STANDING ORDER NO. HRD/55/2024

BASIC TRAINING OF HEAD CONSTABLE - FITTER (BATTERY), FITTER (ENGINE), FITTER (ELECTRICIAN), DRAFTSMAN (TRACER), MAST LASKER & CARPENTER (COMMUNICATION)

I. INTRODUCTION

This standing order provides the guidelines for basic training of newly recruited Head Constable Fitter (Battery), Fitter (Engine), Fitter (Electrician), Draftsman (Tracer), Mast Lasker, and Carpenter (Communication) in Communication Unit of Delhi Police. The purpose of training is to prepare them professionally to discharge their duties according to their trade efficiently with requisite knowledge of Police Wireless Technical and also to inculcate in them, the habit of maintaining mental and physical health, discipline, punctuality and social skills. Besides, Outdoor activities such as Physical Training (PT), Drill, Parade etc., in Indoor activities, they will be imparted training w.r.t subjects of trade as well as knowledge of Police Organization, Rules & Regulations of Police Department & other such activities necessary for becoming a Police officer & to improve their knowledge of day-to-day Police wireless equipment's etc. in the interest of goals of Delhi Police.

II. OBJECTIVES OF TRAINING

The objective of their basic training is as follows: -

(i) To inculcate force discipline.
(ii) To improve physical strength/resilience.
(iii) To give extensive theoretical knowledge and intensive practical training in their trade so that they learn about its requirements in the force and the manner of doing it in a disciplined organization.

III. DURATION

The period of basic training of Head Constable Fitter (Battery), Fitter (Engine), Fitter (Electrician), Draftsman (Tracer), Mast Lasker, and Carpenter (Communication) will be of **06 (six) months** prescribed in Notified Recruitment Rules (RRs), as follows: -

S. No.	Training	Period
1.	Basic Training at DPA, JK	15 weeks
2.	Practical Training at District/Unit Radio Workshops	11 weeks

IV. JOINING PERIOD

(i) All trainees of a batch will join the training on the same day. However, maximum relaxation of 02 working days can be given in exceptional cases by Director/Joint Director, Delhi Police Academy. Relaxation of 04 days can be given with the approval of Special Commissioner of Police, Training.

(ii) The whole batch of the particular trade enlisted in a year should undergo training during that year and no one shall be exempted from the basic training.

V. TRAINING NEEDS

The purpose of training is to prepare them professionally to perform their duties according to their trade efficiently and effectively and also to inculcate in them the habit of maintaining mental and physical health, hygiene, discipline and punctuality, courtesy, straight-forwardness and requisite knowledge of office and Police procedures.

VI. TRAINING ASPECTS

The training at Delhi Police Academy shall be in two folds i.e. "***Outdoor***" aspect for all round physical fitness, capacity building, discipline and ability to perform vigorous duties in general;
"***Indoor***" and Practical training for imparting professional knowledge, develop skills sets of the subject/Trades and dynamic changes in the field of applied knowledge.

Deputy Director, DPA will be the overall In-charge of Training at DPA, JK. The schedule for Basic Training, syllabus of Outdoor Training/examination, Indoor Training/examination is as at *Annexure I, II & III* respectively.

A. OUTDOOR TRAINING

The Outdoor training shall be supervised by the Asstt. Director, DPA who will be the In-charge Outdoor training assisted by the Chief Drill Instructor (CDI), DPA.

(i) The training in outdoors shall be in accordance with the principle laid down in the Police Manual prescribed from time to time.

(ii) The Chief Drill Instructor will issue weekly program after obtaining approval of Assistant Director, Outdoor.

(iii) The daily duration/schedule of the outdoor training shall be as follows:-

Day time	Period	Activity	Duration
Morning	1	P.T.	40 Minutes
	2	Drill/Parade, Weapon Tactics & Training	40 Minutes (10 minutes break in-

			between)
	3	Yoga, Crowd Control, Traffic Control	40 Minutes
Evening	Games/Gym/UAC		60 Minutes

Details of Outdoor subjects, periods & marks are given at **Annexure - II.**

(iv) In order to ensure effective training and proper supervision over the outdoor training, the trainees shall be divided into platoons of not more than 30 trainees, each under the command of a drill instructor as the platoon commander. He will be responsible for the maintenance of discipline and the general conduct of all the trainees of his squad. He will also ensure cleanliness of rooms and barracks under occupation by his trainees.

