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Question Paper Code : 21447

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electronics and Communication Engineering

EC 2251/EC 41/10144 EC 402/080290019 — ELECTRONIC CIRCUITS — II

(Regulations 2008/2010)

(Common to PTEC 2251 Electronic 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. Why gain bandwidth product remains constant with the introduction of negative feedback?

2. A voltage series feedback amplifier has a voltage gain with feedback as 83.33 and feedback ratio as 0.01. Calculate the voltage gain of amplifier with feedback.

3. Compare RC phase shift and Wien bridge oscillator.

4. A Hartley oscillator circuit has $C = 500\,\text{pF}$, $L_1 = 20$ mH and $L_2 = 5$ mH. Find the frequency of 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. State the application of clipper and clamper circuits.

8. Why is monostable multivibrator also called as delay circuit?

9. List the characteristics of pulse transformer.

10. State the two limitations of low duty cycle in an astable blocking oscillator.

PART B — (5 × 16 = 80 marks)

11. (a) With a neat diagram, derive the expression of R_{if}, R_{of}, A_v and A_{vf} for the following. (8 + 8)

(i) Voltage series feedback amplifier

(ii) Current shunt feedback amplifier.

Or

(b) (i) Discuss Nyquist criterion for stability of feedback amplifiers, with the help of Nyquist plot and bode plot. (8)

(ii) An amplifier has a voltage gain of 4000. Its input impedance is 2 K and output impedance is 60 K. Calculate the voltage gain, input and output impedance of the circuit is 5% of the feedback is fed in the form of series negative voltage feedback. (8)

12. (a) Explain RC phase shift oscillator with neat diagram. Derive its frequency of oscillation. Give the amplifier gain and feedback network gain for the sustain oscillator operation. (16)

Or

(b) Draw the circuit diagram and explain the working of Hartley oscillator. Also derive the expression for frequency of oscillation and condition for sustained oscillation. (16)

13. (a) Explain the single tuned voltage amplifier and discuss its frequency response. Also derive the expression for gain and cut-off frequencies of single tuned amplifier. (16)

Or

(b) (i) Explain about the Hazeltine neutralization method to maintain stability in tuned amplifiers. (8)

(ii) A single tuned amplifier using FET has tank circuit components $L = 100 \ \mu H$, $R = 5\,\Omega$ and $C = 1000$ pF. The FET used has $r_d = 500$ kΩ and $g_m = 5$ mA/V find resonant frequency, tank circuit impedance at resonance, voltage gain at resonance and bandwidth. (8)

14. (a) (i) With a neat diagram and waveforms, explain the operation of high pass RC circuit as differentiator. (8)

(ii) A 10 Hz symmetrical square wave whose peak to peak amplitude is 2V is impressed upon a high pass RC circuit whose 3 dB frequency is 5 Hz. Calculate and sketch the output waveform. In particular what is the peak to peak output amplitude? (8)

Or

(b) (i) With a neat sketch explain the operation of fixed bias bistable multivibrator and also discuss about the waveform. (10)

(ii) Determine the value of capacitors to be used in an astable multivibrator to provide a train of pulse $2\,\mu s$ wide at a repetition rate of 75 kHz with $R_1 = R_2 = 10\ k\Omega$. (6)

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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