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Question Paper Code : 73445

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

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. What are the advantages of negative feedback?

2. State Nyquist stability criterion.

3. Differentiate oscillator and amplifier.

4. State the Barkhausen criterion for sustained oscillation. What will happen to the oscillations if the magnitude of the loop gain is greater than unity?

5. An inductor of 250 μH has Q = 300 at 1 MHz. Determine R_s and R_p of the inductor.

6. What is narrow band neutralization?

7. A RC low pass circuit has R = 1.5 Kohms and C = 0.2 micro farad. What is the rise time of the output when excited by a step input?

8. What is a regenerative comparator? Give an example 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) (i) Describe the effect of negative feedback on the bandwidth and harmonic distortion of a amplifier. (10)

(ii) A negative feedback amplifier has an open loop gain of 66,000 and a closed loop gain of 300. If the open loop upper cut off frequency is 15 KHz, estimate the closed loop upper cut off frequency. Also, calculate the total harmonic distortion with feedback if there is 10% harmonic distortion without feedback. (6)

Or

(b) Sketch the circuit of a single stage CE amplifier that uses emitter current feedback. Analyse the circuit and derive the equations for gain, input and output impedance with feedback. (16)

12. (a) With circuit diagram, explain the operation of Colpitts 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 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 $r_d = 500k\,\Omega$ and $g_m = 5\,mA/V$ find resonant frequency, tank circuit impedance at resonance, voltage gain at resonance and bandwidth. (8)

14. (a) (i) Describe the working of a Schmitt trigger circuit with the help of necessary Sketches. (10)

(ii) A square wave whose peak - peak amplitude is 4 V extends ±2V w.r.t ground. The duration of the positive section is 0.1 secs and negative section is 0.3 secs. The circuit time constant is 0.3 secs, If this wave form is impressed upon.

(1) RC integrating circuit

(2) RC differentiating circuit.

find their steady state max and min values of the output wave form and draw the output wave form for both the case. (6)

Or

(b) (i) Sketch the response of RC high pass filter for the following inputs and explain (1) Ramp (2) Pulse. (8)

(ii) Explain the switching characteristics of transistor with a neat sketch. (8)

15. (a) (i) Describe the operation of a triggered transistor blocking oscillator with emitter timing. Sketch the relevant circuit and waveforms. Also obtain an expression for the pulse width t_p. (10)

(ii) With circuit diagram and waveforms, explain the operation of a RC controlled astable transistor blocking oscillator. (6)

Or

(b) Draw the circuit of Bootstrap voltage time base generator and explain the quiescent conditions, formation of sweep, retrace interval and recovery process. (16)