Government of India (Bharat Sarkar)
Ministry of Railways (Rail Mantralaya)
(Railway Board)

No. E(MPP)2019/3/48

RBE No. 32/2020
New Delhi, Dated 18.03.2020

The General Managers,
All Indian Railways/PUs,
Metro Railway/Kolkata
Railway Electrification/Allahabad
DG/RDSO/Lucknow
CAO/DMW/Patiala
CAO/COFMOW/New Delhi
ED/CAMTECH/Gwalior

DG/NAIR/Vadodara
The Directors,
IRITM/Lucknow
IRIEEN/Nasik
IRIMEE/Jamalpur
IRICEN/Pune
IRISET/Secunderabad

Sub: Revised Training Modules of Non-Gazetted Staff of Mechanical Department (Supervisors).

Ref: Chairman/Railway Board's letter No. E(MPP)/2016/3/20 dated 28.11.2018 and Board's letter dated 06.12.2018

Vide Board (CRB) letter No. E(MPP)/2016/3/20 dated 28.11.2018, DG/NAIR had been authorized as the Head of the Academic Council of all CTIs to develop Training Modules of all categories of Non-Gazetted staff. Accordingly, training modules of Mechanical Department (Supervisors) were finalized and sent to this office.

2. Ministry of Railways (Railway Board) has reviewed the above Training Modules proposed and submitted by DG/NAIR. Board (MRS & MS) has approved the revised training modules.

3. The revised modules prepared have been scanned and uploaded under **E(MPP) Training Circulars** and can be viewed or downloaded from **railnet.**

4. Kindly acknowledge receipt.

O/C

(Alka Arora Misra)
Principal Executive Director/Trg. & MPP
Railway Board.

No.E(MPP)2019/3/48 New Delhi, dated: 18-03-2020

Copy to:

8) The General Secretary, NFIR, 3 Chelmsford Road, New Delhi for information with 35 spares
9) The General Secretary, AIRF, 4 State Entry Road, New Delhi for information with 35 spares.
10) The Secretary General, FROA, R.No.256-A, Rail Bhavan, New Delhi for information with 5 spares.
11) The Secretary General, IRPOF, R.No.268, Rail Bhavan, New Delhi for information with 5 spares.
12) All Members, Department Council & Secretary Staff side National Council 13-C, Ferozeshah Road, New Delhi with 90 spares.
13) The Secretary General, AIRPF Association, Room No.256-D, Rail Bhavan, New Delhi with 5 spares.
14) General Secretary, All India SC & ST Railway Employees Association, 171/B-3, Basant Lane Railway Colony, New Delhi (15 copies).

For Secretary/Railways

No.E(MPP)2018/3/48 New Delhi, dated: 18-03-2020

Copy to:

vii) PS & ED(PG) to MR, MSR(A) & MSR(K)
viii) PSO/Sr.PPS to CRB, FC, ML, ME, MM, MS, MT, DG(RHS) & DG(RPF)
ix) Sr.PPS/PPS/PS to AM(Budget), AM(CE), AM(C&IS), AM(Comml.), AM(Elect), AM(Fin), AM(Mech.), AM(Plg.), AM(Project), AM(PU), AM(Sig.), AM(Staff), AM(RS), AM(T&C), AM(Tele), AM(Traffic), AM(Works), Adv.L(RS), Adv(Vig.), Adv.Fin(Exp), Adv(IR), Adv(Safety), LA, OSD(MIS).
x) ED(Plg.), ED(Accts.), EDF(BC), EDCE(B&S), EDCE(G), EDCE(Plg.), ED(CHG), ED(CC), ED(C&IS), ED(E&R), EDEE(Dev), EDEE(G), EDE, ED(RRB), EDE(N), EDE(Res), EDF, EDF€, EDF(S), EDF(B), EDF(RM), EDF(X)I, EDF(X)II, ED(H), EDLM, ED(MIS), EDE(GC), ED(T&MPP), EDME(Chg.), EDME(Fr.), EDME(Tr.), EDME(TOT), EDME(Dev.), EDME(W), ED(PC)I, ED(PC)II, ED(PP), ED(Project), ED(Project)/DMRC, EDRE, ED(Safety), JS, JS(C), JS€, JS(P), IG./RPF(Hqs), IG/RS, ED(S9g.), ED(Stat&Econ.), EDRS(C), EDRS(G), EDRS(P), EDRS(S), EDRS(W), ED(TD), EDTT(M), EDT(MC), EDT(P), ED(T&C), EDCE(P), ED(PM), ED(PG), EDTC-I, EDTC(FM), EDTT(F), EDTT(FM), EDTT(S), EDV(A), EDVE, EDV(T), ED(W).
xi) Chief Commissioner of Railway Safety, Lucknow.
xii) E(Trg.), E(NG)I, E(NG)II, E(G), F(E)I, F(E)II, F(E)III, E(SCT)I, E(SCT)II branches of Railway Board.

भारतीय रेल यांत्रिक एवं विद्युत अभियंत्रण संस्थान
Indian Railways Institute of Mechanical & Electrical Engineering
(AN ISO 9001:2015, ISO 14001:2015, ISO 50001:2011 CERTIFIED INSTITUTE)

No. IMEE.02.04

Date: 19-02-2020

Director General,
NAIR Lalbaug,
Vadodara

Sub: - Process reforms in Training- Revision of Training modules of non- gazetted staff

Ref: - (1) NAIR letter no. NAIR/DG/Corres/2018 dated 26.12.2018
(2) Railway Board letter no. E(MPP)2016/3/20 Pt. dated 15.07.2019
(3) Railway Board letter no. E(MPP)2019/3/48 dated 11.11.2019

IRIMEE has reviewed the training module of supervisors of Mechanical Department and Mechanical Group 'C' staff (other than supervisors) in terms of DG/NAIR's directive and submitted the same for approval vide IRIMEE letter no. IMEE.02.04 dated 19.03.2019 along with the soft copy sent through email on 20.06.2019 & 21.06.2019. Revised training module for Mechanical Group 'C' staff (other than Supervisors) was also sent to DG/NAIR vide IRIMEE letter no. IMEE.02.04/Gr 'C' & 'D' staff policy dated 04.07.2019 along with the soft copy vide email dated 19.07.2019.

2. The proposed revised training modules were submitted by NAIR to Railway Board for approval. As per letter referred at (3) above, Railway Board has recommended some additional changes in the proposed revised training modules. Accordingly, changes in proposed revised training modules as recommended by Railway Board have been incorporated with one addition of four-week duration subject MRT-12 (Title- Integrated course at IRIMEE) in the module for Junior Engineer (C&W/D/W) recruited through RRB i.e module MJR-C, MJR-D & MJR-W by suitable adjustment within the total duration of training period of 52 weeks.

3. The revised training module for mechanical supervisors in soft copies (word and pdf) containing 120 pages after incorporating the above-mentioned changes is resubmitted for onward submission to Railway Board for kind approval.

Encl: As Above

(S K Yagnik)
Director/IRIMEE

Copy to:- Jt.Director/MPP/Railway Board, New Delhi in reference to letter referred at (3)

Revised Training Module for Mechanical Supervisors (February 2020)

Index

Annexure -1

Abstract of Modules

ABSTRACT OF MODULES

Module Code

1. M Mechanical
2. SE Section Engineer
3. JR JE- RRB
4. JI JE- Intermediate
5. JP JE-Promotional
6. C C&W
7. D Diesel
8. W Workshop

Subject Code

1. M Module
2. R Railway
3. E Engineering
4. T Theory
5. C C&W
6. D Diesel
7. W Workshop

MODULE - MSE C

Name of the Post/Category	Sr. Section Engineer
Stream	C&W
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory- Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF/MCF
			Wagon Production Unit		01	Any wagon prod. unit /
			RWF		01	RWF
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Stream specific theory		MCT-01	04	STC
	PRACT	Field Visit	C&W Workshop		04	Respective Places
			Diesel Shed		01	
			CMT lab		01	

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Stream specific theory		MCT-02	08	STC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT-11	02	ZRTI
	PRACT	Field Visit	Stores		01	Parent Unit
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training C & W Depot			04	Parent Unit
		Divisional control office (LMS, FOIS, ICMS)			01	
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
		TOTAL			**52**	

MODULE - MSE D

Name of the Post/Category	Sr. Section Engineer
Stream	Diesel
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory- Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		01	RCF/MCF
			RWF		01	RWF
			DEMU/SPART Manufacturing Unit		01	ICF
			Diesel Production Units and RDSO		02	One week each at DLW/ DMW/ DLF(MEW) & RDSO

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Stream specific theory		MDT-01	04	STC
	PRACT	Field Visit	C&W Depot		01	Respective Places
			CMT Lab		01	
			Diesel Loco POH Shop & Electric Loco POH Shop		03	
			DEMU Shed		01	
III	THEO	Stream specific theory		MDT-02 M/E	08	STC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT-11	02	ZRTI
		Field Visit	Stores		01	Parent Unit
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training Diesel Shed			04	Parent Unit
		RDI, Power Control (LMS, FOIS, ICMS)			01	
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MSE W

Name of the Post/Category	Sr. Section Engineer
Stream	Workshop
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory- Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF/ MCF
			Wagon Production Unit		01	Any wagon prod, unit / workshop
			RWF		01	RWF
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Stream specific theory		MWT-01	03	STC
	PRACT	Field Visit	C&W Depot		02	Respective Places
			Diesel Shed		01	
			C&W Workshop		04	

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Stream specific theory		MWT-02	05	STC
		Stream specific theory		MWT-04	02	BTC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT-11	02	ZRTI
	PRACT	Field Visit	Stores		01	Parent Unit
			CMT Lab		01	
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training in C&W/Diesel/EMU/Elec. loco workshop			05	Parent Unit
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJR C

