Total No. of printed pages = 4

CAI-404/EC&D-I/4th Sem/2014/N

ELECTRONIC CIRCUITS AND DEVICES - I

Full Marks –70

Pass Marks – 28

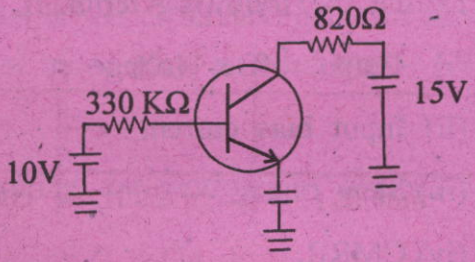
Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Explain the input characteristics of a CE mode transistor. 4

   (b) Calculate the base current and collector current from the following circuit diagram where $\beta = 200$. 4



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(c) Derive the power efficiency of a class A amplifier. 6

2. (a) Obtain the expression of current gain and voltage gain in terms of *h* parameters of a transistor amplifier. 8

(b) Describe the operation of voltage series feedback amplifier with necessary circuit diagram. 6

3. (a) Describe how Colpitt's oscillator works. 5

(b) Determine the oscillation frequency of a transistor hartley oscillator with components $L_1 = 1$ mH, $L_2 = 100\,\mu$H, $M = 50\,\mu$H and $C = 100$ nF. 4

(c) What is the main advantage of crystal oscillator over other oscillator ? Explain the working of parallely connected crystal oscillator. 1+4=5

4. (a) Define the following terms : 4

(i) Output offset voltage

(ii) Input bias current

(iii) Slew rate

(iv) CMRR.

(b) Describe how an OPAMP can act as a differentiator. 5

(c) For an OPAMP having slew rate of SR= 2V/ μS, what is the maximum closed loop voltage gain that can be used when the input signal varies by 0.5V in 10 μS ? 5

5. (a) Explain the working of a monostable multivibrator. 8

(b) Describe the different region of operation of a JFET with the help of V-I characteristics. 6

6. (a) Describe the principle of operation of PMOSFET. 6

(b) What is the difference between an enhancement mode and depletion mode MOSFET ? 2

(c) Describe the working of a CMOS. 6

7. Write short notes on any *four* of the following :

(i) Push-pull amplifier

(ii) Transistor as an amplifier

(iii) Current shunt feedback amplifier

(iv) OPAMP as an adder

(v) nJFET. $3\frac{1}{2} \times 4 = 14$