

This is to recommend the questions for getting ready for a professional interview within the ONMA and Ukrainian maritime education curriculum applicable for electrical cadets:

I. SOURCES OF ELECTRIC ENERGY

1. Acid batteries: purpose, electrical characteristics; charge; lifetime; safety precautions during operation.
2. Alkaline batteries: purpose, electrical characteristics; charge; lifetime; safety precautions during operation.
3. DC generators basic concepts device, operating principle.
4. AC Alternators basic concepts device, operating principle.
5. Synchronous generators of alternating 3-phase current with self-excitation, brush: brushless; construction; operating principle.
6. Protection of synchronous generators.
7. Parallel operation of synchronous generators of alternating 3-phase current: conditions for introducing into parallel; load sharing between generators operating in parallel.

II. ELECTRICAL ENGINEERING

1. Series connection of power sources.
2. Parallel connection of power sources.
3. Series connection of active resistances.
4. Parallel connection of active resistances.
5. Series connection of active resistance and inductance.
6. Series connection of active resistance and capacitance.
7. Resonance of currents.
8. Ohm's law for an electric circuit and for a section of an electric circuit.
9. Rules of Kirchhoff, their application in electrical engineering.

III. SEMICONDUCTOR DEVICES - purpose; operating principle

1. Thermistors.
2. Photoresistors.
3. Rectifier diodes - switching circuits.
4. Zener diodes - switching circuits.
5. Thyristors: diode thyristor; triode thyristor.
6. Photodiodes.
7. LEDs.
8. Transistors and their switching circuits.
9. Phototransistor.

IV. LOGIC ELEMENTS IN DISCRETE ACTION LOOPS

1. Logical elements in discrete action circuits - the principle of operation.
2. Logical elements in discrete action circuits - schematic designation: inversion elements (NOT); element "And"; element "AND-NOT"; element "OR"; element "OR-NOT"

V. DC ELECTRIC MOTORS

1. DC el. motors device; operating principle; safety precautions during operation.
2. Regulation of the number of revolutions of DC el. motors and their protection.

VI. AC THREE-PHASE CURRENT ELECTRIC MOTORS.

1. Three-phase AC motors are with squirrel-cage motor: device; operating principle.
2. The motors of alternating three-phase current with a phase rotor: device; operating principle.
3. Asynchronous electric motors offer connection to a three-phase ship network – “triangle” “star”, and “combined”. What is the difference in the connection diagram, operating principle and advantages?
4. Methods for increasing insulation resistance of electrical motors and alternators.

VII. TRANSFORMERS

1. Classification.
2. Voltage transformers: device; operating principle; appointment.
3. Conditions for parallel operation of transformers.

VIII. ELECTRIC POWER PLANTS onboard ships

1. Generator system purpose and conception of electrical power generation diesel-driven or shaft generator.
2. Main Switchboard System – basic panels, the purpose and conception.
3. Emergency Switchboard System – purpose and conception
4. Distribution system purpose; design and conception.
5. Purpose of insulation resistance control of machines, transformers, appliances, cables and other electr. installations, instruments and devices (Megger test, Meg-ohms of resistance (MΩ))

IX. AUTOMATION

1. Alarm Preventing systems (APS). Appointment.
2. Oil mist detector: purpose; operating principle.
3. Optocoupler: principle of operation, use.
4. Fire alarm: purpose; types of sensors; methods and frequency of checking sensors.
5. Elements of automation and remote control – purpose, device, principle of operation: rotation speed sensors; Pressure Sensors; level sensors; temperature sensors; displacement sensors; radiation sensors; acoustic sensors; ship telegraph.

X. SHIP BOILER INSTALLATION

1. Main board of electrical automation control system of AUX. boiler.
2. Basic protection of steam pressure, water level in steam drum, burner firing

XI. SAFETY IN THE PROCESS OF OPERATION OF ELECTRICAL EQUIPMENT

1. General requirements for the safe operation of electrical equipment: electrical machines; switchboards (control panels); electrical apparatus; cables; wires; electric lighting.
2. Personal safety measure for electrical operations on ships is the use of electrical safety equipment.