Name of the Post/Category	Junior Engineer
Stream	C&W
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory-Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF/MCF
			Wagon Production Unit		01	Any wagon prod, unit / workshop
			RWF		01	RWF
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Welding & Non-Destructive Testing		MRT-10	01	STC
		Stream specific theory		MCT-01	04	STC
	PRACT	Field Visit	C&W Workshop		03	Respective
			CMT Lab		01	
			Diesel Shed		01	

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Stream specific theory		MCT-02	08	STC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT-11	02	ZRTI
	PRACT	Field Visit	Stores		01	Parent Unit
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training C & W Depot			04	Parent Unit
		Divisional control office (LMS, FOIS, ICMS)			01	
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJR D

Name of the Post/Category	Junior Engineer
Stream	Diesel
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory- Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		01	RCF/MCF
			RWF		01	RWF
			DEMU/SPART Manufacturing Unit		01	ICF
			Diesel Production Units and RDSO		02	One week each at DLW/ DMW/DLF(MEW) & RDSO
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Welding & Non-Destructive Testing		MRT-10	01	STC
		Stream specific theory		MDT-01	04	STC/ DTTC
	PRACT	Field Visit	CMT Lab		01	Respective Places
			Diesel Loco POH Shop & Electric Loco POH Shop		03	
			DEMU Shed		01	

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Stream specific theory		MDT- 02 M/E	08	STC/ DTTC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT- 11	02	ZRTI
	PRACT	Field Visit	Stores		01	Parent Unit
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training Diesel Shed			04	Parent Unit
		RDI, Power Control (LMS, FOIS, ICMS)			01	
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJR W

Name of the Post/Category	Junior Engineer
Stream	Workshop
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT-01	03	STC
		Role of Mechanical Dept.		MRT-02	01	
		Rolling Stock Theory- Carriage		MRT-03	03	
		Rolling Stock Theory - Wagon		MRT-04		
		Rolling Stock Theory - Diesel Loco, DEMU, SPART, Train Sets: MEMU/ EMU		MRT-05		
		Industrial Safety, First aid & Firefighting		MRT-06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF/MCF
			Wagon Production Unit		01	Any wagon prod, unit / workshop
			RWF		01	RWF
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT-07	01	STC
		Managerial Skills		MRT-09	02	STC
		Welding & Non-Destructive Testing		MRT-10	01	STC
		Stream specific theory		MWT-01	03	STC
	PRACT	Field Visit	C&W Depot		02	Respective Places
			Diesel Shed		02	
			C&W Workshop		02	

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Stream specific theory		MWT-02	05	STC
		Stream specific theory		MWT-04	02	BTC
		Accident & Disaster management		MRT-08	01	IRIDM
		Train operations with signaling		MRT-11	02	ZRTI
	PRACT	Field Visit	Stores		01	Parent Unit
			CMT Lab		01	
			Drawing Office and HQ Control office		01	Respective Unit/Units
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training in C&W/Diesel/EMU/Electric loco workshop			05	Parent Unit
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJI C

Name of the Post/Category	Junior Engineer
Stream	C&W
Mode of appointment	Promotion through LDCE
Min. Qualification	XII Std/ ITI
Total Duration of Training Period	52 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical Engineering	MET-05		
		Theory of Machines	MET-08		
II	THEO	Strength of Materials	MET-06	07	STC
		Heat Engines & Thermodynamics, Refrigeration and Air-conditioning	MET-07		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Industrial Engineering	MET-11		
		Accident & Disaster Management	MRT-08	01	IRIDM
		Train operations with signaling	MRT-11	02	ZRTI
		Introduction to Rolling stock (Coach, Wagon. Diesel Loco, DEMU, SPART)	MRT-13	03	STC

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Industrial Safety, First aid & Firefighting		MRT-06	01	STC
		Tender & Contract		MRT-07	01	
		Managerial Skills		MRT-09	02	STC
		Computer Awareness		MRT-14	01	
		Technical English		MRT-15	01	
		Stream specific theory		MCT-01	04	
	PRACT	Field Visit	C&W Workshop		01	C&W Workshop
			Divisional control office		01	Respective Unit
			PU Training		01	ICF/RCF/ MCF
IV	THEO	Stream specific theory		MCT-02	08	STC
	PRACT	Practical Training C & W Depot			01	Parent Unit
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJI D

Name of the Post/Category	Junior Engineer
Stream	Diesel
Mode of appointment	Promotion through LDCE
Min. Qualification	XII Std/ ITI
Total Duration of Training Period	52 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical Engineering	MET-05		
		Theory of Machines	MET-08		
II	THEO	Strength of Materials	MET-06	07	STC
		Heat Engines & Thermodynamics, Refrigeration and Air-conditioning	MET-07		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Industrial Engineering	MET-11		
		Accident & Disaster Management	MRT-08	01	IRIDM
		Train operations with signaling	MRT-11	02	ZRTI
		Introduction to Rolling stock (Coach, Wagon. Diesel Loco, DEMU, SPART)	MRT-13	03	STC

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Industrial Safety, First aid & Firefighting		MRT-06	01	STC
		Tender & Contract		MRT-07	01	
		Managerial Skills		MRT-09	02	STC
		Computer Awareness		MRT-14	01	
		Technical English		MRT-15	01	
		Stream specific theory		MDT-01	04	
	PRACT	Field Visit	Diesel POH Workshop		01	Respective Unit
			Divisional control office		01	
			Diesel Loco PU Training		01	DLW/DMW/ DLF (MEW) & RDSO
IV	THEO	Stream specific theory		MDT-03 M/E	04	STC/DTTC
		Stream specific theory		MDT-04 M/E	04	STC/DTTC
	PRACT	Diesel Shed			01	Parent Unit
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJI W

Name of the Post/Category	Junior Engineer
Stream	Workshop
Mode of appointment	Promotion through LDCE
Min. Qualification	XII Std/ ITI
Total Duration of Training Period	52 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical Engineering	MET-05		
		Theory of Machines	MET-08		
II	THEO	Strength of Materials	MET-06	07	STC
		Heat Engines & Thermodynamics, Refrigeration and Air-conditioning	MET-07		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Industrial Engineering	MET-11		
		Introduction to Rolling stock (Coach, Wagon. Diesel Loco, DEMU, SPART)	MRT-13	03	
		Accident & Disaster Management	MRT-08	01	IRIDM
		Welding & Non-Destructive Testing	MRT-10	01	STC
	PRACT	Practical Training in Workshop		01	Parent Unit

Session	Type	Subjects		Subject	Duration in weeks	Activity Centre
III	THEO	Industrial Safety, First aid & Firefighting		MRT-06	01	STC
		Tender & Contract		MRT-07	01	
		Managerial Skills		MRT-09	02	STC
		Computer Awareness		MRT-14	01	
		Technical English		MRT-15	01	
		Stream specific theory		MWT-03	06	
	PRACT	Field Visit	PU Training		01	ICF/RCF/MCF
IV	THEO	Trade specific theory		MWT-04	04	BTC
	PRACT	Practical Training in Workshop			05	Parent Unit
		Practical Training in Welding specific			01	
		On Job Training			02	
	Refreshing /Examination/Viva				01	STC
TOTAL					**52**	

MODULE - MJP C

Name of the Post /Category	Junior Engineer
Stream	C&W
Mode of Appointment	Promotion Through seniority
Min. Qualification	----
Total Duration of Training Period	13 weeks

Session	Type	Subject	Subject code	Duration in days	Activity Centre
I	THEO	Computer Awareness	MRT-14	06	STC
		Industrial Safety, First aid & Fire Fighting	MRT-16	03	
		Accident and Disaster Management	MRT-17	02	
		Supervisory Skills	MRT-18	03	
		Technical English	MRT-19	03	
		Manufacturing Processes (MP)	MET-12	04	
		Industrial Engineering	MET-13	01	
		Engineering Drawing (ED)	MET-14	02	
		Sub Total (Theory)		**24**	
II	THEO	Stream Specific Theory	MCT-03 MCT-04	**24**	STC
	PRACT	C&W POH Workshop/Production Unit		06	Respective Places
		Practical training C & W depot		06	
		On Job training		12	
		Total		**24**	
III		Refreshing/Examination/Viva		06	
Grand total				**78**	

MODULE - MJP D

Name of the Post /Category	Junior Engineer
Stream	Diesel
Mode of Appointment	Promotion Through seniority
Min. Qualification	----
Total Duration of Training Period	13 weeks

Session	Type	Subject	Subject code	Duration in days	Activity Centre
I	THEO	Computer Awareness	MRT-14	06	STC
		Industrial Safety, First aid & Fire Fighting	MRT-16	03	
		Accident and Disaster Management	MRT-17	02	
		Supervisory Skills	MRT-18	03	
		Technical English	MRT-19	03	
		Manufacturing Processes (MP)	MET-12	04	
		Industrial Engineering	MET-13	01	
		Engineering Drawing (ED)	MET-14	02	
		Sub Total (Theory)		**24**	
II	THEO	Stream Specific Theory	MDT-05 M/E	**24**	STC
	PRACT	Diesel Loco POH Workshop		06	Respective Places
		Practical training Diesel Shed		06	
		On Job training		12	
		Total		**24**	
III		Refreshing/Examination/Viva		06	
Grand total				**78**	

MODULE - MJP W

Name of the Post /Category	Junior Engineer
Stream	Workshop
Mode of Appointment	Promotion Through seniority
Min. Qualification	----
Total Duration of Training Period	13 weeks

