OFFICE OF THE DIRECTOR GENERAL OF POLICE RAJASTHAN
JAIPUR

NO. 5284 Police Head Quarters (Admn), Pro, L & Q DATE: 06.11.2020
1. A. D. G. P.
2. I. G. P.
3. S. P./Addl. S. P.
4. O. A./ S. O.
5. R. No. 3266 Date 10-11-20

STANDING ORDER NO. 23/2020

In pursuance of Rule 26(3) and 29(2) of Rajasthan Police Subordinate Service Rules, 1989 read with Schedule-I and Section –III thereto and in supersession of Standing order no.15/91, 25/91 and all previous Standing orders and instructions related to Qualifying examinations for all the posts mentioned below as per gazette notification of Government of Rajasthan on date 05 December ,2019 , the following syllabi and rules are prescribed for all qualifying examination of the Directorate of Police Telecommunication, Rajasthan.

1. QUALIFYING EXAMINATION FOR POST OF INSPECTOR :-

1. ELIGIBILITY:- Substantive Sub Inspector having passed Grade First Technical course examination of Directorate of Police Telecommunication, Rajasthan and 5 years experience as Sub Inspector .

2. SYLLABUS: - Syllabus of Qualifying Examination is at Appendix-'A'

2 QUALIFYING EXAMINATION FOR POST OF SUB INSPECTOR:

1. ELIGIBILITY:- Substantive Assistant Sub Inspector having passed Grade Second Technical course examination of Directorate of Police Telecommunication, Rajasthan and 2 years experience as Assistant Sub Inspector .

2. SYLLABUS: - Syllabus of Qualifying Examination is at Appendix-'B'

3 QUALIFYING EXAMINATION FOR POST OF A.S.I :-

1. ELIGIBILITY:- Substantive Head constable having passed Grade Third Technical course examination of Directorate of Police Telecommunication, Rajasthan and 3 years experience as Head Constable .

2. SYLLABUS: - Syllabus of Qualifying Examination is at Appendix-'C'

4 QUALIFYING EXAMINATION FOR POST OF HEAD CONST. :-

1. ELIGIBILITY:- Substantive Constable having passed Grade Third Technical course examination of Directorate of Police Telecommunication, Rajasthan and 2 years experience as Constable .

2. SYLLABUS: - Syllabus of Qualifying Examination is at Appendix-'D'

CONSTITUTION OF BOARDS:-

All boards shall be constituted by the Director General cum Inspector General of Police .
The board shall be constituted of :-

Qualifying Examination for the post of Inspector :–

(a) Inspector General of Police ... *Chairman*

(b) Dy. Inspector General of Police ... *Member*

(c) One Technical expert ... *Member*

(d) Director , Police Tele-communication ... *Member Secretary*

Qualifying Examination for the post of Sub Inspector :–

(a) Inspector General of Police ... *Chairman*

(b) Dy. Inspector General of Police ... *Member*

(c) One Technical expert ... *Member*

(d) Director , Police Tele-communication ... *Member Secretary*

Qualifying Examination for the post of Assistant Sub Inspector: –

(a) Dy. Inspector General of Police ... *Chairman*

(b) Director , Police Telecommunication ... *Member*

(c) One Technical expert ... *Member*

(d) One Technical expert ... *Member Secretary*

Qualifying Examination for the post of Head Constable :–

(a) Dy. Inspector General of Police ... *Chairman*

(b) Director , Police Telecommunication ... *Member*

(c) One Technical expert ... *Member*

(d) One Technical expert ... *Member Secretary*

The decision of the Board will be final and no correspondence will be entertained from the examinee regarding marks or other details.

5/11/20

(M. L. Lather)
Director General of Police,
Rajasthan, Jaipur

Copy to :
1. Addl. Director General of Police , Training Rajasthan , Jaipur.
2. Addl. Director General (Recruitment and Promotion board), Raj, Jaipur.
3. Director I & II, Police Telecommunication Rajasthan, Jaipur
4. Supdt. of Police I & II, Police Telecommunication Rajasthan , Jaipur.
5. Addl. Supdt. of Police (Training /Jaipur City/ Admn. & HQ) PTC. Jaipur.
6. All Dy. Supdt. of Police Telecommunication , Rajasthan.
7. All Districts Incharge Police Telecommunication Rajasthan, Jaipur .
8. Administrative Officer, Police Telecommunication Rajasthan, Jaipur .

4/11/2020

(Nina Singh)
Addl. Director General of Police
(Training)
Rajasthan, Jaipur

Scheme of Examination

Final examination shall be conducted for the following papers as per prescribed time table decided by the constituted board .

A. WRITTEN TEST		----------	**200 MARKS**
1	THEORY PAPER I	----------	50 MARKS
2	THEORY PAPER II	----------	50 MARKS
3	THEORY PAPER III	----------	50 MARKS
4	THEORY PAPER IV	----------	50 MARKS
B. PRACTICALS & OUTDOOR		----------	**150 MARKS**
1	PRACTICAL I	----------	50 MARKS
2	PRACTICAL II	----------	40 MARKS
3	PRACTICAL III	----------	50 MARKS
4	PARADE/OUTDOOR	----------	10 MARKS
C. RECORD AND INTERVIEW		----------	**100 MARKS**
A SERVICE RECORD		----------	65 MARKS
B INTERVIEW		---------	35 MARKS

A . SERVICE RECORD :

Marks for service record is further divided as under

1 Rewards and punishment	---------	35 MARKS
2 Annual remarks in ACR/ APA reports	---------	25 MARKS
3 Education and Training	---------	05 MARKS

1 Rewards and Punishments : 35 Marks

a. Rewards ----- 20 marks

Marks allotted for various types of rewards will be as under :

1. PPM for gallantry	---- 8 Marks
2 .BAR to PPM for gallantry	---- 4 Marks
3 . IPM for Gallantry	---- 6 Marks
4 . BAR to IPM for Gallantry	---- 3 Marks
5 . Distinguished services medal	---- 8 marks

6 . Meritorious services medal ------- 6 marks

7 . Asadharan karya puruskar -------- 4 Marks

8 . Sarvottam Seva -------- 4 Marks

9 . Ati Uttam Seva ------- 3 Marks

10 . Uttam Seva -------- 2 Marks

(b) Commendation Certificate /Appreciation letter with Cash reward by :

