D 51026 (Pages 2)

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, NOVEMBER 2013

EE 09 305/PTEE 09 304—ANALOG ELECTRONICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What is a filter ? Sketch a simple rectifier circuit with a filter.
2. How the gain of an amplifier is affected by feedback ?
3. Sketch a voltage follower circuit and explain its purpose.
4. What is meant by a regenerative comparator ?
5. What are the properties of an ideal OP-AMP ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. What is thermal runaway in a transistor ? Explain the reasons for it. What are the means of preventing it ?
7. Explain the concept of rectification efficiency. For a full wave rectifier circuit, derive rectification efficiency.
8. Explain the low frequency response of an FET.
9. Sketch and explain the working of a precision rectifier with the help of necessary waveform.
10. What is the concept of PLL ? Differentiate between lock and capture range of PLL.
11. Sketch and explain with waveform, the operation of an OP AMP ramp generator circuit.

(4 × 5 = 20 marks)

Part C

Answer **four** *questions.*
Each question carries 10 *marks.*
Missing data may suitably be assumed.

12. (a) A sinusoidal input is to be clipped to get an approximate trapezoidal waveform. Suggest a suitable circuit to achieve the same. Explain the working of the circuit. Specify the levels of input and output voltage waveform.

Turn over

(b) What is the need of biasing a transistor. With a circuit diagram, explain Voltage divider biasing.

(5 + 5 = 10 marks)

Or

(c) With a hybrid equivalent circuit, compare common emitter and emitter follower amplifier configurations.

(d) Explain the biasing of JFET.

(6 + 4 = 10 marks)

13. (a) Use Miller's theorem to determine the input capacitance of a common emitter stage.

(b) How do coupling and bypass capacitors affect the frequency response of an amplifier stage.

(6 + 4 = 10 marks)

Or

(c) Derive the expression for overall gain of a positive feedback system, if the gain without feedback is G and feedback factor is B. How positive feedback affects input impedance and output impedance of the circuit ?

(d) What are the different types of feedback connections ? Explain.

(5 + 5 = 10 marks)

14. (a) Derive an expression for the gain of a non-inverting amplifier.

(b) Why compensation is required in an OP-AMP ? What are the different compensation techniques ?

(6 + 4 = 10 marks)

Or

(c) Explain the working of a crystal oscillator.

(d) Explain the working of voltage to current converter with a grounded load.

(5 + 5 = 10 marks)

15. (a) Explain the working of Butterworth low-pass filter. Explain how a second order low-pass filter can be designed for a cut-off frequency of 10 kHz.

(10 marks)

Or

(b) Briefly explain the astable mode of operation using Timer IC 555.

(c) What is a Voltage Controlled Oscillator? Explain the principle of working.

(5 + 5 = 10 marks)

[4 × 10 = 40 marks]