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Question Paper Code: **55332**

B.E./B.Tech.Degree Examinations,Nov/Dec 2011
Regulations 2008

Fourth Semester

Electronics and Communication Engineering

EC 2251 Electronics Circuits II
(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 x 2 = 20 marks)

1. What is 'return ratio' of a feedback amplifier?
2. Draw the block diagram of voltage shunt feedback amplifier and write the expressions for its input and output resistances.
3. State the essential conditions for maintaining oscillations.
4. A tuned collector oscillator in a radio receiver has a fixed inductance of 60 μH and has to be tunable over the frequency band of 400 KHz to 1200 KHz. Find the range of variable capacitor to be used.
5. A parallel resonant circuit has an inductance if 150μH and a capacitance of 100pF. Find the resonant frequency.
6. What is a stagger-tuned amplifier?
7. What is 'tilt' applicable to RC circuits? Give an expression for tilt.
8. What type of distortion is observed in astable multivibrator?
9. Draw the equivalent circuit of a pulse transformer. Name the various elements in it.
10. Sketch and define the 'displacement error' of a voltage sweep waveform.

Part B - (5 x 16 = 80 marks)

11. (a) (i) Draw the block diagram of feedback amplifier and discuss the effect of negative feedback with respect to closed loop gain, bandwidth and distortion. (10)

(ii) An amplifier has a mid band gain of 125 and a bandwidth 250 kHz. If 4% negative feedback is introduced, find the new bandwidth and gain. If the bandwidth is to be restricted to 1 MHz, find the feedback ratio. (6)

OR

11. (b) (i) With a neat circuit diagram, explain which type of feedback is employed in a BJT-emitter follower and obtain the expressions for A_V, A_I, R_i & R_0. (8)

(ii) The voltage shunt feedback amplifier has the following values of circuit parameters. $R_s = 600\Omega, h_{ie} = 5k\Omega, h_{fe} = 80, R_L = 2k\Omega, R_B = 40k\Omega$. Calculate $A_v, R_{if}, A_{vf}, R_{of}$ and R'_{of}. (8)

12. (a) (i) Draw the circuit of Wein bridge oscillator using BJT. Show that the gain of the amplifier must be atleast 3 for the oscillation to occur. (10)

(ii) In a certain oscillator circuit, the gain of the amplifier is $\frac{-16 \times 10^6}{j\omega}$ and the feedback factor of the feedback network is $\frac{10^8}{[2 \times 10^8 + j\omega]^2}$. Verify the Barkhausen criterion for the sustained oscillations. Also find the frequency at which the circuit will oscillate. (6)

OR

12. (b) (i) With the help of neat circuit diagrams, explain the operation of the following oscillators. Also explain how the frequency is found out in each case.

(1) Clapp oscillator (6)

(2) Miller crystal oscillator (6)

(ii) The equivalent circuit of a crystal has the values of L = 0.7 H, C = 0.01 pF, R = 1000 Ω and $C_m = 2$ pF. Calculate Series resonant frequency, Parallel resonant frequency and Quality factor of the crystal. (4)

13. (a) (i) Draw the equivalent circuit of a single-tuned amplifier and derive the expression for the gain as a function of frequency. (8)

(ii) The drain circuit of a FET tuned radio frequency amplifier has a 100 pF capacitor placed in parallel with an inductor L, whose unloaded Q-factor is 100. If the frequency of resonance is 1 MHz and the transistor output resistance is 20 kΩ, calculate the loaded Q-factor, inductance and loaded bandwidth. (8)

OR

13. (b) (i) Draw the circuit of class C tuned amplifier and explain its operation with relevant waveforms. (8)

(ii) Explain, with necessary circuits, (1) Hazeltine neutralization and (2) Coil neutralization. (8)

14. (a) (i) Describe the response of low pass RC circuit for step and square wave input. Sketch the circuits and wave forms. (6)

(ii) Explain, with suitable circuit and wave forms, the operation of positive and negative clampers. (6)

(iii) Explain how RC circuit is used as differentiator. (4)

OR

14. (b) (i) Draw the circuit of a Schmitt trigger. Explain its operation with necessary wave forms and hysteresis diagram. Obtain the expressions for LTP and UTP. (8)

(ii) Discuss, with necessary diagrams, the working of a self-biased bistable multivibrator which uses transistors. (8)

15. (a) With necessary circuit diagram, equivalent circuit, equations and wave-form diagrams, explain the working of

(1) Monostable blocking oscillator with base timing. (8)

(2) Monostable blocking oscillator with emitter timing. (8)

OR

15. (b) (i) Design a UJT relaxation oscillator to generate a saw tooth wave form at a frequency of 500 Hz. Assume the supply voltage $V_{BB} = 20$ V, $V_P = 2.9$ V, $V_V = 1.118$ V, $I_P = 1.6$ mA and $I_V = 3.5$ mA. State further assumptions made, if any. Sketch the circuit designed. (8)

(ii) Sketch a current time base circuit and explain its working with the help of relevant waveforms. (8)

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