(v) Team games will also form a regular part of outdoor training schedule.

B. *INDOOR TRAINING*

Indoor training shall be supervised by the ACP/Trg./Comn, assisted by the In-Charge Trg./Comn. The subjects of Police Wireless Technical Grade-III (Course Code: PWT-III) for indoor training syllabus approved by the **Directorate Coordination Police Wireless (DCPW) (MHA)** as at Annexure - III.

(i) The training will be conducted according to the prescribed syllabus for which regular weekly time-table will be drawn.

(ii) The main emphasis of the training will be on practical aspects of the trade. It will be the responsibility of DCP/Comn. to ensure that the Instructional Staff is conversant with their subjects and are able to impart learning to the trainees. The selection of Instructional Staff for teaching trade related aspects will be finalized by a committee headed by Joint CP/Operations.

(iii) There will be 06 indoor periods (04 Theory and 03 Practical) and each period will be of 45 minutes duration & the indoor classes will run from 10:00 AM to 3:30 PM with a recess of 60 minutes duration.

(iv) The training courses will be conducted in English/Hindi medium for all candidates and they will have to learn and pass the test/examination in English/Hindi.

(v) Details of Indoor Subjects, Periods & Marks are given at **Annexure - III.**

VII. STUDY MATERIAL

The Joint CP/Operations, Delhi will constitute a committee under the Chairmanship of DCP/Communication in order to prepare comprehensive study material. The same shall be made available in the Delhi Police Academy library along with nominated faculty decided by the Committee. Digital content available on e-ustaad BPR&D, Knowledge Management

System, i-Got Karamyogi & Delhi Police website/Nipun may also be used as training material.

VIII. GUIDANCE AND PROGRESS OF INDIVIDUAL TRAINEES

For effective supervision, the trainees shall be sub-divided amongst Inspectors/Sub Inspectors to be designated as "Course Guide" who shall be responsible for providing in-depth personal guidance to each trainee and the continuous supervision of progress in work, discipline and all-round conduct. A weekly interactive session will be conducted by the Course Guides to monitor the progress of the trainees. An Assessment of each trainee shall be done by the In-Charge/Trg./Communication, Delhi & CLI, DPA/JK with the help of Course Guide to ensure improvement in professional skills.

Assistant Director/Training, DPA JK must ensure that the trainees are fully and comprehensively trained in all aspects. In all cases, where it is found that any trainee is lagging behind, special attention shall be paid so that she/he is brought to the desired level.

IX. ATTENDANCE AND LEAVES

(i) 90% attendance in Outdoor/Indoor periods is compulsory, failing which she/he will be debarred from appearing in the examination. 10% relaxation in attendance may be given by Director/Joint Director, DPA in case of any unavoidable exigency. The trainee who could not achieve the benchmark will be re-batched and be directed to proceed on leave without pay with the directions to join training from the beginning with the next scheduled batch. A trainee will be re-batched only twice and no further opportunity will be given. Attendance of a trainee will be counted from the date of joining of training. However, those who join late, their syllabus will be covered by conducting extra classes.

(ii) No leave should be granted during this period and only under exceptional circumstances it can be granted with prior approval of the Deputy Director.

X. DISCIPLINE

During basic training at Delhi Police Academy, the trainees shall be deemed to be under the administrative control of Director/Joint Director for all intent and purposes.

XI. EXAMINATION

The assessment of the trainee will be conducted in the form of Periodical Examination & Final Examination including the guidelines issued by DCPW (MHA) as under: -

A. *Periodical Examination*

Two internal assessment tests of the respective trade, involving theoretical & practical related to their trades will be conducted after completion of every 01 month of training.

