2016

M.Sc.

1st Semester Examination

ELECTRONICS

PAPER—ELC-104

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(*Analog Electronics*)

Answer *Q. No. 1* and any *three* questions from the rest.

1. (a) Implement NAND Gate using diode & transistor.

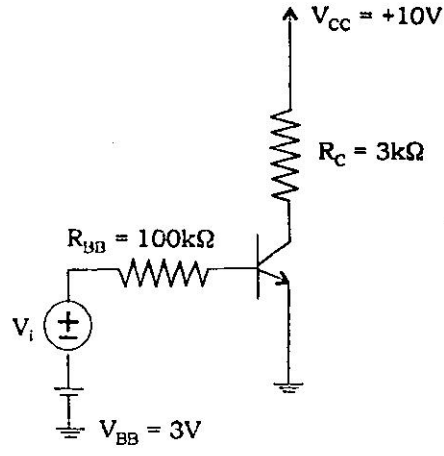
(b) Define role of rate for 1st order Butterworth low pass filter.

(c) How B.J.T. acts as a switch ?

(d) What are the application of PLL ?

(e) Draw the equivalent electrical circuit of a Piezo-electric crystal.

2. (a) A transistor amplifier is shown in below. Determine its voltage gain. Assume $\beta = 100$:



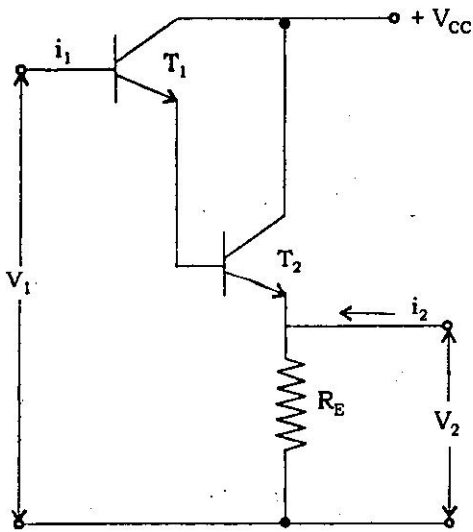
(b) Write short notes on channel length modulation in case of MOSFET.

5+5

3. (a) Draw and explain triangular wave generator. Give proper input-output waveform. Derive output frequency of oscillation.

(b) Compare between Darlington emitter follower and emitter follower.

For the Darlington amplifier shown below, obtain its Z-matrix for identical T_1 & T_2 having h_{be} = 100, R_E = hie = 1kΩ :



5+(2+3)

4. (a) Explain Instrumentation amplifier with suitable circuit diagram.

(b) Explain frequency response of a R–C coupled transistor amplifier with proper circuit diagram.

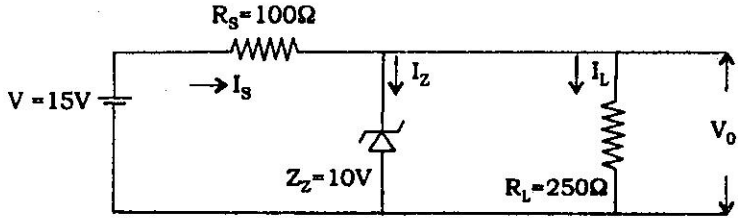
5+5

5. (a) Discuss how a PLL circuit can be used as a frequency multiplier.

   (b) A Colpitt's oscillator is designed with C_1 = 100 PF and C_2 = 7500 PF. The inductance is variable. Determine the range of inductance values, if the frequency of oscillations is to vary between 950 kHz and 2050 kHz.

5+5

6. (a) A Zener diode shunt regulated power supply is shown below. Determine the (a) output voltage, (b) source voltage, (c) current through the zener diode. Assume that the zener resistance is equal to zero :



   (b) Write short notes on SMPS.

5+5

Internal Assessment — 10