Total No. of printed pages = 3

**CAI-404/EC&D-I/4th Sem/2013/N/C**

# 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) Derive the expression of input resistance, voltage gain and current gain in terms of h parameters of a transistor amplifier.

   (b) Explain the working of class C tuned amplifier. 9+5=14

2. (a) Describe the operation of Wien bridge oscillator with necessary circuit diagram.

   (b) Explain how a parallely connected crystal oscillator works.

   (c) State the Barkhausen criterion. 6+6+2=14

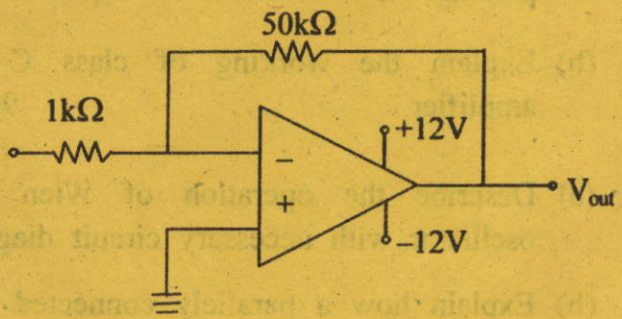
[Turn over

3. (a) Discuss the working of voltage series and current shunt feedback amplifier using transistors.

(b) The frequency of a Hartley oscillator is set at 60 kHz using a tank circuit with the following components : $L_1 = 60$ mH, $C = 20$ nF. Determine the other inductor to be connected to yield the required frequency. 12+2=14

4. (a) Explain how an OPAMP can be used as an adder and subtractor.

(b) Calculate the voltage gain for the amplifier with the following components. Find the output voltage $V_{out}$ if the input voltage is $V_{in} = 0{\cdot}5 \sin 100\pi t$ volt. 8+6=14




5. (a) Explain the working of enhancement mode MOSFET.

(b) Describe the circuit operation of JFET with circuit diagram.

(c) What do you mean by pinch off voltage ?

6+6+2=14

6. (a) What do you mean by saturation and breakdown state of JFET ? 2

(b) Explain the principle of operation of NMOS. 6

(c) Describe the construction and operation of nJFET. 6

7. Write short notes on any *four* of the following : $3\frac{1}{2}\times4=14$

(i) Depletion mode MOSFET

(ii) Voltage shunt feedback amplifier

(iii) Push pull amplifier

(iv) Astable multivibrator

(v) Wien bridge oscillator.