B. *Final Examination*

On completion of the basic training, they shall be examined by a Board of Examiners for Final examination, nominated by the Joint Commissioner of Police/Operations, Delhi on the request of DCP/Communication, Delhi. The board will be constituted under the overall supervision of DCP/Communication with 01 ACP from Communication unit & 01 Assistant Director from DPA, JK as members. Further, Director/Joint Director, DPA will nominate an Assistant Director, DPA and examiner/s (Inspector) for conducting Outdoor Examination.

(i) In all there will be 03 papers for Indoor subjects and the examinees will be required to obtain marks as under, in order to pass the final examination: -

A.	**Final Examination**			**Marks**
	Paper-I	General Paper		
1.	Paper-II	Theory (Trade)		100
2.	Paper-III	Practical (Trade)	Marks	100
		i. Measuring Instruments	25	
		ii. Fabrication & designing	25	
		iii. Project	25	
		iv. Presentation	25	
B.	**Continuous Assessment:** - Apart from final examination, performance of trainee will be assessed continuously on regulars interval by course instructors through unit tests etc.		Max Marks	
1.	CA-I	Theory (Trade)	20	
2.	CA-II	Practical (Trade)	20	

Pass Criterion			**Pass Marks**
i.	Paper-I	General Paper	50
ii.	Paper-II	Theory (Trade)	40
iii.	Paper-III	Practical (Trade)	40
iv.	Aggregate Marks	80% of marks obtained in final examination + marks obtained in Continuous Assessment	

(ii) The Board of examiner will consolidate the marks and declare the result. The training of those who do not pass would be extended by 02 (two) months and during this period, they would be given a maximum of 02 (two) additional chances in supplementary examinations to clear the subjects in which they have failed. However, only minimum qualifying marks i.e. 50% will be added in

such subject(s) in the final result of the trainee, irrespective of the marks secured in such additional chances. If anyone does not pass in all the papers even after availing the additional chances, his/her services will be terminated by the competent authority under Rule 5 of the Central Civil Services (Temporary service) Rules, 1965.

(iii) After completion of their basic training successfully, the trainees will report to Communication unit, Delhi Police for their practical training for a period of 11 weeks. 11 weeks training program will be chalked out by DCP, Communication for effective Hands-on training & Skill development. On successful completion of their practical training, a certificate of proficiency will be issued by DCP/Communication which will be kept in their Service Book & updated in Intra DP also. A copy of the said Proficiency certificate must also be supplied to Training Branch, Delhi Police Academy, Jharoda Kalan, Delhi for record purposes.

(iv) No Head Constable Fitter (Battery), Fitter (Engine), Fitter (Electrician), Draftsman (Tracer), Mast Lasker, and Carpenter (Communication) in Communication Unit of Delhi Police shall be declared confirmed without passing their basic training & obtaining Proficiency Certificate in practical training from DCP/Communication.

XII. HONOUR LIST

The trainees will be eligible for the following awards for obtaining outstanding merit in various subjects at the occasion of the "Oath taking Ceremony" by Director/Joint Director, Delhi Police Academy: -

1	All Round Best	Commendation Certificate with a cash Reward of Rs. 5,000/-
2	First in Indoor	Commendation Certificate with a cash Reward of Rs. 3,000/-
3	First in Outdoor	Commendation Certificate with a cash Reward of Rs. 3,000/-
4	First in Trade test	Commendation Certificate with a cash Reward of Rs. 3,000/-

In case the number of trainees is up to 15, then only 01 prize mentioned at S. No.1 will be given. If the number of trainees is above 15, but up to 50, then prize mentioned at S. No.1, 2 & 3 will be given. If the number of trainees is more then 50, then all the prizes mentioned above will be awarded. An entry to this effect will be made in the Service Book of the individual and updated in the Intra DP record also.

XIII. ATTESTATION PARADE

On the completion of course, an oath-taking ceremony will be held for the successful candidates. However, no trainees shall be sent to the Communication Unit or other District/Unit to which she/he is allocated for withdrawal of pay or for any other purpose whatsoever, unless she/he has

successfully completed the training and has passed out of Delhi Police Academy.

