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## Question Paper Code : X 20443

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Fourth Semester

Electronics and Communication Engineering

EC 6401 – ELECTRONIC CIRCUITS – II

(Regulations 2013)

(Common to PTEC 6401 – Electronic Circuits – II for B.E. Part-Time –

Third Semester – Electronics and Communication Engineering)

(Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. List out the properties of negative feedback amplifier.
2. The voltage gain without negative feedback is 40 dB. What is the new voltage gain if 3% negative feedback is introduced ?
3. What are the factors which affect the frequency stability of an oscillator ?
4. What are the merits and demerits of RC phase shift oscillator ?
5. A tuned circuit has resonant frequency of 1600 kHz and a bandwidth of 10 kHz. What is the value of its Q factor ?
6. An inductor of 250  $\mu$ H has  $Q = 300$  at 1 MHz. Determine  $R_s$  and  $R_p$  of the inductor.
7. An RC low pass circuit has  $R = 1.5 \text{ k}\Omega$  and  $C = 0.2 \text{ }\mu\text{F}$ . What is the rise time of the output when excited by a step input ?
8. State the role of commutating capacitors in bi-stable multivibrator.
9. Mention any two applications of blocking oscillators.
10. What are the advantages of core saturation method of frequency control in a blocking oscillator ?



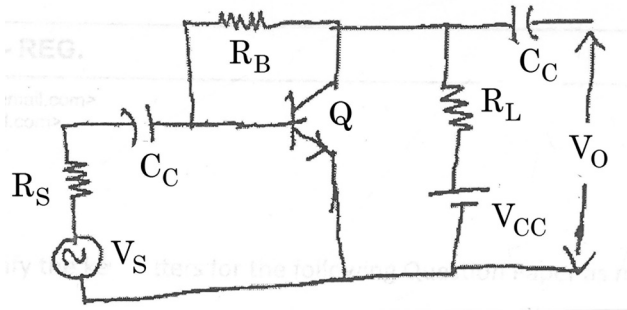
## PART – B

(5×13=65 Marks)

11. a) Draw the block diagram of current series feedback amplifier and derive an expression for input resistance, voltage gain and output resistance.

(OR)

- b) Identify the feedback topology for the network shown below, which have  $R_s = 600 \Omega$ ,  $h_{ie} = 5 \text{ k}\Omega$ ,  $h_{fe} = 80$ ,  $R_L = 2 \text{ k}\Omega$  and  $R_B = 40 \text{ k}\Omega$ . Calculate  $A_v$ ,  $R_{if}$ ,  $A_{vf}$ ,  $R_{of}$  and  $R'_{of}$ .



12. a) With the help of circuit diagram, explain the principle of operation of a Colpitt's oscillator. Obtain the equation for the frequency of operation of the circuit.

(OR)

- b) i) Sketch the circuit of a phase shift oscillator and explain its design approach. (10)
- ii) In a Colpitt's oscillator, the value of the inductor and capacitors in the tank circuit are  $L = 40 \text{ mH}$ ,  $C_1 = 100 \text{ pF}$  and  $C_2 = 500 \text{ pF}$ . Find the frequency of oscillation. (3)

13. a) i) Draw RC-phase shift oscillator using BJT, explain and derive the condition for oscillation. (4)
- ii) In Colpitt's oscillator  $C_1 = 1 \mu\text{F}$  and  $C_2 = 0.2 \mu\text{F}$ . If the frequency of oscillation is  $10 \text{ kHz}$ , find the value of inductor. Also find the required gain for sustained oscillation. (4)
- iii) Compare between Colpitt's and Clap oscillator. (5)

(OR)

- b) i) Draw Hartley oscillator using FET, explain and derive the condition for oscillation. (4)
- ii) Briefly discuss about the frequency of oscillation of Franklin oscillator. (4)
- iii) Write an advantage of Wein bridge oscillator over RC-phase shift oscillator. (5)



14. a) Explain the operation of a Schmitt Trigger with a neat circuit diagram showing relevant input and output waveforms.

(OR)

- b) Explain the following :

i) Positive clamper (4)

ii) Negative clamper and (4)

iii) RC circuit differentiator (5)

15. a) i) With relevant circuit diagram and waveforms, explain the working of UJT relaxation oscillator. (10)

ii) Calculate the value of timing resistor of UJT relaxation oscillator for the oscillation frequency of 100 Hz. The intrinsic stand-off ratio  $\eta$  of UJT is 0.65 and  $C = 100 \text{ nF}$ . (3)

(OR)

- b) With relevant circuit diagram and waveforms, explain the working of Transistor Triggered Monostable blocking oscillator with Base timing. (13)

PART – C

(1×15=15 Marks)

16. a) Design a saturated collector coupled astable multivibrator for the following specification. A 1 kHz square wave signal with 10 V peak amplitude using 2 NPN transistor with  $h_{fe(\text{min})} = 100$  and  $I_{c(\text{on})} = 1 \text{ mA}$ . (15)

(OR)

- b) For the series-shunt feedback amplifier given in Figure 2, find voltage gain  $V_{\text{out}}/V_{\text{in}}$ , input resistance  $R_{\text{in}}$  and output resistance  $R_{\text{out}}$ . Assume  $g_{m1} = g_{m2} = 4 \text{ mA/V}$ ,  $R_{D1} = R_{D2} = 10 \text{ k}\Omega$ ,  $R_1 = 1 \text{ k}\Omega$  and  $R_2 = 9 \text{ k}\Omega$ . For simplicity, neglect  $r_o$  of each of  $Q_1$  and  $Q_2$ . (15)

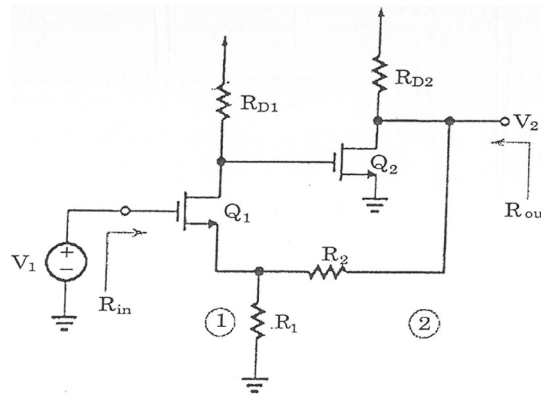


Figure 2