Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71728

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fourth Semester

Electronics and Communication Engineering

EC 6401 — ELECTRONIC CIRCUITS – II

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the effect of negative feedback on circuit noise?

2. Mention the three networks that are connected around the basic amplifier to implement feedback concept.

3. What is Barkhausen criterion?

4. In a Hartley oscillator, if L_1 = 0.2 mH, L_2 = 0.3 mH and C = 0.003 μF. Calculate the frequency of its oscillations.

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 μH has Q = 300 at 1 MHz. Determine R_s and R_p of the inductor.

7. Why do we call astable multivibrator as free running multivibrator?

8. How can a Schmitt trigger act as a zero crossing detector?

9. State any two applications of pulse transformer.

10. Differentiate voltage and current time base circuit.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Sketch the block diagram of a feedback amplifier and derive the expressions for gain with positive feedback and with negative feedback. (9)

(ii) An amplifier has voltage gain with feedback as 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%, determine the values of open loop gain A and feedback ratio β. (4)

Or

(b) (i) Draw the circuits of voltage shunt and current series feedback amplifiers and derive the expressions for input impedance R_{if}. (10)

(ii) Write about the Nyquist criterion for stability of feedback amplifiers. (3)

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 mH, C_1 = 100 pF and C_2 = 500 pF. Find the frequency of oscillation. (3)

13. (a) (i) Draw the circuit of class C tuned amplifier and explain its operation with relevant waveforms. Discuss also its frequency response. (8)

(ii) With a neat circuit diagram, explain the Hazeltine method of neutralization. (5)

Or

(b) Draw the circuit of a double-tuned amplifier and explain its operation Sketch the nature of frequency-gain characteristics and write the expression for 3-dB bandwidth. (13)

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 inductor of 250 μH has Q = 300 at 1 MHz. Determine R_s and R_p of the inductor. (3)

Or

(b) With a neat circuit diagram and necessary wave forms, explain bistable multivibrator operation.

15. (a) With suitable circuit and wave-form diagrams, explain the working of UJT saw tooth generator. (13)

Or

(b) Draw the circuit of an astable blocking oscillator with base timing. Sketch the wave-forms of collector voltage, base voltage and magnetizing current. Explain the operation of the oscillator covering one full cycle, along with necessary equations. Also, mention the advantages and disadvantages of this oscillator. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Design a tuned amplifier using FET to have f_0 = 1 MHz. 3-dB bandwidth is to be 10 kHz and maximum gain is to be –10. FET has g_m = 5 mA/V and r_d = 10k Ω . (8)

(ii) What is the effect of a current series negative feedback on input resistance and output resistance of a BJT amplifier? Explain the same, with necessary circuit, equivalent-circuit and equations. (7)

Or

(b) Design a Astable multi-vibrator circuit to generate a pulse waveform at 40% duty cycle at 20 KHz Using V_{cc} = 10 V, h_{fe} = 220, I_c sat = 2 mA.

———————