1. Government / D.G.P/Addl. D.G.P. -------- 3 Marks each

2. I.G.P /Dy. I.G.P. ------ 2 Marks each

3. S.P ------ 1 Marks each

(c) Commendation Certificate /Appreciation letter with Cash reward by :

1. Government / D.G.P/Addl. D.G.P. -------- 2 Marks each

2. I.G.P /Dy. I.G.P. ------ 1 Marks each

3. S.P ------ 1 Marks each

PUNISHMENT : **15 Marks**

Marks deducted for various types of punishments will be as under

1 Major punishment ------ 3 Marks each

2 Stoppage of grade increment with future effect ------ 2 Marks each

3 Stoppage of grade increment without future effect ------ 1 Marks each

4 Censure ------ ½ Marks each

5 Warning ------- NIL

Note:

1 Out of 35 marks allotted for rewards and punishments , 20 and 15 marks will be earmarked for rewards and punishments respectively . The calculation of marks for rewards will be on the basis of 0 to 20 i.e marks for each good entry of the reward will be added upto the maximum of 20 marks. For bad entries of punishments ,the calculations will be on the basis of 15 to 0 i.e if the candidate does not have any punishment on his record , he will be awarded maximum 15 marks . Marks for each bad entry will be deducted from this total of 15 marks . The total marks

secured for rewards out of 20 plus the balance marks out of 15 marks for punishment will be number of marks the candidate will secure out of 35 marks under this head .

2 Rewards and punishments of candidate shall be entertained only uptil 31 March of the year for which qualifying examination is being held . Rewards and punishments granted after 31 march of the year for which qualifying examination shall not be considered by the board .

2 Annual Remarks in ACRs/APARs for the last five years **25 Marks**

The board , after overall assessment of an ACR/APA records ,will classify the remarks for each year ,in one of the following categories and assign marks accordingly:-

a) Outstanding (Excellent)	5 Marks
b) Above average (Very Good)	4 Marks
c) Good	3 Marks
d) Average (satisfactory)	2 Marks
e) Below Average	NIL

3 Education and Training **5 Marks**

A. Education **3 Marks**

1 . Senior Secondary	NIL
2 Graduation	2 Marks
3 Post Graduation	3 Marks

B. Training **2 Marks**

1 Training at PTC Training Centre	1 Marks
2 Trainings at CPRTI/NCRB/ Other Institutes	1 Marks

B Interview :- **35 Marks**

In interviewing candidates , regard shall be had to the following factors

1 Intelligence, tacts and energy

2 Technical and general knowledge including education ,training and general awareness.

3 Personality (Including turn out ,address and behaviour) and character
4 Experience and efficiency .
5 Physical fitness and capacity to discharge duties of the post to which promotion is to be made including aptitude to undertake extensive tours.
6 Practical knowledge of communication systems and procedure.
7 Integrity

RESULT CRITERION

TOTAL MARKS ---------- 450 MARKS

1 Passing marks in Theory papers in aggregate 40 % required to pass Written test and appear in practicals ------ 80 Marks

2 Passing marks in Practicals and Parade/Outdoor in aggregate 40% required to pass Practicals and Parade /Outdoor ------ 60 Marks

3 Passing marks in Written and Practicals in aggregate 45 % required to qualify in Part I of Examination and qualify for interview --- 157.5 Marks

4 Passing marks in Part II only shall be -------- 45 Marks

5 To qualify in both Part I and Part II candidate shall fulfil above four criterion and shall secure in total --- 225 Marks

6 Candidates securing total marks 225 or above shall be shortlisted by board on the basis of total vacant seats .

APPENDIX : A

Syllabus of Qualifying Examination for the post of Police Inspector, Police Telecommunication,Rajasthan

Paper I : AC Theory

Unit	Contents
Unit 1.1 Basic Electricity	• AC Theory: Root Mean Square value, Average value, Significance of Frequency, Time period, Wavelength, Lagging and Leading • AC Circuits: Properties of L, R & C in DC & AC circuits; LC, RC, RLC Circuits:- Voltage and current relationship. Resonance (Series and Parallel), condition of Resonance, Q factor, Bandwidth • Electromagnetism: Faraday's Law, Lenz's law
Unit 1.2 Transformer	• Transformer: Ideal Transformer – Construction, Working Principle, Ratio, Types, Properties and uses of Transformers. Losses in Transformer: core loss, Copper Loss
Unit 1.3 Electronic Devices and Circuits	• Semiconductor Devices : Diodes, Characteristics of Diodes (Forward and Reverse characteristics) , Zener Diode, Tunnel diode, LED, LCD • Application of Diode as Rectifier: Half Wave, Full Wave, Bridge Rectifier, Various parameters of Rectifiers: Peak Inverse Voltage, Efficiency, Ripple Factor, Zener diode as voltage regulator • Transistor: Types of Transistors, CE, CB & CC configurations, Biasing Techniques, Thermal runaway, Optoelectronic devices: LED, OPTO-coupler, Photo Voltaic Cell etc. • Power electronics: FET, MOSFET, UJT, SCR, Diac, Triac and their applications
Unit 1.4 Power Sources	• Types of Batteries, Theory of Lead acid Batteries, Ampere Hour Capacity, Dry batteries, Operation of Battery charger and Battery tester • Operation of AC/DC Generators, Common faults and their remedies
Unit 1.5 Power Supplies	• Types of Power supplies, Short circuit & overvoltage protection circuits, SMPS • Solar Backup Power system • Concept of UPS and Inverter
Unit 1.6 Network Analysis	• Concept of Circuits, Different Types Of Power Sources, Current source, Voltage Source, Maximum Power Transfer Theorem, Thevenin theorem ,Norton Theorem
Unit 1.7 Mechanical and Electrical Engineering	• Idea of mechanical workshop machines • Idea of Towers and Masts: Foundation, Galvanization, Erection of Towers/Mast • Antenna mounting on Towers and Masts • Earthing and Lightning arrestors • Basic idea of wiring in domestic building: switches, MCB, ELCB and boards, identification of faults in wiring. • Calculation of load of a premise • Working principle of Public address system,Telephone,EPABX

