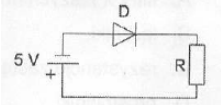
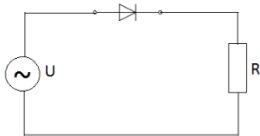


Examination questions from the “Electronics and power electronics” course

Operative level			
Electronics and power electronics			
Questions			
Item	B/D	Question	Correct answer
1	B	Capacitive semiconductor elements include: A. rectifier and signal diodes, B. MOSFET and JFET transistors, C. BJT and IGBT transistors, D. semiconductor resistors, varistors, hall effect sensors, magnetoresistors.	<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">D</div>
2	B	Junction diode rectifier is built on the basis of: A. a p-n junction, B. an m-s junction, C. mercury, D. selenium.	<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">A</div>
3	B	Diode terminals are: A. base and cathode, B. gate and cathode, C. drain, source and gate, D. cathode and anode.	<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">D</div>
4	B	Drop of voltage (threshold voltage) at a silicon diode in the forward direction equals approximately: A. 3.3 V, B. 0.1 V, C. 0.6 V, D. 0 V.	<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">C</div>

5	B	<p>A p-n semiconductor element shown in the figure will enter conduction state when:</p> <ul style="list-style-type: none"> A. electronic load polarity changes, B. voltage source polarity changes, C. source voltage increases to 10 V, D. signal reaches the gate. 	<div style="border: 1px solid black; height: 40px; width: 100%; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-weight: bold;">B</div> </div>
6	B	<p>In a system presented in the picture, the waveform of the electrical load current is:</p> <ul style="list-style-type: none"> A. full-wave rectified, B. half-wave rectified, C. rectified and filtered, D. sinusoidal alternating. 	<div style="border: 1px solid black; height: 40px; width: 100%; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-weight: bold;">B</div> </div>
7	B	<p>In small power and average power rectifiers, the following is used most often as a smoothing filter:</p> <ul style="list-style-type: none"> A. inductor (choke) with a core, B. air core coil, C. integrated stabiliser, D. electrolytic capacitor. 	<div style="border: 1px solid black; height: 40px; width: 100%; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-weight: bold;">D</div> </div>
8	B	<p>The primary component from which non-controlled rectifiers are made of are:</p> <ul style="list-style-type: none"> A. IGBT transistors, B. SCR thyristors, C. diodes, D. Zener diodes. 	<div style="border: 1px solid black; height: 40px; width: 100%; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-weight: bold;">C</div> </div>

9	B	<p>In a diode rectifier, the smoothing filter is connected:</p> <p>A. in parallel with the electrical load, B. in series with the electrical load, C. in series with the diode in the reverse direction, D. in series with the diode in the forward direction.</p>	<div style="border: 1px solid black; padding: 2px; text-align: center;">A</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
10	B	<p>The main parameter of a Zener diode is:</p> <p>A. drop of voltage in the forward direction, B. breakdown (stabilisation) voltage of the p-n junction, C. base current, D. dynamic resistance of the junction.</p>	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">B</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
11	B	<p>In order to make use of the stabilising properties of a Zener diode, we connect it:</p> <p>A. in parallel with the electric load in the forward direction, B. in series with the electric load in the forward direction, C. in parallel with the electric load in the reverse direction, D. in series with the electric load in the reverse direction,</p>	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">C</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
12	B	<p>The Zener Diode with a breakdown voltage of 5.6 V was connected in a parameter stabiliser assembly to a direct voltage of 9 V. Voltage at the electrical load will not exceed the value of</p> <p>A. 9 V, B. 0.6 V, C. 5.6 V, D. 3.3 V.</p>	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">C</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>
13	B	<p>A bipolar transistor is built of:</p> <p>A. 1 layer of semiconductor, B. 2 layers of semiconductor, C. 3 layers of semiconductor, D. 4 layers of semiconductor.</p>	<div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div> <div style="border: 1px solid black; padding: 2px; text-align: center;">C</div> <div style="border: 1px solid black; height: 15px; margin: 2px;"></div>

