2017

M.Sc.

1st Semester Examination

ELECTRONICS

PAPER—ELC-104

Subject Code—27

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.

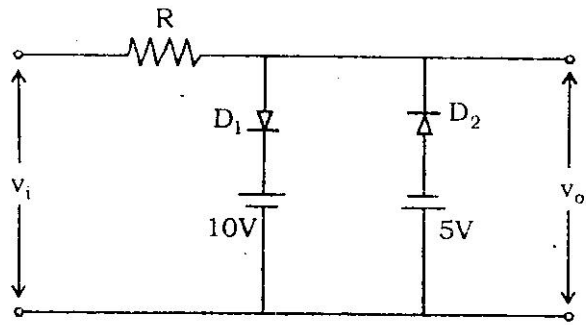
(Analog Electronics)

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

1. (a) Discuss with block diagram how analog multiplication will be done using logarithmic and antilogarithmic amplifiers.

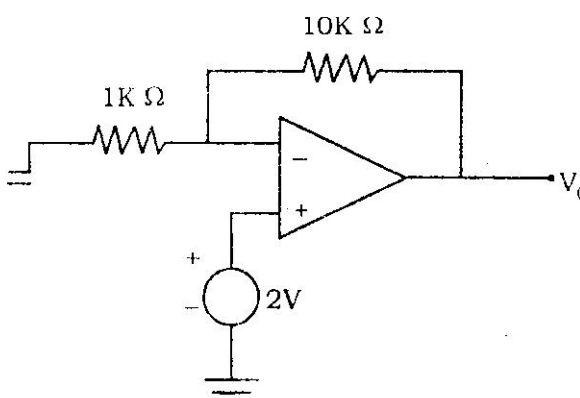
(b) What is SMPS ? What are its differences from ordinary power supply unit.

(c) Suppose a sinusoidal signal of amplitude 30V is applied as V_i in the following clipper circuit.



(d) Construct an OR-gate with diode circuits.

(e) Find out V_0 of the following circuit.



2. (a) *Draw the circuit diagram of an active low pass 1st order* Butterworth filter and describe its principle of operation.

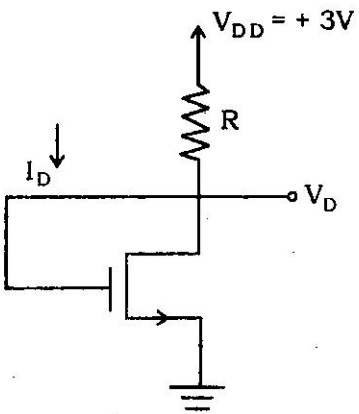
   (b) Define the terms Roll of rate and cut-off frequency for the above filter.

   (c) With the help of circuit diagram briefly discuss about biased clipper. 4+3+3

3. (a) How does a BJT work as an amplifier ?

   (b) Draw hybrid π model of BJT.

   (c) Design the circuit in following figure below to obtain a current I_D of 80rA. Find the value required for R and find the de voltage V_D. Let the NMOS transister have V_t = 0.6V, $\mu_n cox$ = 200μA / V^2, L = 0.8 μm and w = 4 μm. Neglect the channel length modulation effect (i.e, assume $\lambda = 0$)



4. (a) Explain the operation of a square wave generator using proper circuit diagram and derive the expression of its output frequencey.

(b) Draw the circuit diagram of a voltage regulator using op-amp as a comparator and explain its operation. 5+5

5. (a) With suitable circuit diagram explain the operation of R-C coupled amplifier. Mention function of all its component.

(b) Write sort notes on PLL. 5+5

6. (a) Explain Hartley oscillator with suitable circuit diagram and obtain its oscillating frequency.

(b) Write down the principle of operation of Darlington amplifier. 5+5

[Internal Assessment — 10 Marks]

———