Paper II : Radio Communication

Unit	Contents
Unit 2.1 Applications of Transistors	• Feedback (Negative and Positive) • Classification of Amplifiers: Voltage and Power amplifiers, AF and RF amplifiers, Complimentary symmetry and Push Pull amplifier • Operational Amplifiers and its uses • Oscillators: Barkhusen criteria , LC and RC Oscillator, Synthesisers, Frequency stability factors • Clipper & Clamper circuits, Astable, Monostable, BiStable Multi vibrator
Unit 2.2 Modulation	• Comparison between analog and digital communication systems, Bit, Baud, Bps definition, Band width, Information capacity, shanon limit • Digital modulation techniques, Pulse modulation (PWM, PAM), PCM, ASK, FSK, PSK and other complex modulation techniques, PCM system block diagram. • Delta modulation and adaptive delta modulation, sample and hold circuit. • Multi access Techniques :FDMA ,TDMA , Advantage and Disadvantages of TDMA over FDMA •
Unit 2.3 Wave Propag ation	• Propagation of Radio Waves (Ground, Sky , Space) • Duct propagation ,Troposcattering . • Atmospheric effect: Diurnal, Seasonal, Sun spot activities, Fading and its remedies • Basics of Microwave, Waveguides, Advantage and application of Microwaves,
Unit 2.4 Transmitters and Receivers	• Study of AM, FM and SSB Transmitters (Block diagrams) with specific reference to Modulators , Buffer , Frequency Multiplier , Pre-emphasis circuits and Power Amplifier • Protective circuits in transmitters • Study of double Super heterodyne receivers(Block diagram) with specific reference to Choice of IF , Image and Adjacent channel interference ,Squelch circuits, Filters , Spurious generation and their remedies , Am and FM detectors circuits , Delayed AGC, De-Emphasis circuit • Receiver parameters: Sensitivity, Selectivity, Fidelity, Image & IF rejection,
Unit 2.5 Antennas and Transmission Lines	• Principle of fiber communication and structure of fiber cable, losses/light bands, total internal reflection. • Antennas: Introduction, Radiation of energy from antenna, Antenna terminologies(Directivity, Gain, Beamwidth, Radiation resistance, Radiation patterns) • Types of Antennas: Microwave antennas, Parabolic antennas, Antenna Arrays
Unit 2.6 Communicat ion Systems	• Satellite communication: Need of Space communication , Satellite orbits(LEO,MEO,GEO,GSO) , Plnetary laws of motion ,Concept of Apogee and Perigee , up/down converter, transponder, losses, DVBS, • POLNET • Digital communication: Radio Trunking, Digital Mobile Radios • Designing of Communication networks and Repeaters • Data Communication Systems : Email Messaging system

Paper III:- Radio Procedure

Unit	Contents
Unit 3.1 Radio Procedure	• Complete wireless Telegraphy and Radio Telephony Procedure a given in Radio Procedure book issued by DCPW, New Delhi • Signal security instructions and use of code signs • Grid discipline • Handing/Taking over by duty operator • Duties of Radio operator • Procedure of handling of classified messages
Unit 3.2 Radio Security	• Radio communication security: Breaches and their preventive measures • PWCC, Encryption and Decryption, Handling of cipher documents and messages

Paper IV: Information Technology and Computer

Unit	Contents
Unit 4.1 Digital Electronics	• Number System: Binary, Octal, Decimal, Hexadecimal and their conversion , De- morgan theorem ,Boolean Algebra • Logic Gates: Basic gates, Universal gates and Ex-Or Gates • Arithmetic circuits: Half adder and Full Adder , Half subtractor , Flip Flops (RS, JK, D & T flip flop) • Various codes : BCD codes , Gray codes , Excess – 3 codes , ASCII codes • A/D converter, D/A converters • Multiplexer and De Multiplexer • Introduction of microprocessor, Architecture of 8085(pin diagram).
Unit 4.2 Basics of Computer	• Basic knowledge of computer architecture • Hardware: Input & output devices, Storage (Primary & Secondary) • Software: System software (Operating systems like windows, Linux, android, iOS etc), Application Software • MS Office: Word, Excel, Power Point, Access • Virus: Concept, Types and preventive measures(Anti Viruses)
Unit 4.3 Mobiles	Overview of generation of mobile, cellular fundamentals, GSM mobile system architecture. Different communication Generations (2G, 3G, 4G, 5G etc.)
Unit 4.4 Computer Networking	• Introduction of OSI Model • Networking: Topology, Types of networking • Basic idea of IP addressing ,Static and Dynamic IP addresses ,Concept of subnetting and masking • Basic idea of Network security, Wi-Fi, Hotspot, Blue tooth • Networking components: Server, Switches, Hub, Router, Cables, Connectors
Unit 4.5 Cyber security	• Cyber crimes: Definition, Types, Preventive measures • Basic Idea of IT Act • Basic Idea of IT Acts • Cyber crimes: Definition, Types, Preventive measures • Basic idea of latest trends in cyber and economic crime. • Basic idea of different forensic tools. • Basic idea of incident response in cyber crime. • Basic idea of Proxy servers , email spoofing ,masking of IP addresses
Unit 4.6 IT Applications in Police	• CCTNS: Basic concept and scope of CCTNS, • Various Mobile Apps used in Police. • CCTV Surveillance: Concept, Different types of cameras and their uses, CCTV network

