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Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | | |

B.Tech

End Semester Examination Dec. 2014 (Semester: III)

Electronic Devices and Circuit

Paper ID:-410021

Time : Three Hours] [Max. Marks : 100

Note: Attempt all questions, the marks assigned to each question is indicated at question itself.

Q.1. Attempt any FOUR : **5x4=20**

(a) Design an astable multivibrator for output amplitude of 15 volts and square wave of 500Hz, use silicon transistors having $(h_{fe})_{min}$=40 for transistor, R=140kΩ, $(Ic)_{sat}$=6mA and $(V_{ce})_{sat}$=0.2 volt.

(b) What do you mean by tuned amplifier? Explain a single tuned inductively coupled transistor amplifier.

(c) Describe the crystal oscillator. What is the advantage of a crystal oscillator over an LC oscillator?

(d) Explain Hall Effect and give some applications of Hall Effect.

(e) What is the function of speed-up capacitor in a bistable multivibrator circuit?

(f) State and briefly explain Barkhausen criterion of oscillation. Draw the circuit diagram of general oscillator.

Q.2. Attempt any FOUR : **5X4=20**

(a) What is the basic difference among the three types of multivibrators?

(b) Explain "overall voltage gain of a multistage amplifier is less than the product if individual stages"

(c) The lattice constant of a face-centered cubic lattice is $4.25\frac{1}{n}$. Determine the

(i) Effective number of atoms per unit cell and

(ii) Volume density of atoms.

(d) Explain the operation of transistor as an amplifier.

(e) Give the h-parameter model for CE configuration. Also define each of the terms used.

(f) Given $V_{CC}=V_{BB}=5$ volt, $h_{fe}=20, 1_{CON}=10$mA and V_{BE} cut-off for transistor=-1 volt. Determine the values of R_1, R_2, R_3, R_4 R_{L1} and R_{L2} for a bistable-multivibrator.

Q.3. Attempt any TWO : **10x2=20**

(a) Draw the circuit of an emitter coupled differential amplifier and explain its working.

(b) The h-parameters of a CE amplifier are as follows- $h_{ie}=1100\Omega$, $h_{re}=2.5X10^{-4}$, $h_{fe}=50$, $h_{oe}=24\mu A/V$ if the load resistance $R_1=10k\Omega$ and source resistance $R_s=1k\Omega$, find the voltage and current gains. Derive the formula used.

(c) What is Darlington amplifier? Write the main characteristics of it.

Q.4. Attempt any TWO : **10x2=20**

(a) Explain the principle of working of Wein bridge oscillator circuit. Explain why negative feedback in addition to the usual positive feedback is employed in Wein bridge oscillator.

(b) Draw the small signal equivalent circuit of FET amplifier in CS connection and derive the equation of voltage gain and output resistance.

(c) Define negative feedback and positive feedback. An amplifier with current feedback has following specifications: h_{fe}=100Ω, h_{ie}=2000Ω , R_1=15000 Q,R_2=5600 Ω,R_e= 100 Ω and R_L =470Ω calculate the value of voltage gain and input resistance of the amplifier with and without feedback.

Q.5. Attempt any TWO : **10x2=20**

(a) Draw a neat circuit diagram of emitter-coupled monostable multivibrator. Explain its constructional features and operating principle.

(b) In a transistor Colpitt's oscillator, L=100 μH,C1=.01μF,C2=0.001 μF and Cc= 10 μF. Determine

(i) Operating frequency

(ii) Feedback fraction

(iii) Minimum gain to sustain oscillations

(iv) Emitter resistance Re if Rc =2.5 kΩ

(c) Distinguish between ferromagnetic, paramagnetic and diamagnetic materials, mentioning at least one example of each.

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