Syllabus and Important Information of ASOC

ASOC stands for Amateur Station Operator Certificate. There are two grades of Amateur Radio license viz, Restricted Grade and General Grade. The written test for both grades comprises of one paper containing two sections.

Section A: Radio Theory & Practice

Section B: National & International Telecommunication Union Radio Regulations.

Also, there is an examination of Morse reception and sending with 8 WPM for General Grade certificates.

The duration of the written test is of one hour. The test consists of Multiple-Choice Questions. There are 100 questions in total of which 50 questions are in Section A and 50 in Section B. Each question carries 1-mark each. Candidates must secure at least 40% for each section and 50% in aggregate in order to pass the restricted grade exam. To secure General Grade, a candidate must secure at least 50% in both the sections and 60% in aggregate.

Syllabus for Restricted Grade

Section A: Radio Theory & Practice

1. Elementary Electricity & Magnetism:
2. Elementary Theory of Electricity – Passive Devices (resistors, inductors, transformers, capacitors) and Active Devices (diodes, transistors).
3. Kirchhoff's Current & Voltage laws
4. Conductors & Insulators - properties, units of circuit elements, Ohm's Law.
5. Conductance - Definition of self and manual inductance
6. Power & Energy - Definition, units and simple application.
7. Permanent Magnets and electromagnets - Definition, properties and use.
8. Elementary Theory of Alternating Currents
9. Sinusoidal alternating quantities - Definition of peak, instantaneous, RMS, average values and its application.

10. Phase, reactance, impedance, power factor – definition, units, and simple application

11. Parallel, Series circuits series and parallel circuits containing resistance, inductance, capacitance, resonance in series and parallel circuits, coupled circuits.

12. Rectifiers, voltage regulation and smoothing circuits – Their basic knowledge & simple application.

13. Elementary theory of Semiconductor Devices:

14. Diodes and Transistors- Properties, use of these devices for the construction of amplifiers, oscillators, detectors and frequency chargers.

15. Radio Receivers

16. Principles and operation of TRF and Superheterodyne receivers.

17. CW reception

18. Receiver characteristics- sensitivity, selectivity, fidelity, adjacent channel and image interference, AVC and squelch/circuits signal to noise ratio.

19. Transmitter:

20. Principles and operation of low power transmitter, crystal oscillators, the stability of oscillators.

21. Basic knowledge about the construction of semiconductor-based transmitters

22. Radio Wave Propagation

23. Basic Knowledge of Electromagnetic Spectrum

24. Wavelength, frequency, frequency bands.

25. Nature and propagation of radio waves, ground and sky waves, space waves, skip distance, skip zone & fading.

26. Aerials: Common types of transmitting and receiving aerials.

27. Frequency Measurement: Measurement of frequency and use of simple frequency meters.

Section B: Radio Regulations

28. Knowledge of:

1. The Indian Wireless Telegraphs Rules, 1973.

2. The Indian Wireless Telegraphs (Amateur Service) Rules, 1978 and amendments.

29.Knowledge of ITU Radio Regulations relating to the operation of amateur stations with particular emphasis on the following:

Item	Item Provision of Radio Regulation (2008 edition)
Designation of emission	Appendix I
Phonetic alphabets and figure code	Appendix 14
Nomenclature of Frequency & Wavelength	Article 2
Frequency Allocation for Amateur Services	Article 5
Interference, measures against interference and tests	Article 15
Identification of Stations	Article 19
Distress Signal, Call and Message. Transmissions	Article 30, 31, 32 & 33
Urgency Signal, Call and Message Transmissions	Article 30, 31, 32 & 33.
Amateur Station	Article 25
Call Sign series allocated to India	Appendix 42

In addition to the syllabus prescribed for restricted grade examination, the following items are included for the General Grade examination.