Practical : I Technical skills

Unit	Contents
Unit 5.1 Measuring Instruments	• Measurement of AC/DC voltage and current, Continuity of cables etc. • Study of functions of AF/RF Power Meter, Signal Generators, Frequency counters, CRO/DSO, SWR Meter • Radio Test Set, Battery Analyzer, Vector Analyzer and their measurements • Block Diagram and various measurement of Transreceiver like Sensitivity, Selectivity, Image/IF rejection, Channel frequency, RF Power • Study of various Experimental Training Boards • Programming of Transreceivers • Repairing of Accessories like Hand mike, Co-axial cable, Antenna lead, Battery Lead, Loudspeaker and power cables. Faults finding in Transreceivers
Unit 5.2 Fabrication	• Use of Soldering iron/Station • Fabrication of Zener Voltage regulator, Half wave & Full wave rectifiers • Design and fabricate two stage RC coupled amplifier • Design and fabricate Mono-stable, Bi-stable and Astable multivibrator • Fabrication of Logic gates, Half adder, Half Subtractor and Full Adder
Unit 5.3 Mechanical Skills	Wiring on Electric Circuit Board by using switches, holders, plugs, fan regulators, fuse etc. Study of wiring diagram of Tube light, Ceiling Fan, LED bulb Tubelight etc. Knowing symptoms of faults and remedies Identifying Reasons of power failure , check out and take remedial measures Changeover process during failure and using alternative source ex. P.G. Earthing techniques and measurement of earth resistance Installation of Static/Mobile stations. Precautions and standards to be followed during installation of static station and mobile station .Check list of equipments before installation of Static/Mobile wireless station Basic idea of Towers/Mast Installation: Foundation, Erection, Guys and maintenance of towers Functions and working of Mechanical Machines like Drill/Welding/ Lathe machine

Practical II : Radio Procedure

Unit	Contents
Unit 6.1 Morse Receiving & Sending	• Receiving:- 11 Messages (06 plane messages of 125 characters each & 05 crypto messages of 90 characters each. All 11 messages are to be received in 15 minutes with an accuracy of 97.5 percent. 02 marks shall be deducted for each mistake. 30 mistakes are allowed. Pass marks will be 40percent. • Sending:- Sending of 11 messages of 1200 characters in 15 minutes, the corrected errors shall not exceed 15, for each corrected error 04 marks shall be deducted. Sending wrong formation of characters shall be treated as equal to one corrected error & marks shall be deducted accordingly. A maximum of 6 uncorrected error shall be allowed. 10 marks shall be deducted for each such uncorrected error. 5 discrepancies shall be treated equal to one corrected error. Pass marks will be 40 percent.
Unit 6.2 Cipher Skills	• Handling of Cipher Messages/Documents • Encryption/Decryption of cipher messages

Practical III- IT Applications

Unit	Contents
Unit 7.1 Hardware and Software Applications	• Identification of Various Parts Of Computer and Assembling Of Desktop Computer • MS Word Tools: Table, Mail merging, Track change, Macro, different types of formatting. • MS Excel: Insert, Formulas, Review, Data • MS Power point: Slide design, Animations, Slide Show, View • MS Access: Table , Form design, Queries, Reports • Basic idea of Programming languages like HTML, C++
Unit 7.2 Networking and IT Applications	• Making LAN cable: straight and cross cable and their utility with computers • Internet sharing through LAN , Wi Fi ,hotspot , Networking of computers , email management , file sharing through FTP , Teamviewer and other applications • Configuration of IP addresses in computer/IP phones • Familiarization and study of IT applications in Police • POLNET and e-messaging system ,Video conferencing : Software and Hardware based VC

APPENDIX : B

Syllabus of Qualifying Examination for the post of Police Sub Inspector ,Police Telecommunications, Rajasthan

Paper I: AC Theory

Unit	Contents
Unit 1.1 Basic Electricity	• AC Theory: Root Mean Square value, Average value, Significance of Frequency, Time period, Wavelength, Lagging and Leading, • AC Circuits: Properties of L, R & C in DC & AC circuits; LC, RC, RLC Circuits;- Voltage and current relationship. Resonance (Series and Parallel), condition of Resonance, Q factor, Bandwidth. • Electromagnetism: Faraday Law, Lenz law
Unit 1.2 Transformer	• Transformer: Ideal Transformer – Construction, Working Principle, Ratio, Types, Properties and uses of Transformers. Losses in Transformer: core loss, Copper Loss
Unit 1.3 Electronic Devices and Circuits	• Zener Diode, Tunnel diode, LED, LCD • Transistor: Types of Transistors, CE, CB & CC configurations, Biasing Techniques, Thermal runaway, Optoelectronic devices: LED, OPTO-coupler, Photo Voltaic Cell etc. • Power electronics: FET, MOSFET, UJT, SCR, Diac, Triac and their applications
Unit 1.4 Power Sources	• Types of Batteries, Theory of Lead acid Batteries, Ampere Hour Capacity, Dry batteries, Operation of Battery charger and Battery tester. • Operation of AC/DC Generators, Common faults and their remedies
Unit 1.5 Power Supplies	• Types of Power supplies, Short circuit & overvoltage protection circuits, SMPS • Solar Backup Power system • Concept of UPS and Inverter
Unit 1.6 Network Analysis	• Concept of Circuits, Different Types Of Power Sources, Current source, Voltage Source, Maximum Power Transfer Theorem, Thevenin theorem ,Norton Theorem

Paper II: Radio Communication

Unit	Contents
Unit 2.1 Applications of Transistors	• Feedback (Negative and Positive) • Classification of Amplifiers: Voltage and Power amplifiers, AF and RF amplifiers, Complimentary symmetry and Push Pull amplifier • Oscillators: Barkhusen criteria , LC and RC Oscillator, Synthesisers, Frequency stability factors • Wave shaping circuits :Astable ,Monostable, BiStable Multi vibrator
Unit 2.2 Modulation	• Comparison between analog and digital communication systems, Bit, Baud, Bps definition, Band width, Information capacity, shanon limit • Digital modulation techniques, Pulse modulation(PWM, PAM), PCM, ASK, FSK, PSK and other complex modulation techniques, PCM system block diagram. • Delta modulation and adaptive delta modulation, sample and hold circuit. • Multi access Techniques :FDMA ,TDMA , Advantage and Disadvantages of TDMA over FDMA •
Unit 2.3 Wave Propagation	• Introduction of ElectroMagnetic waves, Propagation of Radio Waves (Ground, Sky , Space) • Duct propagation ,Troposcattering . • Atmospheric effect: Diurnal, Seasonal, Sun spot activities,Fading and its remedies • Basics of Microwave, Waveguides, Advantage and application of Microwaves,
Unit 2.4 Transmittersand Receivers	• Study of AM, FM and SSB Transmitters (Block diagrams) with specific reference to Modulators , Buffer , Frequency Multiplier , Pre-emphasis circuits and Power Amplifier • Protective circuits in transmitters • Study of double Super heterodyne receivers(Block diagram) with specific reference to Choice of IF , Image and Adjacent channel interference ,Squelch circuits, Filters , Spurious generation and their remedies , Am and FM detectors circuits , Delayed AGC, De-Emphasis circuit • Receiver parameters: Sensitivity, Selectivity, Fidelity, Image & IF rejection,
Unit 2.5 Antennas and Transmission Lines	• Introduction and types of Transmission lines, Characteristic Impedance, SWR and losses in transmission lines, Matching methods • Principle of fiber communication and structure of fiber cable, losses/light bands, total internal reflection. • Antennas: Introduction, Radiation of energy from antenna, Antenna terminologies(Directivity, Gain, Beamwidth, Radiation resistance, Radiation patterns) • Types of Antennas: Dipole, GP Antenna, Whip Antenna, Microwave antennas, Antenna Arrays
Unit 2.6 Types of Communication Systems	• Satellite communication: Need of Space communication , Satellite orbits(LEO,MEO,GEO,GSO) , Planetary laws of motion ,Concept of Apogee and Perigee , up/down converter, transponder, losses, DVBS, • POLNET • Voice Communication Networks : HF, VHF, UHF(Radio Trunking), Digital Communication, • Basics of Designing of Communication networks and Repeaters , • Data Communication Systems : Email Messaging system •