XIV. CAUTION

While the trainee is undergoing the basic training course, Director/Jt. Director/Delhi Police Academy shall be the competent authority for initiating and finalizing disciplinary action against the trainee. He shall also be the competent authority to pass an order regarding termination of services of the trainee under The CCS (Temporary Services) Rules, 1965 & The Delhi Police (Punishment & Appeal) Rules, 1980. In order to eliminate any unsuitable trainee from the force at the stage of her/his training itself, any one of the following grounds shall be sufficient for termination of services: -

a) Frequent absence of the trainee from Outdoor/Indoor course leading to a conclusion that she/he is an un-devoted trainee and a habitual absentee, not likely to render satisfactory services to the organization in future.

b) Submission of false information and fake Medical Certificate from any doctor for availing leave or light duty or rest.

c) A trainee who avails medical rest for a period of exceeding 14 days continuously will have to appear before a medical board for opinion, if required.

d) Gross misconduct with the Indoor/Outdoor Instructors or with other trainees/staff.

e) Any mischief or any crime involving her/his moral turpitude during the training period.

f) If she/he commits any mischief or any crime involving her/his moral turpitude during her/his training.

g) If any information submitted by the trainee, which is found to be false, fabricated or manipulated to gain employment.

h) Any other ground which adversely reflects upon her/his behavior and the employee being found unsuitable for Police services.

XV. MEDICAL CONDITION/HEALTH STATUS & AGE FACTOR

(i) Women trainee who is pregnant will not be allowed to join the training. Women trainees who are incapacitated on account of pregnancy during training will be re-batched. She will be allowed to join training from the beginning with the next scheduled batch within 2 years.

(ii) Trainees suffering from serious ailments/diseases or who had sustained a physical injury resulting in a medical disability before joining the training/during training, such cases will be considered for appropriate remedy/facilitation i.e. writer/translator etc. with the

approval of Deputy Director, DPA on the recommendation of the Assistant Director, Training.

XVI. DRESS CODE FOR TRAINING

The dress code for the trainees for PT, Drill, Parade, Indoor Classes, Practical Training, Sports, etc. for summer and winter as well as for the attestation-cum-passing out parade shall be specified by the Director/Joint Director, Delhi Police Academy.

XVII. INTER-SE-SENIORITY

The Inter se-seniority shall be fixed as per the provision of Rule - 22 of Delhi Police (Appointment & Recruitment) Rules, 1980.

XVIII. REPRESENTATION

No representation with regard to result of any examination will be entertained after 30 days of the declaration of the result.

XIX. RELAXATIONS

The Commissioner of Police Delhi may relax any conditions laid down in this Standing Order as per the requirement from time to time.

XX. DISCLAIMER

It is made clear that this Standing Order is exclusively for internal smooth functioning of Delhi Police Department.

27/12/24

(SANJAY ARORA)
COMMISSIONER OF POLICE:
DELHI.

No. 16601-16750 /Record Branch/PHQ dated Delhi, the 27/12/24

Copy forwarded to the: -

1. All Special Commissioners of Police, Delhi.
2. All Joint Commissioners of Police including Joint Director, Delhi Police Academy, Delhi/New Delhi.
3. All Additional Commissioners of Police, Delhi.
4. OSD to C.P., Delhi.
5. All Deputy Commissioners of Police, Districts/Units including PHQ, C.P. Sectt., FRRO and Deputy Director/Delhi Police Academy, Delhi.

6. DCP/HQ(IV)/PHQ with the direction to upload the Standing Order on Intra-DP.
7. LA to CP and FA to CP, Delhi.
8. All ACsP/PHQ/Insprs./PHQ, Delhi.
9. PS/Reader to CP, Delhi.
10. HAR/PHQ with 10 spare copies.
11. Inspr./Knowledge Center/PHQ.

