Examination questions from the subject "Electrical machines"

Operating level			
Electrical machines			
Questions B/D – means the character of the question (basic, difficult)			
Ref. no.	**B/D**	**Question**	**Correct answer**
1.	B	A part of a DC machine called the armature corresponds to: A. a commutator, B. a rotor, C. a stator, D. pole pieces.	B
2.	B	A part of a DC machine called the magnet corresponds to: A. a commutator, B. a rotor, C. a stator, D. pole pieces.	C
3.	B	An external characteristics of the separately excited DC generator is the dependency between: A. voltage on terminals and load current, B. excitation current and load current, C. load current and frequency, D. excitation current and voltage.	A
4.	B	The process of self-excitation of a shunt DC generator depends on: A. the direction of rotation, B. network load, C. residual magnetism, D. frequency.	C
5.	B	The relative value of the difference between synchronous speed and rotor speed is called: A. a remanence, B. a slip, C. a harmonic, D. a reluctance.	B

6.	B	As a result of the start-up with a star-delta switch: A. phase voltage is 3 times lower, B. current is lower by 1/3, C. start-up time is shorter, D. phase voltage is $\sqrt{3}$ times lower,	D
7.	B	A doubly-fed motor can be: A. a wound-rotor motor, B. a squirrel cage motor, C. a shunt-wound motor, D. a series-wound motor.	A
8.	B	Asynchronous motors are divided into: A. series-wound and shunt-wound ones, B. wound-rotor and squirrel cage ones, C. separately excited and self-excited ones, D. salient pole and shaded pole ones.	B
9.	B	The angular position transducer converting a mechanical signal to an electric one is called: A. an ampilidyne, B. a rototrol, C. a tachometer, D. a synchro.	D
10.	B	Synchros are electrical machines that: A. modify voltage, B. limit speed, C. transmit the angle of rotation at a distance, D. are an element of the synchro system.	C
11.	B	One of the reasons of sparking in a DC machine can be: A. incorrect positioning of brushes, B. low machine load, C. increased temperature of windings, D. too low rotational speed.	A
12.	B	A slight reduction of excitation current in a shunt DC motor causes: A. motor braking, B. switching into generator action, C. speed reduction, D. speed increase.	D

13.	B	What is the relation between power and the output torque of the rotating machine: A. P=M/ω, B. M=9.55*P/n, C. P=0.972*M*n, D. M=n*P.	B
14.	B	The rated slip in an asynchronous motor totals: A. approx. 3%, B. approx. 10%, C. 5% - 10%, D. 10% - -20%,	A
15.	B	A series-wound DC motor is characterised by: A. a particular tendency to sparking, B. the possibility of convenient start-up, C. the possibility of run-up, D. the possibility of stalling.	C
16.	B	Electrical motors driving anchor winches shall be adapted to: A. continuous duty, B. short-time duty, C. intermittent periodic duty, D. generator action.	B
17.	B	The cause of heating up of electrical machines is: A. a slight load, B. power losses within the machine, C. mainly mechanical losses, D. operation efficiency of the driven device.	B
18.	B	The rings in an induction motor can be: A. closed or connected by means of resistance, B. supplied only from a special source, C. closed during start-up, D. used for machine excitation.	A
19.	B	The direction of action of the electrodynamic force is determined on the basis of: A. the right-hand rule, B. the left-hand rule, C. Maxwell's law, D. Kirchhoff's law.	B

20.	B	Electromotive force induced in the armature winding depends on: A. current and magnetic induction value, B. output torque and rotational speed, C. magnetic stream value and rotational speed, D. winding structure and load current.	C
21.	B	In a shunt DC motor: A. voltage from the shunt is supplied to the armature, B. the excitation winding and the armature are connected in series, C. the excitation winding and the armature are connected in parallel, D. there is no commutator.	C
22.	B	In a series-wound DC motor: A. voltage from the volt multiplier is supplied to the armature, B. the excitation winding and the armature are connected in series, C. the excitation winding and the armature are connected in parallel, D. there is no commutator.	B
23.	B	The rotor of a squirrel cage motor is: A. supplied by the rings, B. supplied by the commutator, C. closed, D. composed of 3 phase windings.	C
24.	B	The rotor of a wound-rotor motor is: A. supplied by the commutator, B. supplied by the rings, C. permanently closed, D. supplied with direct current,	B
25.	B	The critical slip in an asynchronous squirrel cage motor: A. depends on the value of the supply voltage, B. depends on the motor load, C. has a fixed value, D. depends on the order of the supply voltage phases.	C
26.	B	Torque overload of an asynchronous motor should be: A. greater than 1.5, B. within the range of 1.0 – 1.5, C. approx. 3.0, D. approx. 1.0.	A

27.	B	Synchronous speed means: A. the idle run speed, B. the magnetic field speed, C. the speed under load, D. the shaft speed in an asynchronous machine.	B
28.	B	Synchronous speed can be calculated on the basis of the following formula: A. $n_S = 50*p/f$, B. $n_S = f/p$, C. $n_S = 60*f/p$, D. $n_S = 30*U/I$.	C
29.	D	A synchronous machine with a 4-pole magnet operating in the network with the frequency of 60Hz has the shaft speed of: A. $n_w = 1{,}500$ rpm, B. $n_w = 750$ rpm, C. $n_w = 1{,}800$ rpm, D. $n_w = 900$ rpm,	C
30.	B	The change of rotation direction of an asynchronous motor shaft occurs through: A. the change of two phases in the feeder, B. the change of supply voltage, C. the change of rotor resistance, D. one phase disconnection and reconnection.	A
31.	B	A slip in an asynchronous motor corresponds to: A. the change of voltage under load, B. the difference between the supply voltage and the rotor voltage, C. the difference between rotor rotational speed and synchronous speed, D. the difference between idle run speed and synchronous speed.	C
32.	B	Asynchronous squirrel cage motors during start-up: A. draw high current, B. should be supplied with higher voltage, C. are characterised by a much higher torque than the rated one, D. heat up in a dangerous manner.	A
33.	B	In a synchronous generator, a rotating rectifier: A. provides the excitation current, B. supplies DC receivers, C. serves for the regulation of revolutions, D. is the frequency regulator.	A