Paper III : Radio Procedure

Unit	Contents
Unit 3.1 Radio Procedure	• Complete wireless Telegraphy and Radio Telephony Procedure a given in Radio Procedure book issued by DCPW, New Delhi • Signal security instructions and use of code signs • Grid discipline • Handing/Taking over by duty operator • Duties of Radio operator • Procedure of handling of classified messages
Unit 3.2 Radio Security	• Radio communication security: Breaches and their preventive measures • Basic idea of Cipher: PWCC, Encryption and Decryption, Handling of cipher documents and messages

Paper IV: Information Technology and Computer

Unit	Contents
Unit 4.1 Digital Electronics	• Arithmetic circuits: Half adder and Full Adder , Half subtractor , Flip Flops (RS, JK, D & T flip flop) • Various codes : BCD codes , Gray codes , Excess – 3 codes , ASCII codes • A/D converter, D/A converters • Multiplexer and De Multiplexer
Unit 4.2 Basics of Computer	• Software: System software (Operating systems like windows, Linux, android, iOS etc), Application Software • Virus: Concept, Types and preventive measures(Anti Viruses)
Unit 4.3 Mobile Technology	• Overview of generation of mobile, cellular fundamentals, GSM mobile system architecture. • Different communication Generations (2G, 3G, 4G, 5G etc.)
Unit 4.4 Computer Networking	• Introduction of OSI Model • Networking: Topology, Types of networking • Networking components: Server, Switches, Hub, Router, Cables, Connectors
Unit 4.5 Cyber security	• Cyber crimes: Definition, Types, Preventive measures • Basic Idea of IT Act
Unit 4.6 IT Applications in Police	• CCTNS: Basic concept and scope of CCTNS, • Various Mobile Apps used in Police. • CCTV Surveillance: Concept, Different types of cameras and their uses, CCTV network

Practical : I Technical Skills

Unit	Contents
Unit 5.1 Identification and Familiarization	• Passive Components : Resistance, Capacitors, Inductors, • Active Components : Diodes, Transistors, IC's, LED ,SMD • Knowledge of different equipments at a Wireless site : HF, VHF, POLNET, Radio Trunking • Identifying the accessories and batteries of different VHF sets • Other Components : Switch, Relays etc.
Unit 5.2 Measuring Instruments	• Various functions of Multimeter : Measurement of Values of Resistance, Capacitors, AC/DC voltage and continuity test of cables etc. • Study of functions of AF/RF Power Meter, Signal Generators, Frequency counters, CRO/DSO, SWR Meter and their measurements • Measurement of parameters of Transreceiver: Sensitivity, Channel frequency, RF Power • Programming of Transreceiver • Repairing of Accessories like Hand mike, Co-axial cable, Antenna lead, Battery Lead, Loudspeaker and power cables
Unit 5.3 Fabrication	• Use of Soldering iron/Soldering Station • Verification of Ohm's law using circuits (Series & Parallel) • Fabrication of Zener Voltage regulator, Half wave & Full wave rectifiers, • Fabrication of Logic gates and Half adder using ICs
Unit 5.4 Mechanical Skills	• Wiring on Electric Circuit Board by using switches, holders, plugs, fan regulators, fuse etc. • Study of wiring diagram of Tube light, Ceiling Fan, LED bulb etc. Knowing symptoms of faults and remedies • Identifying Reasons of power failure , check out and take remedial measures • Changeover process during failure of mains Power and using alternative source like UPS, Inverter and P.G. • Earthing techniques and measurement of earth resistance • Installation of Static/Mobile stations. Precautions and standards to be followed during installation of static station and mobile station. Check list of equipments before installation of Static/Mobile wireless station • Basic idea of Towers/Mast Installation: Foundation, Erection, Guys and maintenance of towers • Functions and working of Mechanical Machines like Drill/Welding/ Lathe machine

Practical II (Radio Procedure)

Unit	Contents
Unit 6.1 Morse Receiving & Sending	• Receiving:- 11 Messages (06 plane messages of 125 characters each & 05 crypto messages of 90 characters each. All 11 messages are to be received in 15 minutes with an accuracy of 97.5 percent. 02 marks shall be deducted for each mistake. 30 mistakes are allowed. Pass marks will be 40percent. • Sending:- Sending of 11 messages of 1200 characters in 15 minutes, the corrected errors shall not exceed 15, for each corrected error 04 marks shall be deducted. Sending wrong formation of characters shall be treated as equal to one corrected error & marks shall be deducted accordingly. A maximum of 6 uncorrected error shall be allowed. 10 marks shall be deducted for each such uncorrected error. 5 discrepancies shall be treated equal to one corrected error. Pass marks will be 40 percent.
Unit 6.2 Cipher	• Handling of Cipher Messages/Documents • Encryption/Decryption of cipher messages

