

GOVERNMENT OF INDIA
MINISTRY OF COMMUNICATIONS
MONITORING ORGANIZATION

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NOTE: Question No 1 from each section is compulsory.
Grade I answer any 5 of the remaining questions - 2 Hours
Grade II answer any 2 of the remaining questions - 1 Hour

SECTION A

Q.1. Choose the correct answer (any 10)

FSK

- i) A3E indicates a) SSB b) AM-DSB voice c) FM Voice d)
- ii) Capacitance is measured in
a) Amperes b) watt c) Farad d) Coulombs
- iii) Frequency is a) cycles per second b) Kilo cycles per second c) Cycles per minute d) cycles per hour
- iv) Line of sight propagation is the mode of communication in a) LF b) HF c) MF d) VHF
- v) The wavelength of 300 MHz is in Meters is
a) 1 b) .1 c) 1.1 d) 0.01
- vi) 4th harmonic of 2.5 MHz is
a) 10 MHz b) 15 MHz c) 8 MHz d) 7.5 MHz
- vii) Squelch control is used to eliminate
a) static interference b) electrical disturbance
c) receiver noise d) unwanted carrier
- viii) Resonant frequency in a tuned circuit is equal to
a) $1/2\pi LC$ b) $1/2\pi\sqrt{LC}$ c) $2\pi\sqrt{LC}$ d) $2\pi\sqrt{L+C}$
- ix) Power dissipated in a 400 Ohm resistor at 1 Amp is
a) 40 Watts b) 400 KW c) 4 Watts d) 400 Watts
- x) The frequency of 40 Meter band in MHz is
a) 14 - 14.350 b) 7 - 7.1 c) 21 - 21.450 d) 15 -

15.400

- xi) Zener diode is used for a) Rectification b) Voltage regulation c) Current regulation d) Switching
- xii) The UHF range is a) 30 to 300 KHz b) 300 to 3000 KHz c) 3 to 30 GHz d) 300 to 3000 MHz

Q.2 Write short notes on any three a) Skip distance
b) AVC c) eddy currents d) Antenna matching

Q.3 Draw the circuit of a full wave bridge rectifier with and smoothing circuit and explain its function.

Q.4 a) Explain briefly FM and its advantages over AM
b) Explain briefly dipole aerial

Q.5 Draw the block diagram of a superhetrodyne receiver and explain the function of each stage briefly.

Q.6 Explain briefly primary cell and secondary cell and how do they differ ?

Q.7 State the color code of resistors

SECTION B

Q.1. Choose the correct answer (any 10)

- i) Indian amateurs can communicate with other amateurs in
a) All countries b) Countries permitted by ITU
c) Countries permitted by Indian Government
d) Countries permitted by Indian Amateur society
- ii) Grade II amateurs can communicate on 7 MHz in
a) A1 b) A3 c) F3 d) A3A
- iii) Lady amateurs are known as a) XL b) XYL c) YL d) LY
- iv) Minimum age to become an amateur is
a) 18 years b) 14 years c) 12 years d) 16 years
- v) All timing in the Log book should be in
a) IST b) UTC c) GMT d) Local time
- vi) Amateurs should preserve their log for a period of
a) 6 months b) 1 year c) 2 years d) 9 months from the date of the last entry
- vii) Q code to indicate time is a) QRG b) QRX c) QTR d) QSA
- viii) Test signal shall not be continued more than
a) 30 seconds b) 1 minute c) 2 minutes d) 3 minutes
- ix) In India the standard time signal is broadcast by
a) ISRO b) WPC c) OCS d) NPL
- x) PANPAN transmitted thrice indicates a) Distress
b) Emergency c) Urgency d) Distress and emergency
- xi) The broadcast of music is allowed in amateur service
a) on request b) when channel is free c) never
d) only for testing
- xii) The abbreviation VA means a) End of transmission
b) End of message c) End of working d) End of schedule

Q.2 State the conditions under which an amateur station can transmit third party messages ?

Q.3 Write the meaning of four of the following i) QRA
ii) QRL iii) QRX 1600 iv) QRM v) QSY

Q.4 What are the international distress frequencies and write a specimen form of a distress message in A3.

Q.5a. Explain the need for a callsign ? How are the callsigns for amateurs in India formed ?