Session	Type	Subject	Subject code	Duration in days	Activity Centre
I	THEO	Computer Awareness	MRT-14	06	STC
		Industrial Safety, First aid & Fire Fighting	MRT-16	03	
		Accident and Disaster Management	MRT-17	02	
		Supervisory Skills	MRT-18	03	
		Technical English	MRT-19	03	
		Manufacturing Processes (MP)	MET-12	04	
		Industrial Engineering	MET-13	01	
		Engineering Drawing (ED)	MET-14	02	
		Sub Total (Theory)		**24**	
II	THEO	Stream Specific Theory	MWT-05	**24**	STC
	PRACT	Diesel loco POH Work shop		06	Respective Places
		C&W POH Workshop/Production Unit		06	
		On Job training		12	
		Total		**24**	
III		Refreshing/Examination/Viva		06	
Grand total				**78**	

Annexure - II

Subject wise detailed modules

Index of subjects common to all streams

SUBJECT NAME	RAILWAY ORGANISATION & MANAGEMENT
SUBJECT CODE	MRT - 01
MODULE	MSE, MJR & MJI

SL NO.	TOPIC	TIME IN HRS
1	Organization of Indian Railways	03
2	Recruitment and training	03
3	General Conditions of service, APAR	03
4	Medical Attendance Rules	02
5	Leave Rules	03
6	Pass Rules	03
7	Conduct Rules	02
8	DAR	06
9	Payment of Wages Act	02
10	Minimum Wages Act	01
11	Workmen's Compensation Act	02
12	Hours of Employment Regulations	03
13	Factories Act	02
14	Industrial Disputes Act	03
15	NPS, RESS, PF, Pension & Other Retirement benefits	04
16	Welfare Measures, Privilege for differently abled person	03
17	Organization and objectives of Stores branch	02
18	Classification and Codification of Stores	03
19	RTI, CPGRAMS	03
20	Purchase Agencies: IREPS, Use of DSC, GeM,	03
21	Procurement of stores - Non-Stock	04
22	Recoupment of stores - Stock item	04
23	Drawal of Stores	03
24	Scrap disposal	03
25	Disposal of surplus stores	01
26	Inventory Control, IMMIS	03
27	Organization and objectives of Accounts branch	02
28	Budgeting	03
29	Parliamentary control of Railways	02
30	Classification of Expenditure	03
31	Stock Verification	02
32	Delegation of Powers, MSOP	01
33	M&P, Rolling stock and Works Programme: IRPSM, IRMNP and RSP portals	06
34	Audit Paras	03
35	Yoga & meditation	06
36	Rajbhasha	03
37	REVIEW	03
	Total	**108**

SUBJECT NAME	**ROLE OF MECHANICAL DEPARTMENT**
SUBJECT CODE	**MRT-02**
MODULE	**MSE, MJR & MJI**

SL NO.	TOPIC	TIME IN HRS
1	Organization and objectives of Mechanical Dept.	03
2	Types of Rolling stock- Production/Repair/Maintenance practices of same	02
3	Production units: Brief History, Activities	03
4	Workshops: Role of C&W Workshop, Objectives, Organization, Layout, Activities of different shops	06
5	Workshops: Role of Diesel POH Workshop, Objectives, Organization, Layout, Activities of different shops	05
6	C&W Depot: Role of C&W Depot, Objectives, Organization, Layout, Activities of different sections	04
7	Diesel Sheds and EMU/MEMU/DEMU Shed: Role of Sheds, Objectives, Organization, Layout, Activities of different sections	06
8	Latest Development in Mechanical Dept. /Other Organizations- RDSO, IRIMEE, RITES, CONCOR, CAMTECH	02
9	EnHM: Role of EnHM, Organization, objectives, funds for EnHM works	02
10	Review	03
	Total	**36**

SUBJECT NAME	ROLLING STOCK THEORY
SUBJECT CODE	MRT-03, 04 & 05
MODULE	MSE, MJR

SL NO.	TOPIC	TIME IN HRS
	MRT-03	
1	Types of Coach and their nomenclature, Codal life, Transportation Codes, Coach numbering system	03
2	Introduction of Coach Shell: ICF and LHB Coach	02
3	Wheel set- wheel, axle & bearings	04
4	Introduction of Different types of Bogie for Rolling Stock and Suspension system including Air Suspension	06
5	Types of Draw and Buffing Gears in Coaches and Wagons: An Introduction	06
6	Air & EP Brake system; Brake riggings	09
7	Furnishing items: ICF and LHB, EMU/MEMU coaches, Safety & amenity fittings	04
8	Maintenance practice in coaching stock	03
	MRT-04	
9	Types of wagon stock, their nomenclature, Codal life, Transportation Codes, Wagon Numbering System	03
10	Types of bogies in wagon stock	03
11	Features of special wagons/latest wagons	03
12	Pattern of freight train examination	03
13	Weighbridge, WILD and other way side monitoring systems: Overview	03
	MRT-05	
14	Diesel locomotives - types, Introduction of Electric Loco, EMU/MEMU & Train-Sets	03
15	Important systems in a diesel locomotive: Fuel oil, lube oil, cooling water, turbo supercharging & brake system	15
16	Electrical control system in Locomotives and Train-Sets/EMU/MEMU	06
17	Latest development in Rolling Stock including Locomotives & Train-Sets	06
18	DEMU: Power and Trailing cars, important features and systems	05
19	SPART- Introduction, Basic arrangements, importance.	01
20	Visit to model room/coaching/wagon depot/workshop & loco shed	14
21	Review	06
	Total	**108**

SUBJECT NAME	INDUSTRIAL SAFETY, FIRST AID & FIRE FIGHTING
SUBJECT CODE	MRT-06
MODULE	MSE, MJR & MJI

SL NO.	TOPIC	TIME IN HRS
1	Causes of fire; Identification of unsafe conditions and unsafe acts	02
2	Identifying and handling of various types of fire extinguishers	04
3	Precautions to be taken while extinguishing fire	02
4	Render first aid to the burn injuries Render first aid to persons affected by suffocation; Communication	02
5	Scope and Rules of first Aid; Structure and function of body	02
6	General idea about circulation of blood; Wound & Hemorrhages; Dressing & Bandages	02
7	Shock & its management; Asphyxia & Artificial respiration	02
8	Injuries to bones & joints - fractures; Unconsciousness and General rules for the treatments of unconsciousness person	02
9	Practical demonstration of Transport of injured persons, stretcher exercises, preparing and blanketing stretcher, Basic Life Support Training	03
10	Principles of Accident, Causation & its Prevention, Unsafe Acts & Unsafe Conditions	03
11	House Keeping, EOT Crane Operation & Material Handling, 5S	02
12	Safety on Small Tools, Electrical Appliances, Welding & cutting gases, Working on heights	02
13	Use of PPE, Mock Drills	03
14	Role of Supervisors on Safety, Accident Reporting & Investigations	02
15	Review	03
	Total	**36**

SUBJECT NAME	TENDERS & CONTRACT MANAGEMENT
SUBJECT CODE	MRT-07
MODULE	MSE, MJR & MJI

SL NO.	TOPIC	TIME IN HRS
1	Introduction on Estimate preparation to sanctioning and from Detailed Estimate to entering into contract agreement	02
2	Overview of contract management	02
3	Types of contracts, revenue contracts / work contracts, schedule of powers for approval of works, works programme	03
4	Service Contracts, GCC for services, SBD	03
5	Initiation of tenders, Types of tenders, Selection of tenders Sanction to float tender & Tender notice	03
6	Preparation of tender documents, Elements of tender document, General conditions of contract, Special conditions of contract, Tender rules and clauses	03
7	Awareness about features of IREPS, Tender opening and processing, Opening of tenders, Tabulation statement & Briefing note	03
8	Finalization of tenders - Technical evaluation, Tender committee nomination, Tender committee deliberations and recommendations	03
9	Awarding of Contract, Acceptance of tender, Issue of letter of acceptance & Starting of contract	03
10	Execution of Contract- Fulfillment of contract obligations, Inspection of work, Record of work done, Payment to the contract & Monitoring of progress, Shramik kalyan portal	03
11	Vigilance angle to contracts, Do’s and Don'ts, Arbitration	02
12	Case Studies, cases in workshops, open line & Diesel Sheds, Mechanized Laundry Contract under BOOT model	04
13	Review	02
	Total	**36**

SUBJECT NAME	ACCIDENT & DISASTER MANAGEMENT
SUBJECT CODE	MRT-08
MODULE	MSE, MJR & MJI

SL NO.	TOPIC	TIME IN HRS
1	Definition of Disaster, Types of Accidents, Accident Manual, Rail wheel interaction	02
2	Permanent way parameters	03
3	Readings in permanent way	
4	Rolling stock parameters	04
5	Readings in rolling stock	
6	Signal aspects to be recorded at the accident site	02
7	Recording of track, rolling stock	02
8	Role of supervisors at the accident site	02
9	Features of Disaster Management, Disaster Management Plan of Zonal Railways	02
10	Disaster Management Equipment in Railways, Composition and upkeep of ART/ARMV/SPART/ 140T Crane, Hooter Codes	02
11	Civil Defense & First-Aid after an accident	03
12	Duties of Officials at Accident Site	02
13	Rescue Extrication Techniques & Fire Fighting	02
14	Rescue Techniques- Medical Relief, Golden Hour, CPR	03
15	Duties of on-board staff at accident site	02
16	Operation of 140T Crane at Accident Sites, Major Systems of Cranes	02
17	Demonstration of HRE/ HRD, Mock Drill	03
	Total	**36**