Practical III- IT Applications

Unit	Contents

Unit 7.1 Computer Typing	• Identification of Various Parts of Computer and Assembling of Desktop Computer
	• Typing of documents in English and Hindi consisting 300 words on computer in MS word / Libre office /open source document with speed in hindi 10 words per minute and in English 15 words per minute with following formatting:
	• Font formatting
	  ○ Paragraph formatting
	  ○ Page formatting
	• Creating a simple spreadsheet in MS excel using mathematical formula or analysis of data (like CDR) in 20 minutes.
	• Creating a simple MS Power point presentation consisting of 05 simple slides in 20 minutes.
	• Designing of simple page in HTML.
	• Data sharing through team viewer etc. , FTP , Emailing , Whatsapp and other social media
	• Connecting computer on Internet through WI-Fi , Ethernet, Hotspot

UNIT 7.2 Computer And Networking	• Making LAN cable: straight and cross cable and their utility with computers. • Configuration of IP addresses in computer/IP phones. • Familiarization and study of IT applications in Police. • Emails management , drivers loading , Anti virus installation • Sharing files on FTP, Team viewer and other applications • Knowledge of Video conferencing : Software and Hardware based VC • POLNET and E messaging system

APPENDIX : C

Syllabus of Qualifying Examination for the post of Assistant Sub -Inspector , Police Telecommunication, Rajasthan

Paper I: AC Theory

Unit	Contents
Unit 1.1 Basic Electricity	• Ohms law & Combination of Series and Parallel combinations • Kirchoff's law & Calculation of Voltage, Current and Power in simple DC networks, • AC Theory: Root Mean Square value, Average value, Significance of Frequency, Time period, Wavelength, Voltage and current Lagging and Leading, • AC Circuits: AC through single pure resistance, Pure inductance, Pure capacitance,- Voltage and current relationship, Impedance, Reactance, Admittance, Conductance, Phase angle, Power factor and Power. Resonance (Series and Parallel) and filters • Electromagnetism, Faraday's Law, Lenz's law
Unit 1.2 Transformers	• Transformer: Ideal Transformer – Construction, Working Principle, Ratio, Types, Properties and uses of Transformers. Losses in Transformer: core loss, Copper Loss
Unit 1.3 Electronic Devices and Circuits	• Semiconductor Devices; Diodes, Characteristics of Diodes (Forward and Reverse characteristics), Break down in diode, Zener Diode, • Application of Diode as Rectifier: Half Wave, Full Wave, Bridge Rectifier, Various parameters of Rectifiers: Peak Inverse Voltage, Efficiency, Ripple Factor, Zener diode as voltage regulator • Overview of Transistor, configurations, Biasing Techniques, Thermal runaway, Optoelectronic devices: LED, OPTO-coupler, Photo Voltaic Cell etc.
Unit 1.4 Power Sources	• Types of Batteries, Theory of Lead acid Batteries, Ampere Hour Capacity, Dry batteries, Operation of Battery charger and Battery tester. • Operation of Generators/Engine, Common faults and their remedies • Types of Power supplies, SMPS
Unit 1.5 Network Analysis	• Concept of Circuits, Different Types Of Power Sources i.e Current source & Voltage Source, Maximum Power Transfer Theorem •

Paper II: Radio Communication

Unit	Contents
Unit 2.1 Applications of Transistors	• Feedback (Negative and Positive) • Amplifiers: Voltage and Power amplifiers • Oscillators: Basic concept, Hartley, Colpitt, Crystal Oscillator • Frequency stability
Unit 2.2 Modulation	• Concept of Modulation • Types of Modulation: Analog(AM, SSB, FM, PM),
Unit 2.3 Wave Propagation	• Propagation of Radio Waves (Ground, Sky , Space) • Skip Distance, MUF, Critical frequency, Fading, Radio Horizon • Atmospheric effect: Diurnal, Seasonal, Sun spot activities
Unit 2.4 Transmitter and Receiver	• Study of AM, FM and SSB Transmitters (Block diagrams), Modulators, Frequency Multipliers, Pre emphasis • Study of Super heterodyne receivers(Block diagram), De emphasis, Demodulators, Squelch Circuit • Receiver parameters: Sensitivity, Selectivity, Fidelity, Image & IF rejection,
Unit 2.5 Antennas and Transmission Lines	• Introduction and types of Transmission lines, SWR and losses in transmission lines • Antennas: Introduction, Radiation of energy from antenna, Types of Antennas: Dipole, GP Antenna, Whip antenna, Parabolic Antenna
Unit 2.6 Types of Communication Systems	• Voice Communication: HF, VHF, UHF (Radio Trunking), Digital communication • Satellite communication: Orbits, Transponder, Uplink/Downlink • Data Communication: Email Messaging system ,POLNET

Paper III:- Radio Procedure

Unit	Contents
Unit 3.1 Radio Procedure	• Complete wireless Telegraphy and radio Telephony Procedure as given in Radio Procedure book being issued by DCPW, New Delhi • Signal security instructions and use of code signs • Grid discipline • Handing/Taking over by duty operator • Duties of Radio operator • Procedure of handling of classified messages
Unit 3.2 Radio Security	• Breaches of Radio communication security, preventive measures • Basic idea of Cipher: PWCC, encryption and decryption, Handling of Cipher Messages/Documents

Paper IV: Information Technology and Computers

Unit	Contents
Unit 4.1 Digital Electronics	• Number System: Binary, Octal, Decimal, Hexadecimal and their conversion • Logic Gates:Basic gates, Universal gates and Ex-Or Gate, Half Adder, Half Subtractor, Full Adder
Unit 4.2 Basics Of Computer	• Basic knowledge of computer architecture • Hardware: Input & output devices, Storage (Primary & Secondary) • Software: System software (Operating systems, Utility software), Application Software • Overview and difference between Open source and closed source softwares • Software development models ,Waterfall model ,Agile scrum model, their Pros and Cons
Unit 4.3 Computer Networking	• Introduction of OSI Model • Networking: Topology, Types of networking, Internet, intranet, LAN, MAN, WAN • Networking components: Switches, Hub, Router, Cables, Connectors • Basic idea of IP addressing ,Static and Dynamic IP addresses ,Concept of subnetting and masking • Basic idea of Network security, Wi-Fi, Hotspot, Blue tooth
Unit 4.4 Cyber security	• Basic Idea of IT Act • Cyber crimes: Definition, Types, Preventive measures • Basic idea of latest trends in cyber and economic crime • Basic idea of different forensic tools • Basic idea of Proxy servers , email spoofing ,masking of IP addresses
Unit 4.5 IT Applications in Police	• CCTNS: Basic concept and scope of CCTNS • Various Mobile Apps used in Rajasthan Police • CCTV Surveillance: Concept, Different types of cameras and their uses, CCTV network • Basic idea of File server, Print servers, Web servers , Mail servers , Database servers , DHCP servers and DNS servers