Annexure – I

SCHEDULE FOR BASIC TRAINING OF HEAD CONSTABLE - FITTER (BATTERY), FITTER (ENGINE), FITTER (ELECTRICIAN), DRAFTSMAN (TRACER), MAST LASKER & CARPENTER (COMMUNICATION)

Distribution of Training Days

S. No.	Particulars			Days
1.	Duration of the course (15 Weeks - 15 x 7 = 105 days)			105
2.	Saturdays, Sundays & Gazetted Holidays			22
3.	Number of days for Final Examination			03
4.	Total number of days available for training in DPA			105 – 25 = 80 days
5.	Total number of days for Outdoor Training at DPA			80
6.	Total periods available for Outdoor Training (80 x 4)			320 periods
7.	Total periods available for Indoor Training (80 x 6): -			480 periods
	General Paper	80 x 4 = 320 Periods	65 Periods	
	Theory (Trade)		255 Periods	
	Practical (Trade)	80 x 2 = 160 Periods	160 Periods	

Note: -

- A week will consist 06 (six) working days except 2nd Saturday/Gazetted Holidays.
- Indoor period will be of 45 minutes duration, while in Outdoor, PT will be of 40 minutes duration and Drill/Weapon Training/Crowd Control/Traffic Control/Yoga will also be of 40-40 minutes duration with 10 minutes break in Morning.
- Outdoor training in the evening (60 Minutes) will be for Games of choice/Gym/UAC but compulsory.
- In case of Law & Order duties, G.H./2nd Saturday/Sunday will be deemed as working days.
- However, this schedule is subject to change/modification in case of an exigency/contingency/administrative requirement by the Director/Joint Director, DPA.

Annexure – II

OUTDOOR TRAINING SYLLABUS/EXAMINATION FOR BASIC TRAINING OF HEAD CONSTABLE - FITTER (BATTERY), FITTER (ENGINE), FITTER (ELECTRICIAN), DRAFTSMAN (TRACER), MAST LASKER & CARPENTER (COMMUNICATION)

S. No.	Subjects	Periods	Marks
1.	Physical Training (P.T.)	80	30
2.	Drill/Parade	70	30
3.	Weapon Training & Firing	20	20
4.	Yoga	30	05
5.	Basics of Crowd Control	20	10
6.	Basics of Traffic Control	20	05
7.	Games/Gym/UAC (Evening)	80	--
	TOTAL	**320**	**100**

Note: -

- CDI/DPA will provide syllabus/Test key for Outdoor Examination to the Board of Examiners duly approved by Director/Joint Director, Delhi Police Academy.

- Moreover, Outdoor training syllabus is subject to change/modification in case of an exigency/contingency/administrative requirement by the Director/Joint Director, DPA.

DETAILED OUTDOOR TRAINING SYLLABUS/EXAMINATION FOR BASIC TRAINING OF HEAD CONSTABLE - FITTER (BATTERY), FITTER (ENGINE), FITTER (ELECTRICIAN), DRAFTSMAN (TRACER), MAST LASKER & CARPENTER (COMMUNICATION)

S. No.	Subject	Period	Marks
1.	**Physical Training (PT)** • Physical fitness stamina building strengthening of arms, Pull-ups, Push-ups, sit-ups etc. • Ground work (Front, Back roll etc.) • Shuttle Race • Lifting and carrying	80	30
2.	**Drill/Parade** • Turnout, wearing of uniform • Attention, Stand at ease • Turning • Marching (Slow & Quick) • Salutes • Marching & Kadam Tall • Formations	70	30
3.	**Weapon Tactics & Training** Training of Short-range weapons will be as follows: - • Glock Pistol - 10 marks • MP 5 - 10 marks JVPC, 9MM Pistol, INSAS & AK-47 Rifle - *only for Familiarization*	20	20
4.	**Yoga** • Standing Asanas • Sitting Asanas • Lying position Asanas • Pranayam • Yog Nidra	30	05
5.	**Crowd Control** • Types of Crowds • Crowd Control with Rope and Barricades • Cane Shield Drill	20	10
6.	**Traffic Control** • Principle of Traffic Control • Road Sign and discipline • Road Signal • Manual control by hand drill, 2-3 & multiphase traffic control through hand drill • Classification of Vehicles	20	05
7.	Games of choice/Gym/UAC in Outdoor training in the evening	80	--
	GRAND TOTAL	**320**	**100**