14	B	<p>A bipolar transistor is characterised by the fact that:</p> <p>A. small current flowing between two electrodes controls the gate current, B. small current flowing between two electrodes controls greater collector current, C. small voltage between two electrodes controls greater collector voltage, D. small voltage between two electrodes controls greater collector current,</p>	<div> <div></div> <div></div> <div>B</div> <div></div> </div>
15	B	<p>A MOSFET transistor is characterised by the fact that:</p> <p>A. small current flowing between two electrodes controls the current in a channel, B. small current flowing between two electrodes controls greater current in a channel, C. small voltage between two electrodes controls source and drain voltage, D. small voltage between two electrodes controls the current in a channel,</p>	<div> <div></div> <div></div> <div></div> <div>D</div> </div>
16	B	<p>In a JFET transistor, when the gate-source voltage equals zero:</p> <p>A. majority carriers flow between the drain and the source, B. majority carriers do not move, C. the channel is depleted, D. drain current does not flow.</p>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
17	B	<p>Electroluminescent LED diodes utilise the following phenomenon:</p> <p>A. internal photoelectric phenomenon, B. Zener's phenomenon, C. radiative recombination phenomenon, D. photovoltaic phenomenon.</p>	<div> <div></div> <div></div> <div>C</div> <div></div> </div>
18	B	<p>Connecting a LED diode to a source of direct current with a value of 12 V requires:</p> <p>A. connecting additional resistance in series, B. connecting additional resistance in parallel, C. connecting a low resistance coil in series, D. connecting directly.</p>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
19	B	<p>If there is no external polarisation and there is a lighting of the junction, the photodiode operates as:</p> <p>A. a source of gamma radiation,</p>	<div> <div></div> </div>

		B. a resistor, C. a LED diode, D. a source current of the junction in the light.	<div></div> <div></div> <div>D</div> <div></div>
20	B	Photoresistor resistance: A. decreases when it is in the light, B. increases when it is in the light, C. does not depend on light intensity, D. depends on the polarity of applied voltage.	<div>A</div> <div></div> <div></div> <div></div>
21	B	Opto-isolator is an optoelectronics component used most often for: A. generating feedback signals in capacitive potentiometers, B. stabilising of the operating point of operational amplifiers, C. galvanic isolation of control circuits from actuators, D. surge suppression in electronic circuits.	<div></div> <div></div> <div>C</div> <div></div>
22	B	Installation of SMT involves: A. installation of electronic components involving threading wires and soldering them on the other side of the board, B. soldering electronic components to the surface of the board, C. screwing electronic components to the surface of the board, D. gluing electronic components to the surface of the board using an electrically conductive adhesive,	<div></div> <div>B</div> <div></div> <div></div>
23	B	An electronic amplifier is an assembly meant to: A. create a signal at input with a higher value, proportionally to the input signal, by consuming energy from an external power source B. create a signal at input with a higher value, non-proportionally to the input signal, C. create a signal at input with a lower value, proportionally to the input signal, D. create a signal at input with a value equal to the input signal, but phase shifted.	<div>A</div> <div></div> <div></div> <div></div>
24	B	An operational amplifier is: A. an assembly where the input voltage is proportional to the output differential voltage, B. an assembly where the output voltage is proportional to the input differential voltage, C. an assembly where the difference of output and input voltage is proportional to the value of input voltage,	<div></div> <div>B</div> <div></div>