Practical : I Technical - Skills

Unit	Contents
Unit 5.1 Identification and Familiarization	• Passive Components : Resistance, Capacitors, Inductors, • Active Components : Diodes, Transistors, IC's, LED ,SMD • Knowledge of different equipments at a Wireless site : HF, VHF, POLNET, Radio Trunking • Identifying the accessories and batteries of different VHF sets • Other Components : Switch, Relays etc.
Unit 5.2 Measuring Instruments	• Various functions of Multimeter : Measurement of Values of Resistance, Capacitors, AC/DC voltage and continuity test of cables etc. • Study of functions of AF/RF Power Meter, Signal Generators, Frequency counters, CRO/DSO, SWR Meter and their measurements • Measurement of parameters of Transreceiver: Sensitivity, Channel frequency, RF Power • Programming of Transreceiver • Repairing of Accessories like Hand mike,Co-axial cable, Antenna lead, Battery Lead, Loudspeaker and power cables
Unit 5.3 Fabrication	• Use of Soldering iron/Soldering Station • Verification of Ohm's law using circuits (Series & Parallel) • Fabrication of Zener Voltage regulator, Half wave & Full wave rectifiers, • Fabrication of Logic gates and Half adder using ICs
Unit 5.4 Mechanical Skills	• Wiring on Electric Circuit Board by using switches,holders,plugs, fan regulators, fuse etc. • Study of wiring diagram of Tubelight,Ceiling Fan,LED bulb etc. Knowing symptoms of faults and remedies • Identifying Reasons of power failure , check out and take remedial measures • Changeover process during failure of mains Power and using alternative source like UPS, Inverter and P.G. • Earthing techniques and measurement of earth resistance • Installation of Static/Mobile stations. Precautions and standards to be followed during installation of static station and mobile station. Check list of equipments before installation of Static/Mobile wireless station • Basic idea of Towers/Mast Installation: Foundation, Erection, Guys and maintenance of towers • Functions and working of Mechanical Machines like Drill/Welding/ Lathe machine

Practical II Radio Procedure

Unit	Contents
Unit 6.1 Morse Receiving & Sending	• Receiving:- 11 Messages (06 plane messages of 125 characters each & 05 crypto messages of 90 characters each. All 11 messages are to be received in 15 minutes with an accuracy of 97.5 percent. 02 marks shall be deducted for each mistake. 30 mistakes are allowed. Pass marks will be 40percent. • Sending:- Sending of 11 messages of 1200 characters in 15 minutes, the corrected errors shall not exceed 15, for each corrected error 04 marks shall be deducted. Sending wrong formation of characters shall be treated as equal to one corrected error & marks shall be deducted accordingly. A maximum of 6 uncorrected error shall be allowed. 10 marks shall be deducted for each such uncorrected error. 5 discrepancies shall be treated equal to one corrected error. Pass marks will be 40 percent.
Unit 6.2 Cipher	• Encryption & Decryption of cipher messages

Practical III : I. T. Applications

Unit	Contents

Unit 7.1
 	
Computer Typing
	• Identification of Various Parts of Computer and Assembling of Desktop Computer
	• Typing of documents in English and Hindi consisting 300 words on computer in MS word / Libre office /open source document with speed in hindi 10 words per minute and in English 15 words per minute with following formatting:
	• Font formatting
	  ○ Paragraph formatting
	  ○ Page formatting
	• Creating a simple spreadsheet in MS excel using mathematical formula or analysis of data (like CDR) in 20 minutes.
	• Creating a simple MS Power point presentation consisting of 05 simple slides in 20 minutes.
	• Designing of simple page in HTML.
	• Data sharing through team viewer etc. , FTP , Emailing , Whatsapp and other social media
	• Connecting computer on Internet through WI-Fi , Ethernet, Hotspot

UNIT 7.2 Computer And Networking	• Making LAN cable: straight and cross cable and their utility with computers. • Configuration of IP addresses in computer/IP phones. • Familiarization and study of IT applications in Police. • Emails management , drivers loading , Anti virus installation • Sharing files on FTP, Team viewer and other applications • Knowledge of Video conferencing : Software and Hardware based VC • POLNET and E messaging system

APPENDIX : D

Syllabus of Qualifying Examination for the post of Head Constable ,Police Telecommunications, Rajasthan

Theory Paper I : AC Theory

Unit	Contents
Unit 1.1 Basic Electricity	• Units and Dimensions, Basic components (Resistance, Capacitor, Inductor) • Calculation of Voltage, Current and Power in simple DC networks, Ohm's law, Kirchoff's law • AC Theory: Root Mean Square value, Average value, Significance of Frequency, Time period, Wavelength, Lagging and Leading, • AC Circuits: Impedance, Reactance, Phase angle, Power factor and Power. Resonance (Series and Parallel) and filters • Electromagnetism, Faraday's Law, Lenz's law
Unit 1.2 Transformer	• Transformer: Ideal Transformer – Construction, Working Principle, Ratio, Types, Properties and uses of Transformers. Losses in Transformer: core loss, Copper Loss
Unit 1.3 Electronic Devices and Circuits	• Introduction to Passive & Active Components, Structure of Atom, Conductor, Insulator, Semiconductor(Intrinsic and Extrinsic type) Semiconductor • Semiconductor Devices; Diodes, Characteristics of Diodes (Forward and Reverse characteristics), Zener Diode, • Application of Diode as Rectifier: Half Wave, Full Wave, Various parameters of Rectifiers: Peak Inverse Voltage, Efficiency, Ripple Factor, • Overview of Transistor, configurations, Biasing Techniques, Thermal runaway
Unit 1.4 Power Sources	• Types of Batteries, Theory of Lead acid Batteries, Ampere Hour Capacity, , Common faults of Engine/Generators and their remedies
Unit 1.5 Power Supplies	• Types of Power supplies, SMPS • Solar Backup Power system • Concept of UPS and Inverter
Unit 1.6 Network Analysis	• Concept of Circuits, Different Types Of Power Sources, Current source, Voltage Source, Maximum Power Transfer Theorem
Unit 1.7 Mechanical and Electrical Engineering	• Idea of mechanical workshop machines • Idea of Towers and Masts: Foundation, Galvanization, Erection of Towers/Mast • Antenna mounting on Towers and Masts • Earthing and Lightning arrestors • Basic idea of wiring in domestic building: switches, MCB, ELCB and boards, identification of faults in wiring. • Calculation of load of a premise, • Working principle of Public address system, Telephone