34.	B	The regulation of reactive power in a synchronous generator is achieved by means of: A. the regulation of rotational speed, B. the regulation of excitation current, C. frequency regulation, D. the regulation of load current.	B
35.	B	The distribution of active power upon parallel operation of synchronous generators: A. is related to the voltage of running generators, B. depends on rotational speed regulators, C. depends on the excitation regulator, D. depends on the load current regulator.	B
36.	B	The distribution of reactive power upon parallel operation of synchronous generators: A. adapts to network load, B. depends on the load current regulator. C. depends on the voltage regulator, D. depends on the power of motors.	C
37.	B	Directional protection (from inverse power) of a synchronous generator prevents: A. the increase of generator rotational speed, B. the change of generator voltage frequency, C. the increase of generator load current, D. motor duty of a synchronous machine.	D
38.	B	Electromotive force induced in the armature of a synchronous machine depends on: A. the active part of the load current, B. the excitation current and the rotational speed of the shaft, C. the type of rotational speed regulator used, D. the number of pole pairs of armature winding.	B
39.	B	Which of the following items are most frequently used within the generating set: A. synchronous machines, B. series-shunt generators, C. asynchronous machines, D. shunt generators with special design.	A

Z komentarzem [AZ1]: W oryginale: pracy silnikowej maszyny synchroniczne- tłumaczyłam jako maszyny synchronicznej.

40.	B	Which of the following can be used as a shaft generator: A. only a DC electrical machine, B. only a synchronous electrical machine, C. only an asynchronous electrical machine, D. all machines specified above, depending on the solution of the electric power system.	D
41.	B	If a synchronous machine is used as a shaft generator, it is necessary to: A. maintain the speed of the screw shaft above the critical value, B. maintain constant load of the screw shaft, C. maintain constant speed of the screw shaft or use a frequency converter, D. use special voltage regulator.	C
42.	B	When incorporating a synchronous generator to work in parallel, it is necessary to: A. comply with the regulations of the Polish Register of Shipping (PRS) concerning navigation safety, B. increase the requirement for electric power in the vessel network, C. check if the vessel enters a port, D. comply with synchronization conditions.	D
43.	B	The rotational speed regulator of a motor driving a synchronous generator serves for: A. the regulation of frequency and active power of the generator, B. the regulation of rotational speed and reactive power of the generator, C. the maintenance of the constant torque on machine shaft, D. the verification of synchronization conditions.	A
44.	B	Limit power angle in a synchronous generator is related to: A. the maximum reactive power of the generator, B. the maximum active power of the generator, C. the maximum apparent power of the generator, D. the minimum allowable rotational speed of the shaft.	B
45.	B	What conditions the occurrence of the reluctance torque in a synchronous generator: A. the manner of execution of excitation winding, B. the difference between the transverse reactance and the longitudinal reactance, C. the manner of execution of armature winding, D. the interruption of the excitation circuit.	B
46.	B	The regulation of the rotational speed of an asynchronous squirrel cage motor can be performed by means of: A. the application of the Meyer's system, B. the change of rotor circuit resistance, C. the change of shaft load, D. the change of supply voltage frequency.	D

47.	B	The regulation of the rotational speed of an asynchronous wound-rotor motor can be performed by means of: A. the application of the Meyer's system, B. the change of rotor circuit resistance, C. the change of shaft load, D. changing the number of pole pairs of stator winding.	B
48.	B	An asynchronous double squirrel cage motor is characterised by: A. limited starting current, B. reduced current and starting torque, C. the possibility of braking operation which is unlimited in time, D. significantly increased efficiency.	A
49.	B	A critical slip in an asynchronous machine may be regulated: A. by means of a star-delta switch, B. by means of the change of supply voltage, C. only in a wound-rotor motor, D. only in a deep grove squirrel cage motor.	C
50.	B	The designation of connection groups in a 3-phase transformer defines: A. the manner of connection of the primary and the secondary winding, B. the shift between the current and the voltage in the windings, C. transformer turns ratio, D. the number of windings in one phase of the primary winding.	A
51.	B	In the case of parallel operation of 3-phase transformers, the following items must absolutely be equal: A. rated powers of transformers, B. impedance voltages of transformers, C. turns ratios of transformers, D. time designations in groups of transformer connections.	D
52.	B	Impedance voltage of the transformer is: A. a voltage at which the ends of windings can be closed, B. a voltage at which the short-circuit current does not exceed the rated current, C. primary voltage which enforces rated current with the short-circuited secondary side, D. the voltage on short-circuited transformer terminals.	C
53.	B	The change of voltage in the transformer depends on: A. transformer turns ratio, B. the nature of transformer load, C. the manner of execution of transformer core, D. the manner of connection of primary and secondary windings.	B