SUBJECT NAME	**MANAGERIAL SKILLS**
SUBJECT CODE	**MRT-09**
MODULE	**MSE, MJR & MJI**

SL NO.	TOPIC	TIME IN HRS
1	Leadership	12
2	Motivation	06
3	Communication Skills	09
4	Time Management	03
5	Stress management	03
6	Ethical Decision-making	03
7	Computer Applications: Word, Excel, Power Point; including Hands on in Computer Lab	09
8	Project management Concepts	15
9	Teamwork & Teambuilding	06
10	Negotiations	06
	Total	**72**

SUBJECT NAME	**Welding and Non-Destructive Testing**
SUBJECT CODE	**MRT-10**
MODULE	**MJR & MJI-W**

SL NO.	TOPIC	TIME IN HRS
1	Welding - Principle and applications in various fabrication work, different types of Welding Processes, Weldability of material (MS & SS) and Welding metallurgy	03
2	Arc welding process and principle, tools required for Arc welding, Setting welding current & voltage, Maintenance of welding machine, SS Welding, Welding of dissimilar metals	06
3	Job preparation, Electrodes, Electrode selection for difference welding work, Types of Joints, Welding Symbols used in Drawings	03
4	Safety precautions, Do's & Don'ts	02
5	Special Welding Techniques: $C0_2$ welding- Method, precautions etc.; C.I. welding; MIG & TIG welding work; seam welding; sub merged arc welding; flash butt welding	06
6	Different Cutting and Gauging Processes, Plasma Cutting: Electrode Arc Cutting, OA Cutting, Laser Cutting	03
7	Introduction to NDT, Various types of NDT method like LPT, Magna flux, Radiography, Ultra Sonic Flaw Detection etc	04
8	Defects & remedies in welding	02
9	Robotic Welding, Welding Automation	02
10	ISO 3834, WPS Preparation and Welder Qualification	03
11	Review	02
	Total	**36**

SUBJECT NAME	**Train Operation with Signaling**
SUBJECT CODE	**MRT-11**
MODULE	**MSE, MJR & MJI-C&D**

SL NO.	TOPIC	TIME IN HRS
1	Organization of Operating Department	
2	G&SR	
3	Safety rules	
4	Classification of stations	
5	Systems of working	
6	Essentials of Absolute automatic one train only system	
7	Signals of all types	
8	Working of Control Organization	
9	Abnormal working	
10	Line capacity & Important operating statistics	
11	Accident Management	
12	Working of Commercial Department	
13	Customer Care	
14	Review	
	Total	**72***

***Total 72 hrs – Exact distribution to be decided by ZRTI**

SUBJECT NAME	**Integrated Course at IRIMEE**
SUBJECT CODE	**MRT-12**
MODULE	**MSE, MJR**

SL NO.	TOPIC (*)	TIME IN WEEKS
1	Mechatronics	
2	Reliability Engineering	
3	Operation and Maintenance of Crane	
4	Advancement in Rolling Stock Technology	
5	Welding and Non-Destructive Testing	
6	E-office & Manual of Office procedure	
	Total	**04**

(*): These topics are only illustrative. Exact course content and detailing would be done by IRIMEE.

SUBJECT NAME	INTRODUCTION TO ROLLING STOCK
SUBJECT CODE	MRT-13
MODULE	MJI

SL NO.	TOPIC	TIME IN HRS
1	Types of Coach and their nomenclature, Codal life, Transportation Codes, Coach numbering system	03
2	Introduction of Coach Shell: ICF and LHB Coach	02
3	Wheel set- wheel, axle & bearings	04
4	Introduction of Different types of Bogie for Rolling Stock and Suspension system including Air Suspension	06
5	Types of Draw and Buffing Gears in Coaches and Wagons: An Introduction	06
6	Air & EP Brake system; Brake riggings	09
7	Furnishing items: ICF and LHB, EMU/MEMU coaches, Safety & amenity fittings	04
8	Maintenance practice in coaching stock	03
9	Types of wagon stock, their nomenclature, Codal life, Transportation Codes, Wagon Numbering System	03
10	Types of bogies in wagon stock	03
11	Features of special wagons/latest wagons	03
12	Pattern of freight train examination	03
13	Diesel locomotives - types, Introduction of Electric Loco, EMU/MEMU & Train-Sets	03
14	Important systems in a diesel locomotive: Fuel oil, lube oil, cooling water, turbo supercharging & brake system	15
15	Electrical control system in Locomotives and Train-Sets/EMU/MEMU	06
16	Latest development in Rolling Stock including Locomotives and Train-Sets	06
17	DEMU: Power and Trailing cars, important features and systems	05
18	SPART- Introduction, Basic arrangements, importance.	01
19	Weighbridge, WILD and other way side monitoring systems: Overview	03
20	Visit to model room/coaching/wagon depot/workshop & loco shed	14
21	Review	06
	Total	**108**

SUBJECT NAME	**COMPUTER AWARENESS**
SUBJECT CODE	**MRT-14**
MODULE	**MJI, MJP**

SL NO.	TOPIC	TIME IN HRS
1	Introduction to Computers and Application of Computers/Windows, CMM, FMM	06
2	MS Word	09
3	MS Excel	09
4	MS Power Point	06
5	Internet usage	03
6	Review	03
	Total	**36**

SUBJECT NAME	**TECHNICAL ENGLISH**
SUBJECT CODE	**MRT-15**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Communication Vocabulary	03
2	Grammar - Important terms	06
3	Common Errors	06
4	Precis writing, Expansion of given idea	03
5	Comprehension	03
6	Official Correspondence	03
7	Business Correspondence	03
8	Social Correspondence	03
9	General Report Writing	03
10	Technical Report Writing	03
	Total	**36**

SUBJECT NAME	**INDUSTRIAL SAFETY, FIRST AID & FIRE FIGHTING**
SUBJECT CODE	**MRT - 16**
MODULE	**MJP- C, D & W**
DURATION	**3 Days**

SL NO.	TOPIC
1	Causes of fire; Identification of unsafe conditions and unsafe acts
2	Identifying and handling of various types of fire extinguishers
3	Precautions to be taken while extinguishing fire
4	Render first aid to the burn injuries; Render first aid to persons affected by suffocation; Communication
5	Scope and Rules of first Aid; Structure and function of body
6	General idea about circulation of blood; Wound & Hemorrhages; Dressing & Bandages
7	Shock & its management; Asphyxia & Artificial respiration
8	Injuries to bones & joints - fractures; Unconsciousness and General rules for the treatments of unconsciousness person
9	Practical demonstration of Transport of injured persons, stretcher exercises, preparing and blanketing stretcher
10	Principles of Accident, Causation & Its Prevention, Unsafe Acts & Unsafe Conditions
11	House Keeping & Material Handling, 5S
12	Safety on Small Tools and Electrical Appliances
13	Use of PPE
14	Role of Supervisors on Safety, Accident Reporting & Investigations
15	Review

SUBJECT NAME	**ACCIDENT & DISASTER MANAGEMENT**
SUBJECT CODE	**MRT - 17**
MODULE	**MJP- C, D & W**
DURATION	**2 Days**

SL NO.	TOPIC
1	Definition of Disaster, Types of Accidents, Accident Manual, Rail wheel interaction
2	Permanent way parameters, Readings in permanent way
3	Rolling stock parameters, Readings in rolling stock
4	Signal aspects to be recorded at the accident site
5	Recording of track, Rolling Stock
6	Role of supervisors at the accident site
7	Disaster Management Equipment in Railways, Composition and upkeep of ART/ARMV/SPART/ 140T, Hooter Codes
8	Civil Defense & First-Aid after an accident
9	Duties of Officials at Accident Site
10	Rescue Extrication Techniques & Fire Fighting
11	Rescue Techniques- Medical Relief, Golden Hour, CPR
12	Duties of on-board staff at accident site

SUBJECT NAME	**SUPERVISORY SKILLS**
SUBJECT CODE	**MRT - 18**
MODULE	**MJP- C, D & W**
DURATION	**3 Days**

SL NO.	TOPIC
1	Leadership & Leadership styles
2	Motivation
3	Communication Skills
4	Time Management
5	Stress management
6	Interpersonal Skills
7	Ethics

SUBJECT NAME	**TECHNICAL ENGLISH**
SUBJECT CODE	**MRT-19**
MODULE	**MJP- C, D & W**
DURATION	**3 Days**

SL NO.	TOPIC
1	Communication Vocabulary
2	Grammar - Important terms
3	Common Errors
4	Official Correspondence
5	Business Correspondence
6	General Report Writing
7	Technical Report Writing

SUBJECT NAME	**APPLIED MECHANICS**
SUBJECT CODE	**MET-01**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Scalars and Vectors	01
2	Composition & resolution of forces	05
3	Equilibrium	03
4	Parallel forces & Couples	03
5	Plane motion	03
6	Newton's laws of motion	06
7	Collision of Elastic bodies	04
8	Motion of connected bodies	04
9	Work, power and Energy	03
10	Friction	06
11	Motion of Rotation	03
12	Motion along circular path	03
13	Simple Harmonic Motion	03
14	Simple lifting machines	03
15	Review	04
	Total	**54**

SUBJECT NAME	**HYDRAULICS**
SUBJECT CODE	**MET-02**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction to Basic concepts	02
2	Fluid Pressure	02
3	Hydrostatics	02
4	Buoyancy & Floatation	02
5	Hydro Kinematics	02
6	Bernoulli's Theorem	02
7	Flow through Orifices & mouth pieces	02
8	Impact of jets	02
9	Water wheels	02
10	Impulse Turbines	02
11	Reaction Turbines	02
12	Performance of turbines	02
13	Reciprocating Pumps	02
14	Centrifugal Pumps	02
15	Performance of pumps	02
16	Pumping Devices	02
17	Review	04
	Total	**36**