Theory Paper II: Radio Communication

Unit	Contents
Unit 2.1 Applications of Transistors	• Feedback (Negative and Positive) • Amplifiers: Voltage and Power amplifiers • Oscillators: Basic concept, Hartley, Colpitt, Crystal Oscillator • Frequency stability
Unit 2.2 Modulation	• Concept of Modulation • Types of Modulation: Analog(AM, SSB, FM,)
Unit 2.3 Wave Propagation	• Propagation of Radio Waves (Ground, Sky , Space) • Atmospheric effect: Diurnal, Seasonal, Sun spot activities, Skip distance/ MUF, Crictical frequency, fading
Unit 2.4 Transmittersand Receivers	• Study of AM, FM and SSB Transmitters (Block diagrams) • Study of Super heterodyne receivers(Block diagram) • Receiver parameters: Sensitivity, Selectivity, Fidelity, Image &IF rejection,
Unit 2.5 Antennas and Transmission Lines	• Antennas: Introduction, Radiation of energy from antenna, Antenna terminologies (Directivity, Gain, Beamwidth, Radiation resistance, Radiation patterns, SWR) • Types of Antennas: Dipole, GP Antenna, Whip antenna
Unit 2.6 Communication Systems	• Satellite communication: Polnet • Voice Communication: HF, VHF, UHF(Radio Trunking), Digital Communication • Data Communication: Email Messaging system,

Theory Paper IV: Information Technology and Computer

Unit	Contents
Unit 4.1 Digital Electronics	• Number System: Binary, Octal, Decimal, Hexadecimal and their conversion • Logic Gates: Basic gates, Universal gates and Ex-Or Gate
Unit 4.2 Basics of Computer	• Basic knowledge of computer architecture • Hardware: Input & output devices, Storage (Primary & Secondary) • Software: System software (Operating systems, Utility software), Application Software • MS Office: Word, Excel, Power Point • Virus: Concept, Types and preventive measures(Anti Viruses) • Cyber crimes: Definition, Types, Preventive measures
Unit 4.3 Computer Networking	• Networking: Topology, Types of networking • Networking components: Switches, Hub, Router, Cables, Connectors

Practical I : Technical Skills

Unit	Contents
Unit 5.1 Identification and familiarization of Electronic components and Devices	• Passive Components : Resistance, Capacitors, Inductors • Active Components : Diodes, Transistors, IC's, LED • Other Components
Unit 5.2 Familiarization of Measuring Instruments	• Measurement of Values Of Resistance, Capacitors, Various functions of Multimeter. Measurement of AC/DC voltage, Continuity test of cables etc. • Measurement of RF Power and Frequency of any given channel and SWR
Unit 5.3 Soldering	• Use of Soldering iron/Station • Verification of Ohm's law using circuits (Series & Parallel)
Unit 5.4 Installation	• Installation of Static/Mobile stations. Precautions and standards to be followed during installation of static station and mobile station. Check list of equipments before installation of Static/Mobile wireless station • H.F set installation and calculaltion of Dipole length.

Practical II : Radio Procedure

Unit	Contents
Unit 6.1 Morse Receiving & Sending	• Receiving:- 11 Messages (06 plane messages of 125 characters each & 05 crypto messages of 90 characters each. All 11 messages are to be received in 15 minutes with an accuracy of 97.5 percent. 02 marks shall be deducted for each mistake. 30 mistakes are allowed. Pass marks will be 40percent. • Sending:- Sending of 11 messages of 1200 characters in 15 minutes, the corrected errors shall not exceed 15, for each corrected error 04 marks shall be deducted. Sending wrong formation of characters shall be treated as equal to one corrected error & marks shall be deducted accordingly. A maximum of 6 uncorrected error shall be allowed. 10 marks shall be deducted for each such uncorrected error. 5 discrepancies shall be treated equal to one corrected error. Pass marks will be 40 percent.
Unit 6.2 Radio Security	• Basic idea of Cipher: PWCC, encryption and decryption,

Practical III- IT Applications

Unit	Contents

Unit 7.1 Computer Typing	• Identification of Various Parts of Computer and Assembling of Desktop Computer
	• Typing of documents in English and Hindi consisting 300 words on computer in MS word / Libre office /open source document with speed in hindi 10 words per minute and in English 15 words per minute with following formatting:
	• Font formatting
	  ○ Paragraph formatting
	  ○ Page formatting
	• Creating a simple spreadsheet in MS excel using mathematical formula or analysis of data (like CDR) in 20 minutes.
	• Creating a simple MS Power point presentation consisting of 05 simple slides in 20 minutes.
	• Designing of simple page in HTML.
	• Data sharing through team viewer etc. , FTP , Emailing , Whatsapp and other social media
	• Connecting computer on Internet through WI-Fi , Ethernet, Hotspot

UNIT 7.2 Computer And Networking	• Making LAN cable: straight and cross cable and their utility with computers. • Configuration of IP addresses in computer/IP phones. • Familiarization and study of IT applications in Police. • Emails management , drivers loading , Anti virus installation • Sharing files on FTP, Team viewer and other applications • Knowledge of Video conferencing : Software and Hardware based VC • POLNET and E messaging system