exponential input.

(c) For the circuit shown in Fig. 6, Vi is a sinusoidal voltage of 50 volts. Assuming ideal diodes, sketch one cycle of output voltage.

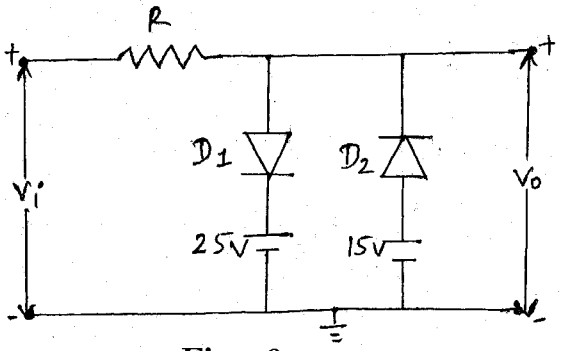

Fig. 6

4 (a) Give the answers : 10

(1) _____ multivibrator is called as master oscillator.

(2) _____ capacitors are used to increase the speed of operation in multivibrator.

(3) When generators with equal frequencies run in synchronism, the synchronization is said to be on a _____.

(4) Synchronization with pulse signals is possible only if _____.

(5) The process of applying an external signal to induce a transition from one state to the other is called _____.

(6) A circuit which can oscillate at a number of frequencies is called a _____.

(7) Which are the types of multivibtrator ?

(8) The smallest allowable interval between triggers is called the _____ of the flip flop.

(9) Storing of binary data can be done by _____ multivibrator.

(10) Emitter coupled bistable multivibrator is commonly known as _____.

(b) Describe a difference between a fixed bias and self bias transistor binary. **5**

(c) Describe a applications of schmitt trigger. **5**

5 (a) Derive the expression for the gate-width T of a monostable multivibrator neglecting the reverse saturation current I_{CBO}. **7**

(b) Design an astable multivibrator to generate a square wave of 1 KHz with duty cycle of 25%. Using a transistor of hFE=25. Ic(sat)=5 mA and VCC=12V. **8**

OR

5 (a) Explain a working of a emitter coupled astable multivibrator with the use of necessary waveforms and derivations. **7**

(b) The fixed bias bistable multivibrator uses n-p-n transistors with hFE=20. The circuit parameters are VCC=12V, VBB=3V, RC=1 $K\Omega$, R1=5 $K\Omega$, R2=10 $K\Omega$, Vce(sat)=0.4V and Vbe(sat)=0.8V. Find the stable state voltages and currents. **8**

6 Write a short note : (any **three**) **15**

(1) Direct connected binary

(2) Commutating capacitors

(3) Loading and elimination of it

(4) Use of monostable multivibrator for frequency division

(5) Method of improving resolution.