SUBJECT NAME	MANUFACTURING PROCESSES
SUBJECT CODE	MET-03
MODULE	MJI

SL NO.	TOPIC	TIME IN HRS
1	Production of metals	06
2	Hot and cold working	06
3	Smithy and forging	03
4	Foundry	03
5	Metal Joining	12
6	Metal Cutting Operations using different machines: Lathe, Drilling machine, Shaper and Planner, Grinding, Milling (CNC& non-CNC) etc.	12
7	Machining Operations in Wheel Shop	09
8	Basics of Metrology and Calibration	06
9	Physical Testing of materials (DT & NDT)	06
10	Un-conventional machines (Laser, Electron Beam etc)	06
11	Review	03
	Total	**72**

SUBJECT NAME	**ENGINEERING DRAWING**
SUBJECT CODE	**MET-04**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction about Engg. Drg.	01
2	Drawing Board, Instruments & its use	01
3	Lettering & Types of Lines	03
4	Dimensioning systems	03
5	Geometrical Constructions	03
6	Scales	06
7	Engineering curves	06
8	Principle of Projection - Projection of Points, Lines, Planes & Solids	18
9	Section of Solids	09
10	Isometric Projections of solids & M/C Components	08
11	Orthographic views of Solids & M/C Components	08
12	Review	06
	Total	**72**

SUBJECT NAME	**ELECTRICAL ENGINEERING**
SUBJECT CODE	**MET-05**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Current & Ohms Law	02
2	Simple DC Circuits & Network Analysis	04
3	Magnetism & Electromagnetism	03
4	Electromagnetic Induction	03
5	D.C. Generator & D.C Motor	04
6	Fundamentals of A.C	03
7	Single Phase A.C. Circuit & Three Phase A.C. Circuit	06
8	Alternators	02
9	Induction motors - Single phase & three phase	06
10	Transformer	03
11	Batteries, electrical instruments & measurements	04
12	Introduction to electrical energy generation, electrical safety, energy conservation	04
13	Basic Electronics	06
14	Review	04
	Total	**54**

SUBJECT NAME	**STRENGTH OF MATERIALS**
SUBJECT CODE	**MET-06**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction about materials & its properties	02
2	Simple stress and strain	12
3	Elastic constants	06
4	Centre of gravity	03
5	Moment of inertia	07
6	Shear force & bending Moment of beams	20
7	Stresses in beams	08
8	Torsion of shafts	08
9	Review	06
	Total	**72**

SUBJECT NAME	HEAT ENGINES & THERMODYNAMICS, REFRIGERATION & AIR CONDITIONING
SUBJECT CODE	MET-07
MODULE	MJI

SL NO.	TOPIC	TIME IN HRS
1	Introduction	02
2	Properties of Gases, Laws of Thermodynamics	06
3	Thermodynamic process of perfect gases	04
4	Heat and mass transfer	06
5	Steam	03
6	Air cycles	03
7	Internal combustion engines	06
8	IC Engine Systems	04
9	Testing of IC Engine	02
10	Compressors	04
11	Refrigerants	04
12	Refrigeration Cycles	06
13	Properties of moist air	06
14	Psychrometry of Air-Conditioning Process, Load calculation	08
15	Application of Air-conditioning in Railways	04
16	Reviews.	04
	Total	**72**

SUBJECT NAME	**THEORY OF MACHINES**
SUBJECT CODE	**MET-08**
MODULE	**MJI**

SL NO.	TOPIC	TIME in HRS.
1	Mechanisms	04
2	Brakes and dynamometers	04
3	Belt, rope and chain drive	04
4	Gears	06
5	Clutches	02
6	Governor	04
7	Flywheel and turning moment diagram	04
8	Balancing of masses	04
9	Review	04
	Total	**36**

SUBJECT NAME	**MATERIAL SCIENCE**
SUBJECT CODE	**MET-09**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction	02
2	Solid phases, phase diagrams and phase transformation, Iron carbon equilibrium diagram	03
3	Heat treatment	06
4	Types of alloy steels	02
5	Non-ferrous metals	02
6	Paint, Enamel, Varnishes and lacquers	02
7	Classification of railway materials	02
8	Plastic and synthetic materials	02
9	Review	03
	Total	**24**

SUBJECT NAME	**MACHINE DESIGN AND DRAWING**
SUBJECT CODE	**MET-10**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction about Design principle	02
2	Design of keys	02
3	Design & Drawing of screw thread	04
4	Design of coupling	04
5	Design of welded joints	03
6	Design & Drawing of cotter& knuckle joints	04
7	Design & Drawing of Riveted joint	04
8	Design & Drawing of CAM profile	04
9	Design of Coil springs	03
10	Design of Laminated springs	02
11	Limits, Fits & Tolerance	04
12	Orthographic & Isometric Drawing of machine components	02
13	Assembly Drg of Foot Step Bearing	02
14	Assembly Drg of Plummer Block	02
15	Assembly Drg of Screw Jack	02
16	Assembly Drg of Tail Stock	02
17	Review	02
	Total	**48**

SUBJECT NAME	**INDUSTRIAL ENGINEERING**
SUBJECT CODE	**MET-11**
MODULE	**MJI**

SL NO.	TOPIC	TIME IN HRS
1	Introduction	02
2	Method Study	04
3	Principle of Motion Economy	02
4	Plant Layout	02
5	Work Measurement	06
6	Network Techniques	06
7	Exercise on Network	02
8	Incentive Schemes in Railway Workshops	06
9	Job Evaluation and Merit Rating	03
10	Review	03
	Total	**36**

SUBJECT NAME	**MANUFACTURING PROCESS**
SUBJECT CODE	**MET-12**
MODULE	**MJP- C, D & W**
DURATION	**04 Days**

SL NO.	TOPIC
1	Production of metals
2	Hot and cold working
3	Smithy and forging
4	Foundry
5	Metal Joining
6	Metal Cutting Operations using different machines: Lathe, Drilling machine, Shaper and Planner, Grinding, Milling (CNC& non-CNC) etc.
7	Machining Operations in Wheel Shop
8	Basics of Metrology and Calibration
9	Physical Testing of materials (DT & NDT)
10	Un-conventional machines (Laser, Electron Beam etc.)
11	Review

SUBJECT NAME	**INDUSTRIAL ENGINEERING**
SUBJECT CODE	**MET-13**
MODULE	**MJP- C, D & W**
DURATION	**01 Days**

SL NO.	TOPIC
1	Introduction
2	Method Study
3	Principle of Motion Economy
4	Plant Layout
5	Work Measurement
6	Incentive Schemes in Railway Workshops
7	Job Evaluation and Merit Rating

SUBJECT NAME	**ENGINEERING DRAWING**
SUBJECT CODE	**MET-14**
MODULE	**MJP- C, D & W**
DURATION	**02 Days**

SL NO.	TOPIC
1	Introduction about Engg. Drg.
2	Drawing Board, Instruments & its use
3	Lettering & Types of Lines
4	Dimensioning systems
5	Geometrical Constructions
6	Scales
7	Engineering curves
8	Principle of Projection - Projection of Points, Lines, Planes & Solids

Index for Stream wise subjects

SUBJECT NAME	**C & W THEORY-01**
SUBJECT CODE	**MCT-01**
MODULE	**MSE-C, MJR-C, MJI-C**

Sl. No.	Topic	Duration in Hours
1	Design, Repair & Maintenance of Shell: ICF, LHB, MEMU/EMU coaches and all variants like double decker, Tejas, Gatiman, Hamsafar, Dindayalu, Project Swarn & Project Utkristh, Train-sets etc.	18
2	Wheel & its defects, Wheel shelling in LHB coaches	06
3	Axles & bearings of all rolling stocks including MSU	06
4	Air Brake System: Components, BMBC, EP brake, WSP, Pipe joints, Testing of coach brake, Loco capability test, continuity test	32
5	Repair and maintenance of Passenger Amenities and Safety fittings	06
6	Bogie and Suspension system including Air Suspension: Failure & remedial features, Repair and Maintenance, FIBA	12
7	Couplings & Buffers, IRS, CBC, Schaku, Dellnor, BDG: Design, repair and maintenance	18
8	Train Examination -Coaches: Maintenance schedules, Revised RPC-IV, Issue of BPC, CMM, En-route trouble shooting	08
9	Infrastructure requirement for coach maintenance: Pit lay-out, Sick line lay-out, Rake link, M&P Pit occupation chart, automated coach washing plant, warranty claims of coaching items	18
10	IRCA Part IV, Modifications, TSOs, CAIs, Technical Pamphlets	06
11	Latest JPOs in Coaching Stock	02
12	Visit to major coaching depot	06
13	Review	06
	Total	**144**

