GROL+R

General Radio Telephone Operator License

*Plus* Radar Endorsement

Marine Radio Operator Permit (MROP) - Element 1

General Radio Telephone Operator License (GROL) - Element 3

Radar Endorsement - Element 8

Question Pools are current as of 25 June 2009

Verified on 10 Mar 17

*Preface:*

With the desire to peruse the GROL+R license, I decided to download the different elements from the FCC’s website. <http://wireless.fcc.gov/commoperators/index.htm?job=question_pools>

When I was a kid I purchased a study guide, but I soon lost interest. This time I decided not to order a book, just in case other priorities popped up. The downloads on the FCC’s website come in Word format and provide multiple-choice questions with an answer key. You and I can easily manipulate these documents to our liking. We can type in notes for each question and then upload our version to GitHub as a big study group. If you do any research, please document where you found your information. This will give us an opportunity to dive deeper into the subject. I have provided you this table of contents so you can spruce up your study guide and have a quick reference. Finally, this license can be applied to one of the Electronics Technicians Association certifications. Check out their website at www.eta-i.org

73’s

Johnny McCown

Think Schematics

Marine Radio Operator Permit (MROP) - Element 1

Sub-element A – Rules and Regulations

Key Topic 1: Equipment Requirements

Key Topic 2: License Requirements

Key Topic 3: Watchkeeping

Key Topic 4: Log keeping

Key Topic 5: Log Entries

Key Topic 6: Miscellaneous Rules and Regulations

Sub-element B – Communications Procedures

Key Topic 7: Bridge-to-Bridge Operations

Key Topic 8: Operating Procedures-1

Key Topic 9: Operating Procedures – 2

Key Topic 10: Distress Communications

Key Topic 11: Urgency and Safety Communications

Key Topic 12: GMDSS

Sub-element C – Equipment Operations

Key Topic 13: VHF Equipment Controls

Key Topic 14: VHF Channel Selection

Key Topic 15: MH-HF Equipment Controls

Key Topic 16: MF-HF Frequency and Emission Selection

Key Topic 17: Equipment Tests

Key Topic 18: Equipment Faults

Sub-element D – Other Equipment

Key Topic 19: Antennas

Key Topic 20: Power Sources

Key Topic 21: WPIRBs

Key Topic 22: SARTs

Key Topic 23: Survival Craft VHF

Key Topic 24: NAVTEX

General Radio Telephone Operator License (GROL) - Element 3

Sub-element A – Principles

Key Topic 1: Electrical Elements

Key Topic 2: Magnetism

Key Topic 3: Materials

Key Topic 4: Resistance, Capacitance and Inductance

Key Topic 5: Simi-conductors

Key Topic 6: Electrical measurements

Key Topic 7: Waveforms

Key Topic 8: Conductors

Sub-element B – Electrical Math

Key Topic 9: Ohm’s Law-1

Key Topic 10: Ohm’s Law-2

Key Topic 11: Frequency

Key Topic 12: Waveforms

Key Topic 13: Power Relationships

Key Topic 14: RC Time Constants-1

Key Topic 15: RC Time Constants-2

Key Topic 16: Impedance Networks-1

Key Topic 17: Impedance Networks-2

Key Topic 18: Calculations

Sub-element C – Components

Key Topic 19: Photoconductive Devices

Key Topic 20: Capacitors

Key Topic 21: Transformers

Key Topic 22: Voltage Regulators, Zener Diodes

Key Topic 23: SCRs, Triacs

Key Topic 24: Diodes

Key Topic 25: Transistors-1

Key Topic 26: Tranistors-2

Key Topic 27: Light Emitting Diodes

Key Topic 28: Devices

Sub-element D – Circuits

Key Topic 29: R-L-C Circuits

Key Topic 30: Op Amps

Key Topic 31: Phase Locked Loops (PLLs); Voltage Controlled Oscillators (VCOs); Mixers

Key Topic 32: Schematics

Sub-element E – Digital Logic

Key Topic 33: Types of Logic

Key Topic 34: Logic Gates

Key Topic 35: Logic Levels

Key Topic 36: Flip-Flops

Key Topic 37: Multivibrators

Key Topic 38: Memory

Key Topic 39: Microprocessors

Key Topic 40: Counters, Dividers, Converters

Sub-element F – Receivers:

Key Topic 41: Receiver Theory

Key Topic 42: RF Amplifiers

Key Topic 43: Oscillators

Key Topic 44: Mixers

Key Topic 45: IF Amplifiers

Key Topic 46: Filters and IF Amplifiers

Key Topic 47: Filters

Key Topic 48: Detectors

Key Topic 49: Audio and Squelch Circuits

Key Topic 50: Receiver Performance

Sub-element G – Transmitters:

Key Topic 51: Amplifiers-1

Key Topic 52 Amplifiers-2

Key Topic 53: Oscillators and Modulators

Key Topic 54: Resonance – Tuning Networks

Key Topic 55: SSB Transmitters

Key Topic 56: Technology

Sub-element H – Modulation

Key Topic 57: Frequency Modulation

Key Topic 58: SSB Modulation

Key Topic 59: Pulse Modulation

Sub-element I – Power Sources

Key Topic 60: Batteries-1

Key Topic 61: Batteries-2

Key Topic 62: Motor and Generators

Sub-element J – Antennas

Key Topic 63: Antenna Theory

Key Topic 64: Voltage, Current and Power Relationships

Key Topic 65: Frequency and Bandwidth

Key Topic 66: Transmission Lines

Key Topic 67: Effective Radiated Power

Sub-element 3-K – Aircraft

Key Topic 68: Distance Measuring Equipment

Key Topic 69: VHF Omnidirectional Range (VOR)

Key Topic 70: Instrument Landing System (ILS)

Key Topic 71: Automatic Direction Finding Equipment (AFD) & Transponders

Key Topic 72: Aircraft Antenna Systems and Frequencies

Key Topic 73: Equipment Functions

Sub-element 3-L – Installation, Maintenance & Repair

Key Topic 74: Indicating Meters

Key Topic 75: Test Equipment

Key Topic 76: Oscilloscopes

Key Topic 77: Specialized Instruments

Key Topic 78: Measurement Procedures

Key Topic 79: Repair Procedures

Key Topic 80: Installation Codes & Procedures

Key Topic 81: Troubleshooting

Sub-element 3-M – Communications Technology

Key Topic 82: Types of Transmissions

Key Topic 83: Coding and Multiplexing

Key Topic 84: Signal Processing, Software and Codes

Sub-element 3-N – Marine

Key Topic 85: VHF

Key Topic 86: HF-HF, SSB-SITOR

Key Topic 87: Survival Craft Equipment: VHF, SARTs & EPIRBs

Key Topic 88: FAX, NAVTEX

Key Topic 89: NMEA Data

Sub-element 3O – Radar

Key Topic 90: RADAR Theory

Key Topic 91: Components

Key Topic 92: Range, Pulse Width & Repetition Rate

Key Topic 93: Antennas & Waveguides

Key Topic 94: RADAR Equipment

Sub-element 3P – Satellite

Key Topic 95: Low Earth Orbit Systems

Key Topic 96: INMARSAT Communications Systems 1

Key Topic 97: INMARSAT Communications Systems 2

Key Topic 98: GPS

Sub-element 3Q – SAFETY

Key Topic 99: Radiation Exposure

Key Topic 100: Safety Steps

Radar Endorsement - Element 8

Sub-element A – RADAR Principles

Key Topic 1: Marine RADAR Systems

Key Topic 2: Distance and Time

Key Topic 3: Frequency and Wavelength

Key Topic 4: Power, Pulse Width, PRR

Key Topic 5: Range, Pulse Width, PRF

Key Topic 6: Pulse Width – Pulse Repetition Rates

Key Topic 7: Components-1

Key Topic 8: Components-2

Key Topic 9: Circuits-1

Key Topic 10: Circuits-2

Sub-element B – Transmitting Systems

Key Topic 11: Transmitting Systems

Key Topic 12: Magnetrons

Key Topic 13: Modulation

Key Topic 14: Pulse Forming Networks Modulation

Key Topic 15: TR- ATR – Circulators – Directional Couplers-1

Key Topic 16: TR- ATR – Circulators – Directional Couplers-2

Key Topic 17: Timer – Triger – Synchronizer Circuits

Key Topic 18: Power Supplies

Sub-element C – Receiving Systems

Key Topic 19: Receiving Systems

Key Topic 20: Mixers

Key Topic 21: Local Oscillators

Key Topic 22: Amplifiers

Key Topic 23: Detectors – Video Amplifiers

Key Topic 24: Automatic Frequency Control - AFC

Key Topic 25: Sea Clutter - STC

Key Topic 26: Power Supplies

Key Topic 27: Interference Issues

Key Topic 28: Miscellaneous

Sub-element D – Display & Control Systems

Key Topic 29: Displays

Key Topic 30: Video Amplifiers and Sweep Circuits

Key Topic 31: Timing Circuits

Key Topic 31: Fixed Range Markers

Key Topic 33: Variable Range Markers

Key Topic 34: EBL, Azimuth and True Bearing

Key Topic 35: Memory Systems

Key Topic 36: ARPA - CAS

Key Topic 37: Display Systems Power Supplies

Key Topic 38: Miscellaneous

Sub-element E – Antenna Systems

Key Topic 39: Antenna Systems

Key Topic 40: Transmission Lines

Key Topic 41: Antenna to Display Interface

Key Topic 42: Waveguides-1

Key Topic 43: Waveguides-2

Sub-element F – Installation, Maintenance & Repair

Key Topic 44: Equipment Faults-1

Key Topic 45: Equipment Faults-2

Key Topic 46: Equipment Faults-3

Key Topic 47: Equipment Faults-4

Key Topic 48: Maintenance

Key Topic 49: Installation

Key Topic 50: Safety