

# INITIAL COURSE FOR APP, ALP/ELECT. (PE-1)

Day	First Half	Second Half
1.	Reporting of class.	General information about Indian Railways.
2.	Definition of Current, Voltage, Resistance, Inductance & Capacitance and their measuring instruments, Precaution to be taken with various voltages of Electricity, Electrical symbols, conductors, semiconductors (Diode, GTO, IGBT), Insulator.	Ohm's law, series and parallel connections, Electrical circuits, open circuits & close circuits, short Circuits, protective devices – fuses, relays, contactors.
3.	AC/DC motor working principle, Motor in series/parallel, speed control, Generators/Alternators working principle.	Batteries, Convertor/Rectifier and invertors.
4.	What is Engine/ Types of Engines- External combustion & internal combustion Engines-(i) Spark ignition (Petrol Engine) (ii) Compression ignition (Diesel Engine), working principle of Diesel Engine?	Two stroke Engines, Four stroke Engines, parts of Engines- engine block, crank case crank shaft, cam shaft, cylinder liner, crank case cover, fuel control shaft, water jackets.
5.	Different types of air brake stocks, BOXN, BCN, BTPN, BRN & Air brake coaches of mail/exp.	Location of air brake system Equipments provide in air brake stock, BP, FP, AR, CR, DV, brake cylinder, slake adjuster, empty/loaded lever, hand brake etc.
6.	Working of air brake system provide in air brake stock, BP, FP, AR, CR, DV, brake cylinder, slake adjuster, empty/loaded lever, hand brake etc.	Releasing of wagon & coaches, adjusting of slake adjuster, method of isolation of DV, CP efficiency test.
7.	Testing of detection of leakage in Loco & load, test of continuity of brake pipe pressure before starting, practical demonstration of continuity testing, releasing & isolation	Shunting of air brake load, attachment & detachment of air brake wagon.
8.	Releasing and isolation in air brake coaches' & detection of leakage, charging of BP/FP Pipe	Brake binding cause & remedy and BMBC system.
9.	General information about Locomotives, types of Loco's, Technical Data.	Wag-5(layout) with general description of all fitted equipments.
10.	Types of contactors, procedure of wedging with practical demonstration.	Types of relays, procedure of wedging with practical demonstration.
11.	Difference between power and control circuits in Locos, different types of power and control circuits used in Locomotives.	Battery charging & auxiliary compressor control circuit, checking of BA & CHBA voltage, MCPA troubleshooting.
12.	Pneumatic circuit of auxiliary compressor and raising pantograph, Troubleshooting of RS/PR pressure not building up.	Description of feeding power circuit- Parts of pantograph, action taken if pantograph not raising, Pantograph testing method, action taken if pantograph broken, High Reach Panto graph.
13.	HPT link, Roof bar, ET-1, ET-2, QLM, HOM, action taken during QLM dropping.	Main transformer, GR, GR safety, PHGR, CGR-1, 2, 3, RGR, RPGR
14.	Description of traction power circuit-RSI, SL, Line contactor, Reverser, Manual setting of Reverser.	Shunting Notch and shunting contactor, Q-20, QD, ammeter, Voltmeter.
15.	Troubleshooting regarding QOP and QRSI dropping.	Pilot lamp control circuit –signalling relay, action to be taken during CCLS melting.
16.	Description of auxiliary power circuit-TFA, Auxiliary motors chart, Q-30, C-118, R-118, QCVAR	Action taken during QOA & QLA dropping.
17.	Description of auxiliary control circuit, working of various auxiliary motors, control switches, isolation of auxiliary motors.	Safety of ARNO convertor, RTPR, Twin beam headlight, DC to DC convertor, battery charger, action taken during CCA fuse melting.
18.	DJ control circuit, preparation of opening & closing DJ.	Manual DJ closing by Q-118, Q-44, Q-45, precaution to be taken after wedging of Q-118.
19.	Tripping via different relays auxiliaries through DJ closing circuit.	Vacuum circuit breaker and TPWS.
20.	Line contactor control circuit, switch position of HMCS-1 and 2, control circuit of Q-50, Q-51 and SMGR.	MP/EEC/GR Manual operation with demonstration, Auto Regression circuit (QD).
21.	Power circuit of Electrical braking. Demonstration of Hand Brake.	Control circuit of Electrical braking, Methods of Electrical Braking, Reasons to avoid Electrical Braking.
22.	Description of MR charging circuit-ADV, SS_1, HPSS-1, VEUL n Air dryer, MR pressure not built up, compressor efficiency test, FP charging circuit.	Description of BP charging circuit, - Charging & discharging of BP pressure, BP pressure not built up.



