amplifier stage. Derive an expression for its normalized output current. Does compensation have any effect on rise time ? 10

7. How would you realize a voltage-to-frequency converter? Explain by drawing a neat diagram and deriving the necessary equations. 10

8. (a) Explain a UJT based time base generator with the help of appropriate circuit diagrams and waveforms. 7

(b) Why a UJT is suitable for the above purpose? 3

Sixth Semester Examination – 2009

ADVANCED ELECTRONICS CIRCUITS

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) Do all integrators act as low pass filters? Justify.

(b) Draw the output waveform across a diffrentiator if the input is a periodic square wave.

(c) Cite two reasons for using active filters.

(d) Give two applications of multivibrators as used in digital circuits.

(e) Are waveshaping linear circuits ? Justify.

(f) What is low frequency compensation ? Where is it done ?

(g) What is rise time ? Why is it important ?

(h) Compare the doping levels of a rectifier diode and a tunnel diode.

(i) Write down two applications of a sawtooth waveform.

(j) What is the physical meaning of negative resistance ? Will you find it in a BJT ?

2. (a) A symmetrical square wave of peak-to-peak amplitude V and frequency f is applied to a high pass RC circuit. Derive a general expression for the percentage tilt. 6

(b) Redo your derivation as in P.2-a if fRC << 0.5. 4

3. (a) Name the methods of generating a voltage time base. Discuss the constant current charging method. Draw a neat diagram with proper labelling. 5

(b) In the circuit you have drawn in P.3.a , a resistor R_1 is shunted across the capacitor. Find out an expression for the slope error. 5

4. (a) Discuss a circuit for generating a trapezoidal waveform. 6

(b) Why is a current time base generation designed separately from a voltage time base ? 4

5. (a) Discuss an instrumentation amplifier. Derive the necessary equations. 6

(b) Discuss an application of the instrumentation amplifier. 4

6. Draw the equivalent circuit of one stage of a cascaded shunt compensated transistor