1. Principles of Communication
    a. Elementary idea of analog and digital communication.
    b. Need for modulation; Modulation - amplitude, frequency and pulse modulation.
    c. An elementary idea about demodulation.
2. Alternating Current
    a. Basic concepts about the construction of transformers
    b. Definition of Transformer losses
    c. A transformer as a matching device
3. Semiconductor devices and Transistors
    a. Elementary principles of conduction and construction
    b. Symbols and biasing methods
4. Power Supplies
    a. Basic knowledge of half-wave and full-wave rectifiers
    b. Definition and application of Bridge rectifier, smoothing and regulating circuits

5. Transmitters and Receivers

    a. Elementary principles of transmission and reception of Facsimile and Television signals

6. Propagation

    a. Characteristics of ionosphere and troposphere

    b. Properties of ionosphere layers

    c. Critical frequency and day/night frequencies

7. Aerials

    a. Principles of radiation

    b. Aerials for different frequency bands including aerials for microwave

8. Space Communications

    a. Elementary principles of communication via satellites

Section B: Radio Regulations

Syllabus is the same as that prescribed for the Amateur Station Operators' License (Restricted) Examination.

Part II – Morse Code

Morse receiving (Speed: 8 wpm)

- The test piece will consist of plain language passage of 200 characters which includes letters, figures, punctuation, etc.
- On average, one word shall contain 5 characters, and each figure/punctuation will be considered as 2 characters.
- The test will be for 5 consecutive minutes at a speed of 8 WPM.
- A short practice piece of one minute shall be sent at the prescribed speed before the start of the actual test.
- Candidates will not be allowed to make more than one attempt in Morse reception and sending test.
- The test may be written in ink or pencil but must be legible. Overwriting will be treated as an error. If any correction is required, the candidate may strike through the wrong character and write the correction above it. More than 5 errors will disqualify a candidate. However, if a candidate can receive, without any error in any part of the passage, continuously for one minute, he or she will be declared successful in the Morse reception test.

Morse Sending (Speed: 8 wpm)

The test piece will be like Morse Receiving test for Amateur Station Operators' License (General) Examination. Candidates are required to send for five consecutive minutes at speed not less than 8 words per minute. Other conditions are the same as applicable to Amateur Station Operators' License (General) Examination.

Who issues the Amateur Wireless licenses in India?

The Wireless Planning & Coordination Wing (WPC Wing) under the Department of Telecommunications, New Delhi, of the Ministry of Communications issues the licences.

Categories of Amateur Licenses in India

1. Amateur Wireless Telegraph Station License, Restricted Grade.

2. Amateur Wireless Telegraph Station License, General Grade.

Who are eligible for Amateur licenses in India?

1. The Amateur license will be issued to citizens of India above 12 years of age who pass the ASOC exam.

2. The holders of the Certificate of Proficiency like Radio Communication Operators General or Radio Telegraph Operators First or Second-Class Certificate are eligible for Restricted Grade Amateur license without writing any exams.

3. Applicants holding Degree in Engineering/Science or Diploma in Engineering and having studied Electronics or Telecommunications are exempted from appearing in Section A of Part I of the test.

4. Licenses are also given to Radio Club, society, school, college or any institution interested in this hobby, provided that their office-bearer has a General License.

Reciprocal Licence

Foreign nationals are eligible for reciprocal licence under the following conditions:

1. The country of which the applicant is a citizen should grant a reciprocal licence to Indian nationals. It may not apply if the Government thinks otherwise.

2. The applicant must be above 18 years of age.

3. The applicant must be a holder of an appropriate category of licence.

4. The licence shall be initially granted for one year or till the validity of the visa, whichever is earlier.

The function of the Amateur Station

The function of the amateur station is to communicate with other stations, licenced similarly, in the authorised frequencies and modes.

CLASSIFICATION OF RADIO FREQUENCIES

Symbols	Full-Form	Freq. Range	Corresponding metric Subdivision
VLF	Very Low Frequency	3 to 30 kHz	Myria metric waves
LF	Low Frequency	30 to 300 kHz	Kilometric waves
MF	Medium Frequency	300 to 3000 kHz	Hecto metric waves
HF	High Frequency	3 to 30 MHz	Deca Metric waves
VHF	Very High Frequency	30 to 300 MHz	Metric Waves
UHF	Ultra-High Frequency	300 to 3000 MHz	Deci metric Waves
SHF	Super High Frequency	3 to 30 GHz	Centi Metric Waves
EHF	Extremely High Frequency	30 to 300 GHz	Milli metric Waves