SUBJECT NAME	**C & W THEORY-02**
SUBJECT CODE	**MCT-02**
MODULE	**MSE-C, MJR-C, MJI-C**

Sl. No.	Topic	Duration in Hours
1	Train lighting & Air-Conditioning: Maintenance of Battery and Battery box, RMPU, Lay-out of TL & AC equipment in Non-AC/AC and Power cars, Alternator, Invertor, RRU, IVC (inter vehicle couplers), SG, EOG, HOG	24
2	Toilet Systems: WRA and plumbing system, Bio toilets & Bio-vacuum toilets	06
3	EnHM: MCC, OBHS, CTS, Pest control, Rodent control & Bed bugs control, Linen distribution, laundry: BOOT Laundry Equipment, disposal of solid waste, quick watering system, automatic coach washing plant, waste water recycling, Station cleaning, cleaning of IT device, electrical equipment	24
4	Design features of various wagons including Stainless steel wagons, Aluminum wagons, Higher Axle load wagons, BOBRN Wagon including its door opening mechanism	18
5	New pattern of Train examination of goods stock-CC/Premium/End to End, long haul, heavy haul, Issue of BPC, e-BPC, FMM	06
6	Wagon manufacturing - use of huck bolts	06
7	ODC: classification, procedure for sanction, movement guidelines	06
8	Container wagons-BLC Train operation and maintenance practice	06
9	IRCA Part III	12
10	Repair & maintenance of goods stock-ROH	12
11	Tank Wagons - repairs & maintenance	06
12	Twin pipe air brake system in wagon, BMBS in wagon, Brake Binding- Causes & remedies	12
13	Train Parting - Causes & remedies	12
14	Tippler operation, Silo loading; recovery of damages during loading unloading from private siding, warranty claims of wagon items	06
15	Accident Relief Train	06
16	Derailment Mechanism	06
17	Accident Investigation, CRS Inquiry	06
18	Disaster Management - Role of Supervisors	15
19	Prevention of accident on C&W account	12
20	ART/MFD/SPART/140T Crane Maintenance	09
21	Layout of Coaching & goods stock yard and its infrastructural facilities	12
22	Weigh bridge: AMC, test special, Calibration, action to be taken in case of overloading	06
23	WILD, Hot Box detector, Track side bogie monitoring system, Action to be taken on reporting	06

Sl. No.	Topic	Duration in Hours
24	Depot stores management	06
25	Marshaling of trains	06
26	Role of Supervisors to minimize sick figures/coach detachment/ineffective %	06
27	Visit to major coaching depot	06
28	Visit to major goods depot	18
29	Review	12
	Total	**288**

SUBJECT NAME	**C & W THEORY-03**
SUBJECT CODE	**MCT-03**
MODULE	**MJP-C**

Sl. No.	Topic	Duration in Hours
1	Overview of C&W organization	03
2	Design, Repair & Maintenance of Shell: ICF, LHB, MEMU/EMU coaches and all variants like double decker, Tejas, Gatiman, Hamsafar, Dindayalu, Project Swarn & Project Utkristh, Train-Sets etc.	06
3	Air Brake System: Components, BMBC, EP brake, WSP, Pipe joints, Testing of coach brake, Loco capability test, continuity test	09
4	Twin pipe air brake system in wagon, BMBS in wagon, Brake Binding -Causes & remedies	03
5	Repair and maintenance of Passenger Amenities and Safety fittings	03
6	Bogie and Suspension system including Air Suspension: Repair and Maintenance, FIBA	08
7	Wheel & its defects, Wheel shelling in LHB coaches, Axles & bearings of all rolling stocks including MSU	06
8	Couplings & Buffers, IRS, CBC, Schaku, Dellnor, BDG: Design, repair and maintenance	06
9	Train Parting - Causes & remedies	03
10	Train Examination -Coaches: Maintenance schedules, Revised RPC-IV, Issue of BPC, CMM, En-route trouble shooting	03
11	IRCA Part IV, Modifications, TSOs, CAIs, Technical Pamphlets, Latest JPOs in Coaching Stock	03
12	Train lighting & Air-Conditioning: Maintenance of Battery and Battery box, RMPU, Lay-out of TL & AC equipment in Non-AC/AC and Power cars, Alternator, Invertor, RRU, IVC (inter vehicle couplers), SG, EOG, HOG	16
13	Toilet Systems: WRA and plumbing system, Bio-toilets & Bio-vacuum toilets	03
	Total	**72**

SUBJECT NAME	**C & W THEORY-04**
SUBJECT CODE	**MCT-04**
MODULE	**MJP-C**

Sl. No.	Topic	Duration in Hours
1	Design features of various wagons including Stainless steel wagons, Aluminum wagons, Higher Axle load wagons, BOBRN Wagon including its door opening mechanism	06
2	New pattern of Train examination of goods stock-CC/Premium/End to End, long haul, heavy haul, Issue of BPC, e-BPC, FMM	03
3	Wagon manufacturing - use of huck bolts	03
4	ODC: classification, procedure for sanction, movement guidelines	03
5	Container wagons-BLC Train operation and maintenance practice	03
6	IRCA Part III	03
7	Repair & maintenance of goods stock-ROH	03
8	Tank Wagons - repairs & maintenance	03
9	Accident Relief Train	03
10	Derailment Mechanism	03
11	Accident Investigation, CRS Enquiry	03
12	Disaster Management - Role of Supervisors	03
13	Prevention of accident on C&W account	03
14	ART/MFD/SPART/140 T Crane Maintenance	03
15	WILD, Hot Box detector, Track side bogie monitoring system, Action to be taken on reporting	03
16	Depot stores management	03
17	Marshalling of trains	03
18	Role of Supervisors to minimize sick figures/coach detachment/ineffective %	03
19	Weigh bridge: AMC, Test special, Calibration, action to be taken in case of overloading	03
20	EnHM: MCC, OBHS, CTS, Pest control, Rodent control & Bed bugs control, Linen distribution, laundry: BOOT Laundry Equipment, disposal of solid waste, quick watering system, automatic coach washing plant, waste water recycling, Station cleaning, cleaning of IT device, electrical equipment	09
21	Layout of Coaching & goods stock yard and its infrastructural facilities	03
	Total	**72**

SUBJECT NAME	DIESEL LOCOMOTIVE THEORY (Common.) - 01
SUBJECT CODE	MDT-0I
MODULE	MSE-D, MJR-D, MJI-D

Sl. No.	Topic	Duration in Hours
1	Lay out of Locomotives, Single/Dual Cab design, Types of I.C. Engines and working, classification	06
2	Traction Machine, Tractive effort-speed characteristics and co efficient of Adhesion (Alco & HHP)	06
3	Supercharging principles, methods and various testing parameters, Air and Computer control brake system (Alco & HHP)	06
4	Fuel system - components, function, defects and remedy, Fuel injection system (Alco & HHP)	06
5	Lube oil system - components, function, defects and remedy (Alco & HHP)	06
6	Cooling water system - components, function, defects and remedy, Radiator fan - principle, operation and maintenance (Alco & HHP)	06
7	Layout of shop and shed, Schedule of maintenance (Alco & HHP), Shed management, Record keeping, Outages, Super checking	06
8	Loco maintenance procedure; Bogies- types, load transfer, transmission of TE, suspension system; Cattle guard, gear case, wheel profile, specification & defect, coupling, bearing fitment etc. (Alco & HHP)	06
9	REMMLOT and Vigilance Control Device	06
10	GE locos- introduction, features, advantages etc	06
11	Various types of Transmission, feature of an Ideal transmission in Diesel Loco, AC-DC, AC-AC transmission	12
12	Various rotating equipment such as TA, TM, EG/CA, AG, DB Blower, Fuel booster pump motor - Description /Overhauling/Repair/Testing, common problems & remedy (Alco & HHP), ECC & CCEM in Alco	18
13	Excitation systems and Dynamic brake system (Alco & HHP), Transition system - circuit analysis, defects and remedy for Alco	12
14	Microprocessor based controls, APU, DEMU DPC, Distributed Power Control System (DPCS)	12
15	Types of governors, overhauling procedure, testing methods	12
16	Various safety & Misc items- Cab equipment, Driver seat, Wiper, Horn, Head light, Sanding equipment, Hand brake, Emergency switches and alarm fitted in Loco - working principles (Alco & HHP)	12
17	Testing of Engines - Dry-run-Test, Blow-bye test, Random test, Load Box testing, MU operation testing	06
	Total	**144**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(MECHANICAL)-02 M**
SUBJECT CODE	**MDT-02 M**
MODULE	**MSE-D, MJR-D**

Sl. No.	Topic	Duration in Hours
1	Power pack – Cylinder head, cylinder liner, connecting rod, cam shaft etc (Alco & HHP)	48
2	Supercharging principles, methods and various testing parameters, Air and Computer Control Brake	36
3	Air compressor, types, function and overhauling procedures; Air-Dryer	30
4	Fuel system – components, function, defects and remedy, Fuel injection system (Alco & HHP)	22
5	Lube oil system – components, function, defects and remedy (Alco & HHP)	28
6	Cooling water system – components, function, defects and remedy, Radiator fan – principle, operation and maintenance (Alco & HHP)	22
7	Layout of shop and shed, Schedule of maintenance (Alco & HHP), Shed management, Record keeping, Outages, Super checking	18
8	Loco maintenance procedure; Bogies- types, load transfer, transmission of TE, suspension system; Cattle guard, gear case, wheel profile, specification & defect, coupling, bearing fitment etc. (Alco & HHP)	30
9	GE loco- Mechanical System	12
10	DEMU-DPC Power pack and its mechanical system	24
11	Safety & Misc items- Cab equipment, Driver seat, Sanding equipment, Hand brake etc	06
12	Testing of Engines - Dry-run-Test, Blow-bye test, Random test, Load Box testing	12
	Total	**288**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(ELECTRICAL)-02 E**
SUBJECT CODE	**MDT-02 E**
MODULE	**MSE-D, MJR-D**