Annexure – III

INDOOR TRAINING SYLLABUS/EXAMINATION (THEORY & PRACTICAL) FOR BASIC TRAINING OF HEAD CONSTABLE - FITTER (BATTERY), FITTER (ENGINE), FITTER (ELECTRICIAN), DRAFTSMAN (TRACER), MAST LASKER & CARPENTER (COMMUNICATION)

S.No.	Subject	Days x Periods		Total Marks
1.	Paper - I General Paper	80 x 4 = 320 Periods	65	100
2.	Paper - II Theory (Trade) as per SCR-2019 (Police Wireless Technician Grade-III)		255	100
3.	Paper - III Practical (Trade) as per SCR-2019 (Police Wireless Technician Grade-III)	80 x 2 =160 Periods	160	100
TOTAL			**480**	**300**

PAPER - I

GENERAL PAPER

Organization, Administration, Police & Society, Laws & Service rules

Periods - 65 **Marks - 100** **Time - 03 Hours**

S.No.	Subject	Periods
1.	**Organization & Administration**	**20**
	• Organization of Central Government	02
	• Organization of State government, District & Sub-Division	02
	• Hierarchical set up of Delhi Police, Ranges, District, Sub-Divisions, Police Station, Various units of Delhi Police	03
	• Commissionerate System of Police	
	• Badges/Flags (of cars) of all rank of police	01
	• Establishment of Communication unit & it's working	01
	• Personal hygiene, health and care	01
	• Turnout and care of Uniform	01
	• Discipline in police force - Rules & regulation etc.	01
	• Clothing & equipment	01
	• Pay and allowances, Income Tax Calculation	01
	• Rewards and decorations	01
	• Leave Procedure	01
	• Retirement benefits	01
	• Administration	01
	• Medical Benefits	01
		01
2.	**Police and Society**	**15**
	• Organization of Political & Communal parties.	02
	• Understanding human behavior o Individual o Group behavior	03
	• Police public relations o It's Importance o Interpersonal relationship	04
	• Expectations of the people o Community Policing	02
	• Human Rights o Concept of Human rights and their importance in Police work o Do and Don'ts for protection and observance of human rights o Provisions of Human Rights in Indian Constitution & in other laws o Human Rights Organization & civil liberties o Uplift of weaker sections of the society o Gender Sensitization	04

3.	**Laws & Rules – Basic Concepts** • Constitution of India - Salient features • Fundamental rights, duties & directive principles • Articles 303 to 311 of the Constitution of India • General Structure of The Bharatiya Nyaya Sanhita, 2023 • General Structure of The Bharatiya Nagarik Suraksha, Sanhita, 2023 • General Structure of Delhi Police Act, 1978 • Delhi Police (Promotion & Confirmation) Rules, 1980:- Rules 4 to 19 & 23 • Delhi Police (General Conditions of Services) Rules, 1980:- Rules 7, 8, 10 to 13, 15, 16 & 17 • Delhi Police (appointment & Recruitment) Rules, 1980:- Rules 3 to 5, 7 to 11, 14, 21 to 25, 28 & 29 • CCS (Central Civil Services) Rules • CCA (Classification, Control & Appeal) Rules 1965	**22** 02 02 02 03 03 02 02 02 01 02 01
4.	**Fire Fighting** • Elementary knowledge of Fire-fighting • Equipment for Fire-fighting - Practical exercise.	**03**
5.	**First Aid** • General Principles of First aid and importance • Choking, its Causes and First aid • Application of bandages for control of bleeding • First Aid in situation of Fracture, Burn injuries, Snake-bite & electrocution cases • Basic Life Support Awareness/Cardio Pulmonary resuscitation (CPR)	**05**
	TOTAL	**65**

PAPER - II
THEORY (TRADE)

