

## 10 Nonlinear systems

### 1) Task

Assuming a diode model with a constant voltage drop of  $U_D = 0.7V$ , in the circuit of Fig.8 calculate:

- The operating point of the diode (assume  $R = 6k8$ ,  $R_L = 1k$ ,  $E = 2V$ ),
- dynamic resistance of the diode,
- Determine the maximum amplitude of the output voltage possible in the circuit.

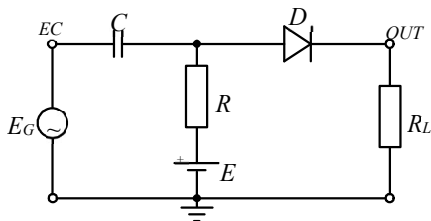


Fig.8.

### 2) Task

In the circuit of Fig.8, select the operating point of the diode ( $R$ ,  $E$ ) so that it is possible to obtain  $U_{OUT}$  with an amplitude of  $\pm 100mV$ . For calculations, assume a diode model with a constant voltage drop of  $U_D = 0.7V$  and  $R_L = 1k$ .

### 3) Task

In the circuits of Fig.9, determine the operating points of the diodes, assuming:

- perfect diode model,
- A diode model with a constant voltage drop of  $U_D = 0.7V$ .

For calculations assume:  $E_1 = 15V$ ,  $E_2 = -5V$ ,  $R_1 = 3k3$ ,  $R_2 = 5k1$ .

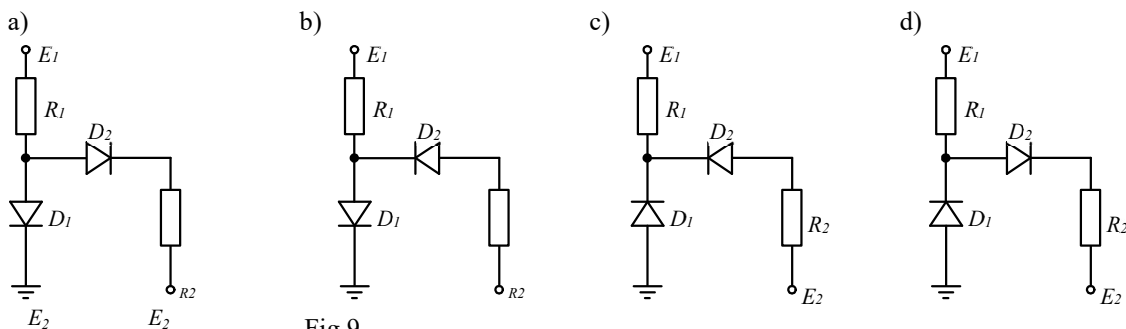


Fig.9.

### 4) Task

In the circuits of Fig.10, determine the operating points of the diodes, taking:

- diode ideal model,
- A diode model with a constant voltage drop of  $U_D = 0.7V$ .

For calculations assume:  $E_1 = 15V$ ,  $E_2 = -5V$ ,  $E_3 = 3V$ ,  $E_4 = 0V$ ,  $R_1 = 3k3$ ,  $R_2 = 5k1$ ,  $R_3 = 4k7$ .

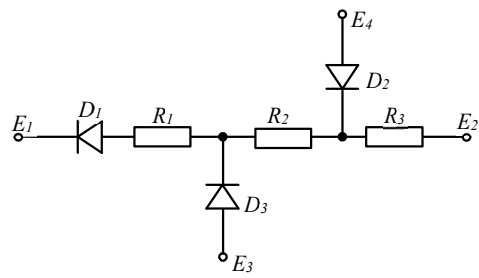
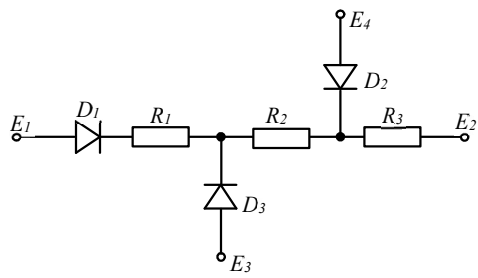


Fig.10a      Fig.10b.