5b. Who allots callsigns for amateurs in India ?

Q.6 On May 27 1986 Tuesday presume you had a contact Sri Vidyaprakash of Coimbatore on 14025 KHz signing VU2DVP at 2130 IST with good signal strength, tone and readability. Convey your particulars to him before closing down. Show the above contact in proper log form.

Q.7 What types of messages are the amateurs forbidden to transmit ?

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GRADE - II QUESTION PAPER
TIME ALLOWED ONE HOUR
MAXIMUM MARKS 100

NOTE: Question No 1 from each section is compulsory. Answer any two questions from each section in addition to compulsory question No 1

SECTION A

Q.1. Choose the correct answer, Any ten. (compulsory)

- i) Plate current in a diode flows only when the plate is
a) Negative with respect to cathode b) positive with respect to cathode c) when plate is at a lower voltage than cathode
d) both at same potential
 - ii) Zener Diodes are used for a) Rectification b) Detection
c) voltage regulation d) none of these
 - iii) 3 resistors of 2,3 & 4 ohms are connected in series. The voltage across the circuit is 9 V , the current drawn by 3 ohms resistor is a) 1.5 Amps b) 27 Amps c) 1 Amp d) 3 Amps
 - iv) A superhetrodyne receiver is tuned to 555 KHz and its local oscillator at 1010 KHz . The image frequency will be a) 1565 KHz
b) 455 KHz c) 1465 KHz d) none of these
 - v) 3 to 30 MHz band is known as a) MF b) LF c) VHF d) HF
 - vi) The wavelength of a broadcast station at 1000 KHz is
a) 30 Meters b) 300 Meters c) 0.3 Meteors d) none of these
 - vii) The core of power supply transformer is laminated to
a) decrease impedance b) increase impedance c) decrease eddy current losses d) none of these
 - viii) In a resonant circuit
a) $X_L = X_C$ b) $X_L > X_C$ c) $X_L < X_C$ d) none of these
 - ix) When frequency of a carrier is varied according to modulation the result is a) frequency modulation b) amplitude modulation
c) product detection d) none of these
 - x) The phase relationship between the input and output of a common emitter circuit in degrees is a) 90 b) 180 c) 270 d) 0
 - xi) The quartz crystal oscillator is known for its
a) linearity b) stability c) high output d) flexibility
 - xii) The effect of interelectrode capacitance of a triode is more predominant at a) HF b) VHF c) LF d) none of these
- Q.2 Draw the block diagram of a superhetrodyne receiver and explain briefly the function of each stage.
- Q.3 Draw the circuit of a full wave rectifier and explain briefly its working.
- Q.4 Write short notes on any three of the following
a) demodulation b) AVC c) Microphones d) Harmonic generators
- Q.5 a) What are the colour codes for 100 Ohms, 470 K Ohms and 4.7 MOhms with 5% tolerance
- b) Is it possible to use a Ground plane antenna on HF communication. Justify your answer.

SECTION B

Q 1. Choose the correct answer, Any ten. (compulsory)

- i) Swl's are permitted to transmit in the frequency band of
a) 7-7.1 MHz b) 3.89-3.9 MHz c) 144-146 MHz d) none of these
 - ii) The amateur license is renewed by a) P & T b) Ministry of communication c) monitoring stations d) none of these
 - iii) A3E emission is a) DSB b) SSB c) CW d) FSK
 - iv) Q code to indicate the location of a station is
a) QTL b) QTH c) QTN d) None of these
 - v) Amateur station on a ship can contact another amateur on land on a frequency authorized to a) the ship b) amateur stations c) by the ministry of communication d) ships calling frequency
 - vi) SOS transmitted three times indicates
a) urgency b) distress c) safety d) none of these
 - vii) All timings in logbook should be in a) IST b) GMT c) UTC
 - viii) Amateurs are required to preserve their log for a period of ---- from the date of last entry a) 1 year b) 2 year
c) 6 months d) permanently
 - ix) The callsign VU2VX is authorized to a) Gr I amateur b) Gr II amateur c) Advanced amateur d) not authorized
 - x) Amateurs are forbidden to transmit about
a) Equipments b) weather c) Antennas d) Third party messages
 - xi) Standard time and frequency is transmitted on
a) 7050 KHz b) 14050 KHz c) 21050 KHz d) 15000 KHz
 - xii) Test signals are not to be transmitted for more than
a) 10 minutes b) 5 minutes c) 1 minute d) none of these
- Q.2 What are the frequency bands, power and emissions permitted to Gr II amateurs
- Q.3a Give 'Q' codes for the following expressions. answer any four i) Your frequency varies ii) what is the name of the station ? iii) please change frequency to 14050 KHz iv) who is calling me ? v) please increase power
- 3b Give the meaning of any four
i) QRS ? ii) QRX 2000 iii) RST 599 iv) QRG 7051 KHz v) DE
- Q.4 Write short notes on any three a) Test signals b) secrecy of correspondence c) Amateur service d) Amateur Log Book
- Q.5a What do you understand by the term 'inspection' ?
5b What is the license fee for grade II and restricted amateurs ? What is the surcharge for late renewal ?
5c Explain the procedure to obtain a duplicate license and who issues a duplicate license ?