Sl. No.	Topic	Duration in Hours
1	Various types of Transmission, feature of an Ideal transmission in Diesel Loco, AC-DC, AC-AC transmission	12
2	Various rotating equipment such as TA, TM, EG/CA, AG, DB Blower, Fuel booster pump motor - Description /Overhauling/Repair/Testing, common problems & remedy (Alco & HHP), ECC & CCEM in Alco	90
3	Excitation systems and Dynamic brake system, Transition system - circuit analysis, defects and remedy for Alco	48
4	Microprocessor based controls, APU, Distributed Power Control System, Safety devices Flasher light, horn, Wiper, head light, cab light etc.	42
5	Types of governors, overhauling procedure, testing methods	06
6	Emergency switches and alarm fitted in Loco - working principles	06
7	Testing of Engines - Load Box testing, MU operation testing	12
8	DEMU-DPC Electrical and control system, EP Brake, SPART	24
9	GE Loco- Electrical System	12
10	Excitation systems, Dynamic brake system, circuit analysis, defects and remedy for HHP loco	36
	Total	**288**

SUBJECT NAME	DIESEL LOCOMOTIVE THEORY(MECHANICAL)-03 M
SUBJECT CODE	MDT-03 M
MODULE	MJI-D

Sl. No.	Topic	Duration in Hours
1	Power pack - Cylinder head, cylinder liner, connecting rod. cam shaft etc. (Alco & HHP)	48
2	Supercharging principles, methods and various testing parameters, Air and CCB (Alco & HHP)	42
3	Air compressor types, function and overhauling procedures (Alco & HHP); Air-Dryer	30
4	Fuel system - components, function, defects and remedy, Fuel injection system (Alco & HHP)	24
	Total	**144**

SUBJECT NAME	DIESEL LOCOMOTIVE THEORY(MECHANICAL)-04 M
SUBJECT CODE	MDT-04 M
MODULE	MJI-D

Sl. No.	Topic	Duration in Hours
1	Lube oil system - components, function, defects and remedy (Alco & HHP)	24
2	Cooling water system - components, function, defects and remedy, Radiator fan - principle, operation and maintenance (Alco & HHP)	18
3	Layout of shop and shed, Schedule of maintenance (Alco & HHP), Shed management, Record keeping, Outages, Super checking	18
4	Loco maintenance procedure; Bogies- types, load transfer, transmission of TE, suspension system; Cattle guard, gear case, wheel profile, specification & defect, coupling, bearing fitment etc. (Alco & HHP)	30
5	GE loco – Mechanical System	12
6	DEMU DPC – Power pack and mechanical System	24
7	Safety & Misc items- Cab equipment, driver seat, sanding equipment, Hand brake etc	06
8	Testing of Engines - Dry-run-Test, Blow-bye test, Random test, Load Box testing	12
Total		**144**

SUBJECT NAME	DIESEL LOCOMOTIVE THEORY(ELECTRICAL)-03 E
SUBJECT CODE	MDT-03 E
MODULE	MJI-D

Sl. No	Topic	Duration in Hours
1	Various types of Transmission, feature of an ideal transmission in Diesel Loco, AC-DC, AC-AC transmission	12
2	Various rotating equipment such as TA, TM, EG, AG, DB Blower, CCEM, ECC, Fuel booster motor- Description/Overhauling/Repair/Testing, common problems & remedy for Alco loco	38
3	Excitation systems for Alco and HHP loco	30
4	Various rotating equipment such as TA, CA, AG, DB blower, starting motor, DB grid motor, Radiator fan motor, TCC Blower, FP motor etc for HHP loco	40
5	DEMU-DPC Electrical and control system, EP Brake, train lighting, SPART	24
	Total	**144**

SUBJECT NAME	DIESEL LOCOMOTIVE THEORY(ELECTRICAL)-04 E
SUBJECT CODE	MDT-04 E
MODULE	MJI-D

Sl. No	Topic	Duration in Hours
1	Dynamic brake system, Transition system - circuit analysis, defects and remedy for Alco	30
2	Microprocessor based controls, APU, REMMLOT, Distributed Power Control System (DPCS)	30
3	Types of governors, overhauling procedure, testing methods	12
4	Various safety devices, Horn, Head light, Wiper, Emergency switches and alarm fitted in Loco - working principles	12
5	Testing of Engines - Load Box testing, MU operation testing	12
6	Dynamic brake system, circuit analysis defect and remedy for HHP loco	30
7	GE Loco- electrical machines and control system	18
	Total	**144**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(MECHANICAL)-5M**
SUBJECT CODE	**MDT-05 M**
MODULE	**MJR-D**
DURATION	**24 Days**

Sl. No.	Topic	Duration in Hours
1	Power pack – Cylinder head, cylinder liner, connecting rod, cam shaft etc (Alco & HHP)	24
2	Supercharging principles, methods and various testing parameters, Air and Computer Control Brake	18
3	Air compressor, types, function and overhauling procedures; Air-Dryer	12
4	Fuel system – components, function, defects and remedy, Fuel injection system (Alco & HHP)	12
5	Lube oil system – components, function, defects and remedy (Alco & HHP)	12
6	Cooling water system – components, function, defects and remedy, Radiator fan – principle, operation and maintenance (Alco & HHP)	12
7	Layout of shop and shed, Schedule of maintenance (Alco & HHP), Shed management, Record keeping, Outages, Super checking	12
8	Loco maintenance procedure; Bogies- types, load transfer, transmission of TE, suspension system; Cattle guard, gear case, wheel profile, specification & defect, coupling, bearing fitment etc. (Alco & HHP)	12
9	GE loco- Mechanical System	08
10	DEMU-DPC Power pack and its mechanical system	12
11	Safety & Misc items- Cab equipment, Driver seat, Sanding equipment, Hand brake etc	04
12	Testing of Engines - Dry-run-Test, Blow-bye test, Random test, Load Box testing	06
	Total	**144**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY (ELECTRICAL)-5E**
SUBJECT CODE	**MDT-05 E**
MODULE	**MJR-D**
DURATION	**24 Days**

Sl. No	Topic	Duration in Hours
1	Various types of Transmission, feature of an Ideal transmission in Diesel Loco, AC-DC, AC-AC transmission	06
2	Various rotating equipment such as TA, TM, EG, AG, DB Blower, CCEM, ECC, Fuel booster motor- Description/Overhauling/Repair/Testing, common problems & remedy for Alco loco	18
3	Excitation systems for Alco and HHP loco	12
4	Various rotating equipment such as TA, CA, AG, DB blower, starting motor, DB grid motor, Radiator fan motor, TCC Blower, FP motor etc for HHP loco	18
5	Dynamic brake system, Transition system - circuit analysis, defects and remedy for Alco	12
6	Microprocessor based controls, APU, REMMLOT, Distributed Power Control System (DPCS)	18
7	Types of governors, overhauling procedure, testing methods	08
8	Various safety devices, Horn, Head light, Wiper, Emergency switches and alarm fitted in Loco - working principles	08
9	Testing of Engines - Load Box testing, MU operation testing	12
10	Dynamic brake system, circuit analysis defect and remedy for HHP loco	12
11	GE Loco- electrical machines and control system	08
12	DEMU-DPC Electrical and control system, EP Brake, train lighting, SPART	12
	Total	**144**

SUBJECT NAME	**WORKSHOP THEORY -01**
SUBJECT CODE	**MWT-01**
MODULE	**MSE-W, MJR-W**

Sl. No	Topic	Duration in Hours
1	Organizational Set up of Railway from Board to Workshop	02
2	Function of each department in short	02
3	Layout of Workshop with important facilities for each shop function	06
4	Role of Workshop, diff shops & its functions in brief, Attendance monitoring: GA card punching/Digital/Bio metric	12
5	Reporting in Workshops- Targets, Planning, Statistics, Workshop Portal, 100 days failure statistics	02
6	Role of Supervisors in Workshop & their responsibilities	03
7	Material Handling Methods & Equipment	06
8	Machinery & Plant Maintenance	12
9	Jigs, Fixtures & Gauges	12
10	Quality Management System (QMS) & TQM	12
11	ISO & EMS System in Workshop. Introduction to ISO 9001, ISO 14001 & ISO 50001, IMS 14001 & OHSAS 18001, Green-Co Rating, ISO 3834, 5S, Lean six Sigma	06
12	Value Engineering, types of needs and demands	03
13	Production Planning and scheduling	06
14	Process inventory control	06
15	Industrial Safety Requirement & Procedure	06
16	Drawing usage, preparation, Modification & its record maintenance	03
17	Workshop Specific Labour laws, HOER, Workman Compensation Act	02
18	Pollution and its Control Measures in Workshops, Solid Waste Management, Effluent Treatment	03
19	Industry 4.0, CNC Machines	02
20	Revision	02
	Total	**108**

SUBJECT NAME	WORKSHOP THEORY -02
SUBJECT CODE	MWT-02
MODULE	MSE-W, MJR-W

Sl. No	Topic	Duration in Hours
1	Work Measurement Techniques, Procedures & Analytical Methods	02
2	Work Sampling Methods	02
3	Work Sampling Techniques & Probability Theory	02
4	Incentive Scheme, Rate Fixing, Normalizing & AT fixing, Work Order System & Procedure, Inspection Report sheets	06
5	Method Study Definition, Objectives & Procedures, On Cost booking & methods to reduce on cost	12
6	Job Evaluation & Merit Rating	02
7	Job Costing	06
8	Inspection & Testing Procedure- DT & NDT Methods	03
9	CMT Lab functions	06
10	POH of different types of Wagons in Workshops, POH of different types of Bogies of Wagons, Suspension System in wagon bogies, Spring failure: causes and remedies	04
11	POH of Stainless Wagons in Workshops, Rehabilitation and Conversion of Wagons	04
12	POH of ICF and LHB Coaches in Workshops	04
13	Details and Comparison of ICF and FIAT Bogies in Coaches, POH of Bogies and their components, Suspension system in coach bogies, Spring failure: causes and remedies	04
14	Coach Body Repair, Passenger Amenity Items, Bio Toilets & Bio-vacuum Toilet fitment during POH	06
15	POH of TL & AC system of Coaches (ICF & LHB)	18
16	Corrosion Repair Practice in Coaches & Wagons & Underframe	12
17	Air Brake System of Coaches & Wagons, Twin pipe brake system in wagons, Coupler: Balance draft Gears, POH Procedure & Testing methods	06
18	POH of different types of Locomotives in Workshops	02
19	Wheel Shop, Flow and Maintenance Wheels, POH of Loco, Coaches and Wagon Bearings in Shops.	09
20	NTXR Examination on Coaches & Wagons, NTXR reject able defects, Local Passing.	03
21	Role of Stores Department in Workshops, Stock & Non-Stock Items, Stocking, EAC & AAC of Material.	03
22	Stores drawl procedure	03

