SYLLABUS AND THE DETAILS OF EXAMINATIONS FOR THE AWARD OF AMATEUR STATION OPERATOR'S LICENCE (Restricted) and (General)

1. The examination shall consist of the following two parts:

PART 1 - Written Test

It shall comprise of one paper containing two sections as under:

Section A: Radio Theory and Practice

Note - Applicants holding degree in Engineering/Science or Diploma in Engineering and having studied electronics or telecommunications shall be exempted from appearing in Section A of Part-I of the test.

Section B: National and international Telecommunication Union (ITU) Radio Regulations applicable to the operation of amateur station and those relating to the working of station generally.

PART II - Morse (Only for General Certificate)

Morse reception and sending (8 wpm)

2. Detailed syllabus:

2.1 Amateur Station Operator's Licence (Restricted) Examination

Part I - Written Test

Section A: Radio Theory and Practice

(i) Elementary Electricity and Magnetism:

1. Elementary theory of electricity- Passive Devices (Resistors; Inductors, Transformers, Capacitors) and Active Devices (Diodes; Transistors).

2. Kirchoff's current and voltage laws- Simple applications of the law.

3. Conductors and Insulators — Properties; units of circuit elements, Ohm's Law.

4. Conductance — Definition of self and mutual inductance;

5. Power and energy- Definition, Units and simple applications.

6. Permanent magnets and electromagnets — Definition, properties and their use.

(ii) Elementary Theory of Alternating Currents:

1. Sinusoidal alternating quantities - Definition of peak, instantaneous, R.M.S., average values and its simple application.

2. Phase, reactance, impedance, power factor- Definition, units and simple applications.

3. Parallel and Series Circuits series and parallel circuits containing resistance, inductance, capacitance; resonance in series and parallel circuits, coupled circuits.

4. Rectifiers, voltage regulation and smoothing circuits - Their basic knowledge and simple application.

(iii) Elementary theory of Semiconductor Devices:

Diodes and transistors- Properties use of these devices for construction of amplifiers, oscillators, detectors and frequency changers.

(iv) Radio Receivers:

1. Principles and operation of T.R.F. and super heterodyne receivers.

2. CW reception.

3. Receiver characteristics-sensitivity, selectivity, fidelity, adjacent channel and image interference, A.V.C. and squelch/circuits signal to noise ratio.

(v) Transmitter:

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

2. Basic knowledge about construction of Semiconductor based transmitters.

(vi) Radio Wave Propagation:

1. Basic knowledge of Electromagnetic Spectrum.

2. Wave length, frequency, frequency bands.

3. Nature and propagations of radio waves, ground and sky waves, space waves, skip distance, skip zone and fading.

(vii) Aerials: Common types of transmitting and receiving aerials.

(viii) Frequency Measurement: Measurement of frequency and use of simple frequency meters.

Section B: Radio Regulations

(a) Knowledge of :- (i) the Indian Wireless Telegraphs Rules, 1973.

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

(b) Knowledge of ITU Radio Regulations as relating to the operation of amateur stations with particular emphasis on the following:

Item	Provision of Radio Regulation (2008 edition)
Designation of Emission	Appendix I
Phonetic alphabets and figure code	Appendix 14
Nomenclature of the Frequency & Wavelength	Article 2
Frequency allocation for Amateur Services	Article 5
Interference, measures against interference & 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

(c) Standard Frequency and Time Signals Services in the World.

d) The following 'Q' codes and abbreviations shall have the same meaning as assigned to them in the Convention.

QRA, QRG, QRH, QRI, QRK, QRL, QRM, QRN, QRO, QRS, QRT, QRU, QRV, QRW, QRX, QRZ, QSA, QSB, QSL,QSO, QSU, QSV, QSW, QSX, QSY, QSZ, QTC, QTH, QTR, and QUM.

Abbreviations: AA, AB, AR, AS, C, CFM, CL, CQ, DE, K, NIL, OK, R, TU, VA, WA, WB.

Note:-

1. The written test will be of one hour duration. The maximum marks will be 100 and candidate must secure at least 40 % in each section and 50% in aggregate for a pass.

2. There will be no Morse test for Restricted Grade.

2.2. Amateur Station Operators' License (General) Examination

Part I - Written Test

Section A: Radio Theory and Practice

In addition to the syllabus prescribed for Amateur Station Operator's License (Restricted) examination, following items shall be included in the syllabus of Amateur Station Operators' license (General) examinations:

(i) Principles of Communications:

1. Elementary idea of analog and digital communication.
2. Need for modulation; Modulation- amplitude, frequency and pulse modulation.
3. Elementary idea about demodulation.

(ii) Alternating current:

1. Basic concepts on construction of transformers.
2. Definition of Transformer losses.
3. Transformer as a matching device

(iii) Semi Conductor devices and Transistors:

1. Elementary principles of conduction and construction;
2. Symbols and biasing methods.

(iv) Power Supplies:

1. Basic knowledge of half wave and full wave rectifiers.
2. Definition and application of Bridge rectifier, smoothing and regulating circuits.

(v) Transmitters and Receivers:

1. Elementary principles of transmission and reception of Facsimile and Television signals,

(vi) Propagation:

1. Characteristics of ionosphere and troposphere.
2. Properties of ionosphere layers.
3. Critical frequency and day / night frequencies.

(vii) Aerials:

1. Principles of radiation.
2. Aerials for different frequency bands including aerials for microwave,

(viii) Space Communications

1. Elementary principles of communication via satellites.

Section B: Radio Regulations

Same syllabus as prescribed for Amateur Station Operators' License (Restricted) examination.

The above written test will be of two hour duration. The maximum marks will be 100. A candidate must secure at least 50 % in each section and 60% in aggregate for a pass.

Part Il-Morse Code

Morse receiving: (Speed: 8 words per minute)

The test piece will consist of a plain language passage of 200 characters which may comprise of letters, figures. Test piece may also contain the following punctuations i.e. full stop; comma; semi colon; break-sign; hyphen and question mark. The average words shall contain five characters and each figure and punctuation will be counted as two characters. The test will be for five consecutive minutes at a speed of 8 words per minute. 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 more than one attempt in Morse reception and sending test; the test may be written in ink or pencil but must be legible. Over-writing will be treated as error. If any correction is required the candidate may struck the wrong character and write the correct above the character. More than 5 errors will disqualify a candidate. However ii a candidate receives without any error in any part of the passage continuously for one minute duration will be declared successful in the Morse reception test.

Morse sending: (Speed: 8 words per minute)

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

Note- A candidate shall have to pass both receiving and sending simultaneously.