Periods - 255 **Marks-100 (20+80)** **Time-3 hrs.**

UNIT-I	**ENGINEERING MATHEMATICS**
1.	Logarithms: Concept of Logarithm, Logarithm Functions, Decibel, Calculation and conversion of decibel units, dBW, dBm, dBi, dBc.
2.	ELEMENTARY TRIGONOMETRY: Trigonometrical Ratios, Functions and Identities simple problems based on Trigonometry formulas.
3.	Complex numbers: j notation, rectangular and polar form of complex numbers, application of complex numbers in analyzing LCR circuits.
UNIT-II	**ELECTRONICS AND SEMICONDUCTORS DEVICES**
4.	Semiconductor: Definition, Valence & Conduction Band, Intrinsic and Extrinsic, N type & P type Semiconductors
5.	Semiconductor Diodes: PN junction Diode-Forward and Reverse Bias characteristics, -Drift current & Diffusion current, Zener Diode-Construction & working principle, Zener Break Down, Avalanche Break Down, Zener Diode as a voltage regulator
6.	Special diodes: LED, 7 Segment LED, LCD, Laser Diode, Solar Cell Avalanche Photo Diode.
UNIT-III	**TRANSFORMER, RECTIFIER AND POWER SUPPLY**
7.	Transformer: Ideal Transformer–construction-working principle – EMF equation – Losses in transformer – core loss, copper loss – Efficiency - Regulation-OC, SC test on transformer, applications
8.	Rectifier: Introduction and Classification of Rectifiers, Halfwave Rectifier- Full wave Rectifier (Center tapped, Bridge) Efficiency, Ripple factor, comparison, -Applications, Filters - C, LC, and PI Filter
9.	Power supply: Regulated Power supply (circuit diagram), Block diagram of SMPS, advantages and disadvantages of SMPS. UPS-Types
UNIT-IV	**TRANSISTOR, AMPLIFIERS & OSCILLATORS**
10.	Bipolar junction TRANSISTOR: Transistor construction & operation, NPN and PNP transistor, Transistor biasing
11.	Transistor amplifiers: Transistor Configurations – CB, CE, CC Configuration characteristics, and their Comparison in terms of input impedance, Output impedance, Current gain, and Voltage gain, feedback and its effect,
12.	Transistor oscillators: Condition for oscillations (Barkhausen criterion), General form of LC oscillator–Hartley Oscillator–RC Phase shift oscillator, Crystal oscillator.
UNIT-V	**CIRCUIT THEORY AND NETWORK THEOREMS**
13.	DC circuits: Definition and unit for voltage, current, power, resistance, conductance, resistivity–ohm's law, Kirchoff's current law and voltage law. Series circuits, parallel circuits, series parallel circuits, Thevenin's, Norton's, Superposition and maximum power transfer theorem.

