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Question Paper Code : X60444

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Fourth Semester
Electronics and Communication Engineering
EC 2251/EC 41/10144 EC 402/080290019 – ELECTRONICS CIRCUITS – II
(Regulations 2008/2010)
(Common to PTEC 2251 Electronics Circuits – II for B.E. (Part – Time) Third Semester ECE – Regulations 2009)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define 'feedback factor' of a feedback amplifier.
2. State the effect on output resistance and on input resistance of amplifier when current shunt feedback is employed.
3. Draw the feedback circuit of a Colpitt's oscillator. Obtain the value of the equivalent series capacitance required if it uses a L of 100 mH and is to oscillate at 40 KHz.
4. What is the necessary condition for a Wien bridge oscillator circuit to have sustained oscillations ?
5. What is the need for neutralization in tuned amplifiers ?
6. A parallel resonant circuit has an inductance of 150 μH and a capacitance of 100 pF. Find the resonant frequency.
7. Why is neutralization required in tuned amplifiers ?
8. Define the threshold points in a Schmitt trigger circuit.
9. Mention the applications of pulse transformers.
10. Name the different methods of generating a time-base waveform.

PART – B **(5×16=80 Marks)**

11. a) i) Draw the block diagram of a voltage series feedback amplifier and derive the equation for input impedance, output impedance and the voltage gain. **(10)**

ii) Explain how a negative feedback in an amplifier helps in reduction of distortion and noise. **(6)**

(OR)

b) i) Draw the typical circuit for current series feedback confirmation and derive the expression for voltage gain, current gain, input impedance and output impedance. **(10)**

ii) Discuss the effect of negative feedback on stabilization of gain. **(6)**

12. a) With circuit diagram, explain the operation of Colpitt's oscillator and obtain the expression for the frequency of oscillations.

(OR)

b) With circuit diagram, explain the operation of op-amp based Wien-bridge oscillator. Also derive the condition for oscillation.

13. a) Explain the functioning of a capacitor coupled single tuned amplifier. With the high frequency transistor model, carry out an analysis and obtain the gain and bandwidth of the amplifier. Plot its frequency response. **(16)**

(OR)

b) What are synchronous tuned amplifiers ? Draw the circuit of a two stage capacitor coupled single tuned amplifier and explain with equations the effect of cascading on the gain and bandwidth. **(16)**

14. a) i) Sketch a transistor switching circuit and its collector-current response wave form for a pulse input. For such a circuit, explain the following terms :

1) Delay time

2) Turn-on time

3) Storage time

4) Fall time and

5) Turn-off time. **(10)**

ii) An inverter circuit using 2N3904 transistor with t_{on} = 70 ns has R_s = 600 Ω and R_B = 5.6 k Ω. Determine :

1) the size of the speed up capacitor to give maximum improvement in transistor turn-on time,

2) recovery time of the circuit,

3) the maximum square wave input frequency that may be used with the circuit. **(6)**

(OR)

b) i) With necessary circuit diagram and waveforms, explain the operation of a collector-coupled astable multivibrator which uses transistors. Derive the expression for pulse width. **(8)**

ii) Design a collector coupled astable multivibrator for the following specifications : output voltage = 10 V peak; Ic(on) = 1 mA; $h_{fe(min)}$ = 100; output to be a positive pulse, the duration of which is 20 μ sec; the time between pulses to the 10 μ sec. State clearly the assumptions made, if any. **(8)**

15. a) i) Draw the circuit of free running oscillator and explain its operation. **(8)**

ii) Explain with the help of circuit and waveforms, the operation of RC controlled push-pull astable blocking oscillator with emitter timing. **(8)**

(OR)

b) i) Explain in detail about UJT sawtooth generator. **(8)**

ii) Explain about the free running blocking oscillator. **(8)**

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