Answer any 3 questions from each section.

SECTION A

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Q.No 1. Answer in brief any two :-

- (a) What is the difference between VFO and BFO
- (b) What are the advantages and disadvantages of FM over AM transmission
- (c) What is the difference between intermediate and image frequency

Q.No.2

- (a) What is the peak value of mains voltage of 220 V AC
- (b) Define Ohms law ?
- (c) What do you mean by the directivity of an antenna

Q.No.3

- (a) What is the time constant of 2 uF capacitor and 250 K Ohm resistor ?
- (b) Define standing wave ratio.

Q.No.4 Write short notes on any three :- (a) Skip zone

- (b) Squelch control (c) Zener diode (d) Loudspeaker

Q.No.5 Draw the block diagram of a transmitter and explain briefly the function of each stage.

SECTION B

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Q.No 1. Write short notes on any three :-

- (a) Secrecy of correspondence (b) test signals
- (c) QSL cards (d) General call to all stations (F3E).

Q.No.2.

- (a) What types of messages can be exchanged among amateur stations
- (b) What precautions are taken to avoid interference.

Q.No.3.

- (a) State the frequencies, band and power authorized to restricted amateurs ? (b) What documents are to be kept in an amateur station

Q.No.4.

- (a) How is a duplicate copy of the amateur license obtained ?
- (b) What are the penalties of violation of Indian Wireless telegraph (amateur service) Rules 1978.

Q.No.5.

- Draw the specimen form of the Equipment register with two entries

OR

Describe six important conditions under which the amateur station equipment is to be kept.

Solve any three from each section ...

SECTION A

Q.No 1. Draw the block diagram of a superhet communication receiver and explain briefly the function of each stage.

Q.No.2. Write short notes on any three :- (a) G.P Antenna (b) FM (c) Capacitor microphone (d) skip distance

Q.No.3. (a) Define Ohms law. (b) What series dropping resistor is required if five 6.3 V and five 12.6 V filaments are connected to 110 V and draw a current of 205 mA ?

Q.No.4.(a) What is the value of the resistor with the following colors (i) Black red white gold (ii) red green yellow silver (iii) orange brown red gold (b) What is a crystal oscillator and why is it preferred to a LC oscillator ?

Q.No.5. Draw the schematic diagram of a full wave rectifier with smoothing circuits and explain how it works.

SECTION B

Q.No 1. (a) Write the meaning of any FOUR of the following :-

- (i) DE (ii) QRL IMI (iii) QRM 4 (iv) QRX 1600 (v) QSY 7020
- (b) Give the Q code or abbreviation used for the following expressions:- ANY FOUR (i) send slow (ii) what is your location (iii) received correctly (iv) weather (v) calling any station

Q.No.2. What is the importance of a callsign ? How callsigns of Indian amateurs are formed.

Q.No.3. (a) What types of messages are permitted to be passed by Amateurs ? (b) State the procedure to make a general call to all stations in radio telephony.

Q.No.4. Write short notes on any four of the following :-

- (a) QSL cards (b) Distress (c) test signals (d) Secrecy of correspondence (e) Amateur service (f) categories of license

Q.No.5. State the frequency, power and emissions authorized to restricted grade amateurs ?

GRADE - II QUESTION PAPER TIME ALLOWED ONE HOUR
RESTRICTED : NOV 12, 1990 MAXIMUM MARKS 100

Answer any 3 questions from each section.