23.	BP continuity test, BP leak test of Loco and train, action to be taken during front BP angle cock broken.	Description of Independent Loco brake system, Loco brake teststand. Understanding the silent features of air brake system, Independent brake application and release (SA-9), C-2 relay valve.
24.	Synchronising Loco brake system- Synchronising Loco brake test, Isolating of distributive valve.	Dead Loco attachment, BPEMS, OHE Indicator.
25.	VCD, Auto flasher light	Speedometer, ESMON, Direct drive, RTIS.
26.	Location training	
27.	Checks before energising a Locomotive Procedure of cab changing.	Safety precaution before entering in HT compartment, Grounding of Loco.
28.	Duties of ALP during -Take over charge, Run, Halting at station & Hand over charge.	Various schedule inspection of Loco-IA, IB, IC etc.
29.	Safety items of loco to be checked while turning out loco from shed	Items to be checked while taking over charge from incoming crew at starting station/yard and enroute.
30.	Working during abnormal conditions- Floated Tracks, Foggy weather, Wheel floating, Fire smoke in Loco, Head light defective and horn not working. Fire fighting + type and use of fire extinguisher.	Train parting (causes and steps for avoiding trainparting), wheel slipping, use of sanders, Procedure for stopping a train on a rising gradient, Controlling of heavy loaded Train on Don gradients.
31.	SIV Loco, Introduction, Benefits of SIV in comparison with ARNO, New Relays, Interlocks, Lamps, Contactors, Fuses, Switches provided in SIV fitted Loco.	Energise Procedure of SIV fitted Loco, Tripping with External & Internal Faults.
32.	Action to be taken if SIV, Compressor and Blower not working.	Microprocessor Loco-Benefits and important Instructions for Loco pilots & ALP's, Microprocessor version III.
33.	Energising multiple Locomotives, Procedure of cab changing.	Different types of COC's and Switches- Position in Trailing & Leading Loco, Recognising faulty Loco during Tripping.
34.	Revision of Syllabus.	
35.	Examination (I Paper)	
36.	Working of Lobby	
37.	Working of Control Office	
38.	Review of Syllabus	
39.	Studies of Various OHE components- catenary/contact wire, cantilever assembly, droppers.	Insulator, Bonding, Implantation.
40.	Crossovers, ATD Assembly, Neutral Section.	AT supply, Display Boards, Precaution to be followed on electrified territory.
41.	Technical Data, Abbreviation, characteristics of three phase Locomotives.	Lay Out (General Idea of working).
42.	Description of Cab panel A, B, C, D. Educating & provide hands on training for reading DDS kept in Model Room.	Description of pneumatic panel, SB-1, SB-2, HB-1, HB-2
43.	Control Electronics on/off, VCU operation, Battery, Auxiliaries compressor, Types of MCB's	. Traction Power circuit, Traction convertor, Auxiliary convertor and Load distributions.
44.	Single phase-415/110 Volt Auxiliaries, Harmonic Filter	Main Compressor & reservoir, Parking Brake system, ECPSW
45.	BP charging, Regenerative braking, Loco brake, Fire Alarm, Flasher light	Banking mode, Procedure of passing neutral section, Dead Loco attachment
46.	Miscellaneous-Over current relay, catenary voltage out of limit, Memotal, sanding, working function inactive cab, alarm chain pulling, Train parting	Items to be checked while taking over charge from incoming crew at starting station/yard and enroute.
47.	Procedure to energise three phase Loco. Three Phase multiple Loco, Long Haul, Push-Pull.	Operation of- constant speed controller, emergency STOP push button, Vigilance control device.
48.	Screening, Types of faults, Reading of DDS.	Modified Three phase Loco (Knorr Bremse).
49.	Knorr Bremse Loco fitted with CCB.	IGBT, Hotel Load, maintenance schedule chart, SOAEB, DPWCS
50.	Location	
51.	CMS	
52.	FOIS	
53.	Exam (II nd paper)	
54.	Viva-Voce and Release	

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