Exam No._____

S.V.NATIONAL INSTITUTE OF TECHNOLOGY-SURAT

B. Tech. II (EC) SEM IV

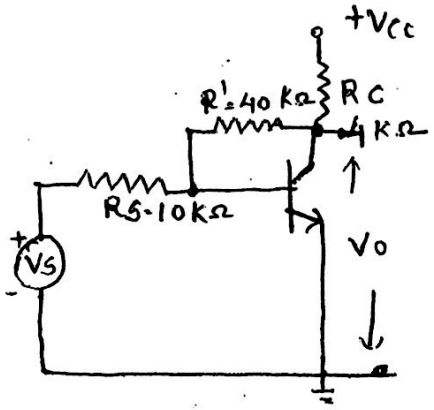
Supplementary End Sem. Exam. July 2013

Electronic Circuits

Marks: 50 **Time: 2 hour**

Instructions:

1. Attempt all questions.
2. Draw neat & clean circuit diagram/block diagram and waveforms.
3. Figure to the right indicates full marks.
4. Assume data if necessary with proper justification.
5. **For Q.5/6/7 take: For n-p-n transistor: $V_{BE(active)}$=0.7V, $V_{CE(sat.)}$=0.2V, $V_{BE(sat.)}$=0.8V, V_γ=0.6V**
   For p-n-p transistor: $V_{BE(active)}$= -0.7V, $V_{CE(sat.)}$= -0.2V, $V_{BE(sat.)}$= -0.8V, V_γ= -0.6V

Q.1(a)	Draw the circuit of a BJT amplifier with all its biasing and essential components.	**04**
Q.1(b)	Calculate the Miller Capacitance of input of an inverting amplifier.	**03**
Q.2	Draw qualitatively the frequency response (low & high) of the amplifier in Bode plot showing 3 lower cut-off and 3 higher cut-off frequencies, corresponding 3dB gains, mid band gain and bandwidth.	**08**
Q.3(a)	For voltage Series feedback amplifier, draw equivalent circuit and obtain expression for input and output resistance R_{if} and R_{of}. Give one Example of voltage Series Feedback amplifier and draw circuit for it.	**05**
Q.3(b)	Explain principle of operation of phase shift Oscillator in detail. Derive Equation of frequency of oscillation for it.	**03**
	OR	
Q.3(b)	Explain Colpitt's oscillator in detail and also, Derive frequency of oscillation for Same.	**03**
Q.4(a)	For the feedback amplifier shown in **Fig.1.**, 1. identify topology 2.find input and output circuit  **Fig.1**	**04**

Q.4(b)	In a Colpitt's Oscillator, the values of the inductor and capacitors in the tank circuits are L=40mH, C1=100pF and C2=500pF. 1. Find frequency of oscillations 2. If output voltage is 10V, find feedback voltage 3. Find value of C1 for gain of 10 4. Find the new frequency of oscillations	**03**
	OR	
Q.4(b)	An Amplifier with open loop voltage gain of 1000 delivers 10W of power output at 10% second harmonic distortion when input is 10mv. If 40dB Desensitivity is given and output power is to remain at 10W, determine required input signal V_S and second harmonic distortion with feedback.	**03**
Q.5	Derive the expression quasi-stable pulse width for monostable multivibrator	**06**
Q.6	Design a bistable multivibrator using n-p-n transistors. Neglect I_{CBO} and the voltage drop across collector-to-emitter. Assume $h_{FE\,min}$ = 20. Take the transistor which is OFF has base-to-emitter voltage of -1V and transistor which is in saturation with a base current 50 percent in excess of its minimum required value. The collector supply and base supply are V_{cc}= V_{bb} =10V and the saturated collector current is 5mA.	**08**
Q.7	**Attempt any three:**	**06**
(i)	Define holding current and latching current for thyristor.	
(ii)	Consider self biased bistable multivibrator using p-n-p transistors with R_1=25KΩ, R_2=15KΩ, R_C=5KΩ, R_E=1KΩ, C_1=100pF, $h_{fe(min)}$=20, V_{cc}=-20V. Find the maximum frequency of operation.	
(iii)	Consider Astable multivibrator with p-n-p transistors with V_{cc}=12V, R_c=1.8KΩ, R_1=10KΩ, C_1=0.1μF, R_2=20KΩ, C_2=0.01μF. Find frequency of output voltage.	
(iv)	The compensated attenuator with V_{cc}= 15V, R_1=15KΩ, C_1=2μF, R_2=20KΩ, C_2=1μF. Determine $V_{R1}(0^+)$, $V_{R2}(0^+)$, $V_{R1}(\infty)$ and $V_{R2}(\infty)$	

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