

2023

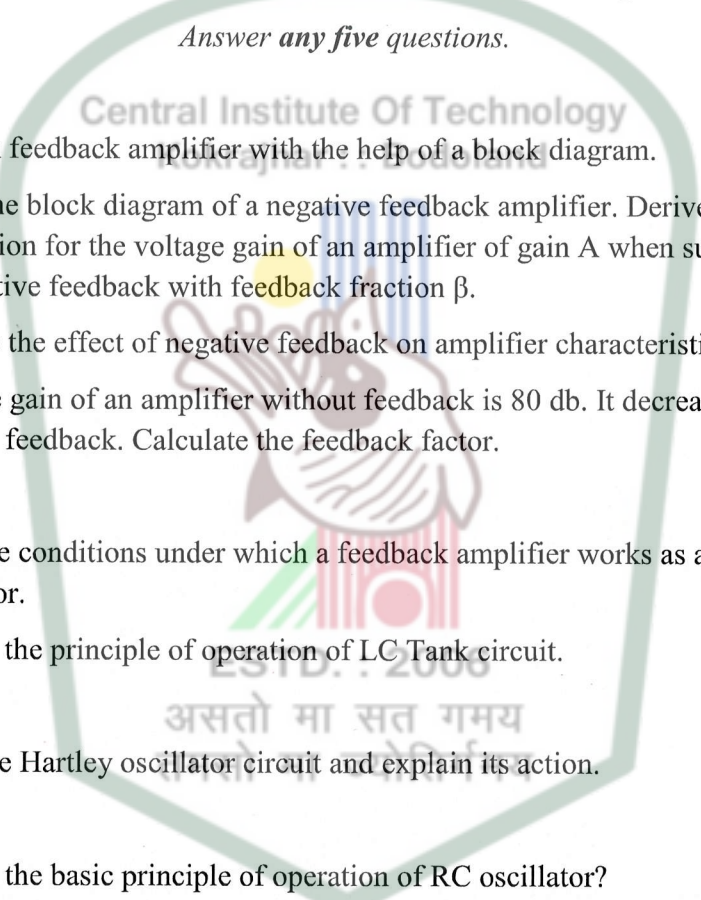
ELECTRONICS DEVICES AND CIRCUITS-II

Full Marks : 100

Time : Three hours

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

Answer any five questions.

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1. a) Explain feedback amplifier with the help of a block diagram. 6
- b) Draw the block diagram of a negative feedback amplifier. Derive an expression for the voltage gain of an amplifier of gain A when subjected to negative feedback with feedback fraction β . 6
- c) Discuss the effect of negative feedback on amplifier characteristics. 5
- d) Voltage gain of an amplifier without feedback is 80 db. It decreases to 30 db with feedback. Calculate the feedback factor. 3
2. a) State the conditions under which a feedback amplifier works as an oscillator. 2
- b) Describe the principle of operation of LC Tank circuit. 4
- c) Describe Hartley oscillator circuit and explain its action. 6
- d) What is the basic principle of operation of RC oscillator? 4
- e) A tuned collector oscillator in radio receiver has a fixed inductor of $70 \mu\text{H}$ and has to be tunable over the frequency band 400 kHz to 1200 kHz. Find the range of variable capacitor to be used. 4
3. a) Classify amplifiers on the basis of frequency. 3
- b) What is tuned amplifier? Why tuned amplifiers cannot be used for audio frequency amplification? 1+2=3
- c) Explain tuned amplifier with capacitive coupling. 7

- d) Explain double tuned amplifier with a suitable circuit diagram. 7
4. a) Define the following terms: 5
 (i) CMRR (ii) Input offset voltage (iii) PSRR (iv) Slew rate
 (v) Input bias current
- b) Give Ideal Op-amp characteristics. 4
- c) Draw the pin diagram of IC741 2
- d) Explain the block diagram of Op-amp. 4
- e) Write the limitations for Open loop Op-amp. 2
- f) Explain voltage follower. 3
5. a) Derive the expression for gain of an inverting amplifier. 7
- b) An inverting amplifier circuit has input series resistor of $20\text{ k}\Omega$, feedback resistor of $100\text{ k}\Omega$ and a load resistor of $50\text{ k}\Omega$. Draw the circuit and calculate the input current, load current, and the output voltage when the applied input voltage is equal to $+1.6\text{ V}$ 7
- c) Why an astable multivibrator is called a free running multivibrator? Explain. 6
6. Write short notes on following (any four) 4x5=20
- i) Differentiator
- ii) Non Inverting Op-amp
- iii) Stagger tuned amplifier
- iv) Phase shift oscillator
- v) Crystal oscillator