		D. an assembly where the output voltage is proportional to the sum of input voltages.	<input type="text"/>
25	B	In order to excite the oscillator, conditions must be fulfilled regarding the following parameters: A. frequency, B. amplitude and phase, C. phase, D. series resonance.	<input type="text"/> B <input type="text"/> <input type="text"/>
26	B	Trigger circuit is an electronic assembly that: A. generates periodic or aperiodic sawtooth electric waveforms as a result of quick changeover processes, B. generates periodic or aperiodic rectangular electric waveforms as a result of quick changeover processes, C. generates periodic or aperiodic electric waveforms of a random shape, D. generates periodic or aperiodic sinusoidal alternating electric waveforms as a result of quick changeover processes,	<input type="text"/> B <input type="text"/> <input type="text"/>
27	B	Bistable trigger circuits are characterised by: A. no state of stable equilibrium, B. there is one state of stable equilibrium where the circuit may be kept for inordinate amount of time, C. there are two states of stable equilibrium, D. lack of hysteresis loop.	<input type="text"/> <input type="text"/> C <input type="text"/>
28	B	In a Schmitt trigger circuit, the threshold levels are determined by changing the relationship between: A. two resistances, B. two capacities, C. two real inductances, D. two impedances.	A <input type="text"/> <input type="text"/> <input type="text"/>
29	B	An SCR thyristor is characterised by the fact that: A. it can be activated to conducting state only when there is a gate pulse different than zero, or the anode current equals zero, B. it can be activated and deactivated in any operation state, C. it can be deactivated from the conducting state only at conduction current equal to zero, D. it can be deactivated from the conducting state at zero gate pulse,	<input type="text"/> <input type="text"/> C <input type="text"/>

30	B	<p>A GTO thyristor is characterised by the fact that:</p> <p>A. in order to deactivate it, a short gate pulse shall be provided with an amplitude equal to approx. 1% of the anode current,</p> <p>B. in order to deactivate it, a long gate pulse shall be provided with an amplitude equal to approx. 1% of the anode current,</p> <p>C. in order to deactivate it, a short gate pulse shall be provided with an amplitude equal to approx. 15% of the anode current,</p> <p>D. in order to deactivate it, a long gate pulse shall be provided with a large amplitude equal to approx. 20-30% of the anode current.</p>	<div> <div></div> <div></div> <div></div> <div>D</div> </div>
31	B	<p>An IGBT transistor is an assembly that combines the characteristics of:</p> <p>A. an IGCT thyristor and an FET transistor,</p> <p>B. a GTO thyristor and a BJT transistor,</p> <p>C. a FET transistor and a BJT transistor,</p> <p>D. an SCR thyristor and a MOSFET transistor.</p>	<div> <div></div> <div></div> <div>C</div> <div></div> </div>
32	B	<p>Which of the listed non-controller rectifiers generates the greatest average output current:</p> <p>A. diode, single-phase, half-wave with a capacitive filter,</p> <p>B. diode, single-phase, with a Graetz bridge,</p> <p>C. diode, single-phase, half-wave,</p> <p>D. diode, single-phase, with a Graetz bridge and a capacitive filter.</p>	<div> <div></div> <div></div> <div></div> <div>D</div> </div>
33	B	<p>An oscillating rectifier in a brushless generator excitation circuit is a rectifier:</p> <p>A. three-phase, bridge,</p> <p>B. single-phase, full wave,</p> <p>C. single-phase, half-wave,</p> <p>D. three-phase, three pulse</p>	<div> <div>A</div> <div></div> <div></div> <div></div> </div>
34	B	<p>In high power thyristor rectifier assemblies the following is used as an output filter:</p> <p>A. electrolytic capacitors,</p> <p>B. inductors (chokes),</p> <p>C. power resistors,</p>	<div> <div>A</div> <div></div> <div></div> </div>

		D. parameter stabilisers.	<input type="text"/>
35	B	<p>In ship technology, cycloconverter is an electronic power device used primarily as:</p> <p>A. a power supply for high power electrical loads, B. a power supply assembly for the main electric drive, C. network inverter for the shaft generator, D. an assembly used to connect the ship to an onshore network.</p>	<input type="text"/> <input type="text"/> B <input type="text"/> <input type="text"/>
36	B	<p>The course of the output voltage generated by the voltage inverter with a voltage control has the following shape:</p> <p>A. sinusoidal alternating, B. trapezoid alternating, C. a series of rectangular pulses with a constant width, D. a series of rectangular pulses with a variable width,</p>	<input type="text"/> <input type="text"/> <input type="text"/> D <input type="text"/>