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Question Paper Code : 60447

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

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. Calculate the closed loop gain of a negative feedback amplifier if its open loop gain is 1,00,000 and feedback factor is 0.01.

2. What is the effect on input and output impedance of an amplifier if it employs voltage series negative 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. Draw the electrical equivalent circuit of crystal.

6. What are tuned amplifiers? What are the various types of tuned amplifiers?

7. In a low pass RC circuit, rise time is 35 nano seconds. What is the bandwidth that can be obtained using the circuit?

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

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) Draw the circuit diagram and explain the operation of a RC phase shift oscillator. Describe the phase shift network and amplifier gain requirements. Derive the expression for frequency of operation of the circuit. (16)

Or

(b) (i) What is the principle of oscillation of crystals? Sketch the equivalent circuit and impendance-frequency graph of crystals and obtain its series and parallel resonant frequency. (8)

(ii) Explain how crystals are employed in oscillators for stabilization. (8)

13. (a) (i) Draw the circuit diagram of a two-stage synchronously tuned Amplifier and also its equivalent circuit, Derive the expression for bandwidth. (8)

(ii) Design a tuned amplifier using FET to have $f_0 = 1\text{ MHz}$, 3-dB bandwidth is to be 10 kHz and maximum gain is to be –10. FET has $g_m = 5\text{ mA/V}$ and $r_d = 10\text{ k}\Omega$. (8)

Or

(b) (i) 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. (10)

(ii) Explain about a stagger-tuned amplifier. Sketch and compare the frequency responses of individual stages with that of a two-stage stagger-tuned amplifier. (6)

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) A pulse transformer has the following parameters : $L = 5\ mH$, $\sigma = 40\ \mu H$, $C = 50\ pF$, $R_1 = 200\Omega$, $R_2 = 2\ k\Omega$, $n = 1$. Find the response to a $2\ \mu s$ 10-V pulse.

Or

(b) With the equivalent circuit and waveforms explain the operation of a monostable transistor blocking oscillator with emitter timing.