SECTION A

- Q No 1. State Ohm's Law. What is the effective value of capacitance of two capacitors of 10 pf. connected in parallel.
What is the color code of a resistance of 20 k ohms 10% tolerance.
2. Draw the block diagram of a Communication Receiver. what is the necessity of a BFO.
3. What do you know about skip distance and fading
What is the difference in mode of propagation between HF and VHF
4. Draw the block diagram of a low power transmitter for transmitting speech.
5. Describe the aerial you are going to use for transmitting on 2 metres and 7 Mhz.

SECTION B

1. Draw the specimen form of Log you are supposed to maintain
2. (i) Expand the following: QRM? QRU QTC2 VA AR
(ii) Write the phonetics of -K X Y M 2 6.
3. What are the documents to be kept in a Amateur Station
4. Write briefly (i) Precautions against interference
(ii) Secrecy of correspondence (iii) Call and reply procedure.

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GRADE - II QUESTION PAPER TIME ALLOWED ONE HOUR
RESTRICTED : DEC 10, 1990 MAXIMUM MARKS 100

Answer any 3 questions from each section.

SECTION 'A'

1. Answer any five :-
(a) Draw the symbol of a PNP and NPN transistor
(b) What is the formula for determining the frequency in a resonant circuit ?
(c) What is the value of a resistor having red red orange color combination.
(d) What is the total capacitance of 3,4, and 5 μ F capacitors in parallel.
(e) What is the wavelength of a frequency of 150 MHz ?
(f) Define selectivity of a receiver.
2. Draw the block diagram of a Superhet Receiver. Explain briefly the functions of each stage.
3. What are the advantages and disadvantages of FM over AM
4. Write short notes on any three :-
(a) Crystal oscillator (b) Microphone (c) signal to noise ratio (d) AVC (e) Ground plane antenna.
5. (a) Describe a dipole antenna
(b) What are the functions of a filter circuit and a zener diode in a rectifier circuit.

SECTION 'B'

1. Answer any five:-
(a) What is the meaning of F3E emission ?
(b) What is meant by UR RST 599 ?
(c) At what intervals should a transmitting station identify itself ?
(d) What is the retention period of a amateur logbook ?
(e) What is meant by CQ DX ?
(f) What are the phonetics for VU3ABC
2. What are frequency bands, emission and power authorized to restricted grade amateurs.
3. (a) How to general call to all amateurs in radio telephony ?
(b) What is secrecy of correspondence ?
4. (a) What types of messages are permitted between amateur stations ?
(b) What are test signals ? What is the procedure for the transmission of test signals ?
5. Write short notes on any three :-
(a) Amateur station
(b) Penalties for breach of amateur service rules.
(c) Harmful interference
(d) Equipment register

GRADE - II QUESTION PAPER TIME ALLOWED ONE HOUR
RESTRICTED : DEC 26, 1990 MAXIMUM MARKS 100

Answer any 3 questions from each section.

SECTION 'A'

1. What is the difference between a full wave and half wave rectifier ? Draw a diagram of either of them.
2. (a) Define Ohm's law (b) Explain the color code for resistance. How will a resistance of 46,000 Ohms 5% tolerance color coded ?
3. (a) Explain briefly SSB transmission & its advantages over DSB. (b) An Ideal transformer has a primary turns of 4000 and 800. When primary voltage is 230 Volts, What is the Secondary voltage ?
4. (a) What do you understand by Selectivity, Selectivity and Fidelity as applied to a communication receiver ?
5. Draw a block diagram of your intended transmitter and explain briefly the function of each stage.

SECTION 'B'

1. Answer any FOUR:-
(a) Define amateur station.
(b) What is the frequency band for restricted amateur service
(c) What is the Q code for "who is calling me ?"
(d) What is the emission code for amplitude modulated radio-telephony ?
(e) What are phonetics for JA5CQS
2. Explain the procedure by which an amateur station establishes contact with another amateur station on R/T ?
3. What are the different columns of the log book maintained by an amateur ? why is it necessary to maintain a log ?
4. (a) What types of messages can be exchanged among amateur stations ?
(b) What precautions would you take for making test signals ?
- 5 (a) What is secrecy of correspondence ?
(b) How a duplicate of an amateur license is obtained ?