14.	AC circuits: AC through single pure resistance, pure inductance, pure capacitance-voltage and current relationship, impedance, reactance, admittance, conductance, phase angle, R-L, R-C, R-L-C circuits. Series and Parallel R-L circuit, R-C circuit, R-LC circuits
15.	RESONANCE: Resonance series resonance–parallel resonance-condition, For resonance–resonant frequency-Q factor-resonance curve-band width
UNIT-VI	**MODULATION, & TRANSMISSION TECHNIQUES**
16.	Amplitude Modulation: Frequency spectrum. Relationship between wave length and frequency, Need for modulation, types of modulation. Amplitude modulation: Expression, AM spectrum and side bands, AM modulators. Diode detector.
17.	Angle Modulation: Frequency modulation, Expression waveforms-frequency spectrum, effects of noise in FM, Phase modulation comparison of AM, FM and PM, Reactance tube and varactor diode modulator. FM detectors – slope detector, phase discriminator, ratio detector
18.	Pulse Modulation: Pulse transmission, Pulse Amplitude Modulation (PAM), Pulse width modulation (PWM), Pulse Position Modulation (PPM)
UNIT-VII	**TRANSMISSION LINES, ANTENNA THEORY & WAVE PROPAGATION**
19.	Transmission Lines: Types of Transmission lines, characteristics impedance, SWR, impedance matching methods, Quarter wave, transformer, balun.
20.	Antenna Theory: Antenna principle, polarization, directive gain, directivity, radiation pattern, folded dipole, parasitic array, broad-side and end-fire array, Yagi antenna, Log periodic and parabolic antenna
21.	Wave Propagation: Radio wave propagation, Ground wave propagation, sky wave, space wave propagation, ionosphere layers
UNIT-VIII	**TRANSMITTERS, RECEIVERS & TRANSCEIVERS**
22.	AM Transmitter: Types of transmitters-SSB transmitter.AM Receiver: TRF receiver, super heterodyne radio receiver-Selection of IF-Image frequency- AGC types, SSB receiver.
23.	FM Transmitters & Receiver: Direct and Indirect methods-stereophonic FM transmitter. FM Receiver: Block diagram–AFC-stereophonic FM receiver. Phase modulation Principles, phase modulator circuit,
24.	Transceivers: Study of specification of HF/VHF/UHF transceivers, Detailed study of analog VHF/UHF radios including their maintenance and programming, Pre-emphasis and de-emphasis circuits
UNIT-IX	**DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS**
25.	Number System & Boolean Algebra: Binary, Octal, Decimal, Hexa decimal - Number systems, Conversion from one to another. Binary codes Boolean Algebra - Boolean postulates and laws. De-Morgan's theorem, Simplification of Boolean expressions
26.	Logic Gates: AND, OR, NOT, NAND, NOR, EXOR, EX-NOR.

	Implementation of logic functions using Gates Adder, subtractor etc., Realization of gates using Universal Gates.
27.	Computer Fundamentals: Architecture of computer, Basic Hardware and software, components, operating systems like windows, Application software such as MS office. Multi-media and Cyber security.
UNIT-X	**MEASURING INSTRUMENTS AND TECHNIQUES**
28.	Block diagram of Digital multimeter - Advantages over analog instruments- Block diagram of Digital frequency counter,
29.	CRO- Block diagram and principle of operation of CRO-operation, Applications of CRO Types of CRO-Block diagram and operation of dual Trace CRO-dual beam CRO–comparison between dual trace and dual beam CRO–Digital storage oscilloscope – Block diagram-advantages.
30.	Description and use of Signal generator, Power output meter, Through line Watt meter, RCT Field Exposure:1. Setup HF Communication 2. POLNET Flyaway Terminal

PAPER - III
PRACTICAL (TRADE)

Periods - 156 **Marks-100 (20+80)**

A)	**IDENTIFICATION OF COMPONENTS, STUDY OF WIRELESS SET**
1.	Study of Active and Passive components
2.	Study of Transistors, Logic Gates and ICs
3.	Study of Transformer & Batteries
4.	Study of computer parts
5.	Study of Radio Antennas
6.	Study of HF and VHF radios
B)	**FABRICATION AND MEASUREMENTS INSTALLATION OF NETWORK**
1.	Characteristics of PN junction Diode and Zener Diode
2.	Voltage Regulator using Zener Diode.
3.	Half Wave, Full Wave, Bridge Rectifier
4.	Transistor Biasing
5.	Transistor Amplifier, (NPN, PNP) Parameters
6.	L-C-R circuits, Regulated Power Supply.
7.	Study of Adder and Subtractor circuits
8.	Study of Antenna, Dipole, Yagi, Whip
C)	**STUDY OF INSTRUMENT, TRANSRECEIVER & INSTALLATION OF NETWORK**
1.	Multi-meter:(i) measurement of values of Resistance, Capacitors, various function of Multimeter (ii) measurement of AC/DC voltage, continuity of cables etc.
2.	A. AF/RF Power Meter B. Signal Generator-AM & FM
3.	Study of Circuit Diagram and measurement of VHF Transceiver parameters of VHF Radio
4.	Installation and Operation of VHF Network (Static Setup and Handheld Setup, Frequency Programming)
5.	Study and Operation of VSAT

****