Sl. No	Topic	Duration in Hours
23	Stocking Application procedure for new stock items, Standardization, Rationalization, Specification, Purchase Cycle	06
24	Procurement of Non-Stock Items, Indenting, Requisitions, Technical Suitability, Local Purchase, IREPS, iMMIS, GeM, long term contracts	03
25	Manufacture activities in Workshops	03
26	Workshop Manufacturing Suspense	02
27	Condemnation of Coaches, Wagons and Locomotives, Excluded Fittings	02
28	Condemnation of Ferrous & Non-Ferrous Scrap and its return to stores	03
29	Machinery, Plant & Equipment used in Workshops	06
30	Painting schedule and types of paints used in C&W, Powder Coating, Vinyl Wrapping, Grit Blasting	06
31	Warranty claims of coaching and wagon items	02
32	SPART/SPRMV & 140 T Crane maintenance practices	04
32	Workshop Visit	18
33	Revision	06
	Total	**180**

SUBJECT NAME	WORKSHOP THEORY -03
SUBJECT CODE	MWT-03
MODULE	MJI-W

Sl. No	Topic	Duration in Hours
1	Organization setup of Railway from Board to workshop	02
2	Function of each department in short	02
3	Layout of workshop with important facilities for each shop functions	06
4	Role of workshop diff shops & its functions in brief, Attendance monitoring: GA card punching/Digital/Bio metric	08
5	Reporting in Workshops- Targets, Planning, Statistics, Workshop Portal, 100 days failure statistics	02
6	Role of supervisors in workshop & their responsibilities	02
7	Material handling methods & Equipment	06
8	Jigs, Fixture & Gauges	08
9	Quality managements item (QMS) & TQM	08
10	ISO & EMS systems in workshop, Introduction to ISO 9001, ISO 14001 & ISO 50001, IMS 14001 & OHSAS 18001	08
11	Value Engineering types of needs and demands, Industry 4.0	04
12	Production planning and scheduling	04
13	Process inventory control	06
14	Industrial safety requirement & procedure	06
15	Drawings usage, preparation, Modification & its Record maintenance	03
16	Workshop Specific Labour laws, HOER, Workman Compensation Act	02
17	Pollution and its Control Measures in Workshops, Solid Waste Management, Effluent Treatment	03
18	Job costing	06
19	Standardization, Rationalization, Specification etc.	03
20	Inspection & Testing Procedure- DT & NDT Methods	03
21	CMT Lab functions.	03
22	POH of different types of Wagons in Workshops. POH of different types of Bogies of Wagons, Suspension System in wagon bogies, Spring failure: causes and remedies	04
23	POH of Stainless Wagons in Workshops, Rehabilitation and Conversion of Wagons	04
24	POH of ICF and LHB Coaches in Workshops	04
25	Details and Comparison of ICF and FIAT Bogies in Coaches, POH of Bogies and their components, Suspension system in coach bogies, Spring failure: causes and remedies	04
26	Coach Body Repair. Passenger Amenity Items, Bio Toilets & Bio-vacuum Toilet fitment during POH	06

Sl. No	Topic	Duration in Hours
27	POH of TL & AC system of Coaches (ICF & LHB)	12
28	Corrosion Repair Practice in Coaches & Wagons & Underframe	06
29	Air Brake System of Coaches & Wagons, Twin pipe brake system in wagons, Coupler: Balance draft Gears, POH Procedure & Testing methods	04
30	POH of different types of Locomotives in Workshops	02
31	Wheel Shop, Flow and Maintenance of Wheels, POH of Loco, Coaches and Wagon Bearings in Shops	08
32	NTXR Examination on Coaches & Wagons, NTXR reject able defects, Local Passing	03
33	Role of Stores Department in Workshops, Stock & Non-Stock Items, Stocking, EAC & AAC of Material	03
34	Stores drawl procedure	03
35	Stocking Application procedure for new stock items, Purchase Cycle	06
36	Procurement of Non-Stock Items, Indenting, Requisitions, Technical Suitability, Local Purchase, IREPS, iMMIS, GeM, long term contracts	03
37	Manufacture activities in Workshops	03
38	Workshop Manufacturing Suspense	02
39	Condemnation of Coaches, Wagons and Locomotives, Excluded Fittings	02
40	Condemnation of Ferrous & Non-Ferrous Scrap and its return to stores	03
41	Machinery, Plant & Equipment used in Workshops	06
42	Painting schedule and types of paints used in C&W, Powder Coating, Vinyl Wrapping, Grit Blasting	06
43	Warranty claims of coaching and wagon items	02
44	SPART/SPRMV & 140 T Crane maintenance practices	04
45	Industry 4.0, CNC Machines	04
46	Workshop Visit	14
47	Revision	03
	Total	**216**

SUBJECT NAME	**WORKSHOP THEORY -04**
SUBJECT CODE	**MWT-04**
MODULE	**MJI-W**

Note: To be trained in any one of the following subjects depending on the trade

Carriage Shop

1	Layout, Organization structure, different sections of the shop
2	Salient features and constructional difference of coaches, repair practice at all stages of POH of different types of coaching stock. Modification to coaches for high speed running and precaution taken there to.
3	Lifting of coaches- dismantling of bogies, wheels etc
4	Repair, Overhaul & testing of bogies frame, bogie components
5	Repair, Overhaul & testing of springs, draft gear, buffing gear
6	Repair, Overhaul & testing of Air brake components
7	Repair, Overhaul & Inspection of Wheel & Roller Bearings
8	Repair, Overhaul & testing of water tank
9	Body repairs
10	Carpentry work.
11	Lowering and Levelling of coaches
12	Corrosion repairs
13	Modifications done on coaching stock
14	Provision of safety fittings, provision of amenity fittings.
15	Painting of Coaches
16	NTXR examination
17	Train lighting,
18	DEMU/EMU Coach POH Workshop
19	Repair and maintenance of Bio-Toilets, Bio-Vacuum toilets
20	Shop wise staff strength, material requirement, M&P, T&P and targets
21	Attention of accident involved coaches & conversion of coaches
22	POH practices of buffers and couplers
23	Air conditioning and Train lighting
24	RSP works and modifications
25	IMS cell, Drawing, Safety cell, Planning, Budget, PCO, Rate fixing, Progress, Inspection sections

Wagon Shop

1. Layout, Organization structure, Different sections of the shop
2. POH procedure for different types of wagons like BOXN, BOXC etc
3. POH procedure of tank wagons
4. POH procedure of Brake Van
5. POH of special wagons
6. Lifting & Lowering
7. Repair, Overhaul & testing of bogies frame, bogie components
8. Repair, Overhaul & testing of Air brake components
9. Repair, Overhaul & testing of springs, draft gear, buffing gear
10. Repair Overhaul & Inspection of Wheel & Roller Bearings
11. Body Repairs
12. Corrosion Repairs
13. Modifications done on goods stock
14. Painting of Wagons
15. NTXR Examination
16. Shop wise staff strength, material requirement, M&P, T&P and targets
17. Attention of accident involved wagons & conversion of wagons
18. POH practices of buffers and couplers
19. RSP works and modifications
20. IMS cell, Drawing, safety cell, Planning, Budget, Progress sections

Wheel Shop

1. Layout, Organization structure, different sections of the shop
2. Design, construction, operation and maintenance of wheels of different types of rolling stock.
3. Repair procedure for Wheels & Axles
4. Repair procedure for Roller bearings
5. Wheel defects and repairs.
6. Machinery & plant required for wheel shop, their operation and maintenance
7. Inspection of wheel, axles and bearings
8. Disposal of condemned tyres and axles, reclamation procedure in wheel shop

Machine Shop

1 Layout, Organization structure, different sections of the shop
2 Lathes
3 Milling machines
4 Drilling & Boring Machines
5 Shaper, Planer & Slotting machines
6 Grinding machines
7 Special types of machines
8 Tools & Cutters, tool diagrams
9 Limits, fits & tolerances, allowance & interchangeability, Jigs & fixtures
10 Surface finish, various types of gauges and their use
11 Cutting fluid their use in various machine
12 Cutting speed, feed, depth of cut
13 Manufacturing process of some major components for Rolling stock

Mill Wright Shop

1 Layout, Organization structure, Different sections of the shop
2 Transmission of Power-Belt, Chain, gear drive, clutches and couplings, Hydraulic system
3 Design, construction and maintenance of EOT cranes and traverser and its subassemblies
4 Design, construction and maintenance of Rail and Road cranes, breakdown cranes
5 Design, construction and maintenance of various machine tools
6 Installation of machinery and plant (Foundation Engineering)
7 Design, construction and maintenance of hydraulic pressure, steam and pneumatic hammer, drop forging hammer,
bolt and nut forging machine, wheel lathe, under pit lathe. Weigh bridges and weighing machine.
8 Design, construction and maintenance of compressor and Distribution of compressed air.
9 Design construction and maintenance of Hydraulic pumps
10 Knowledge of hydraulic and pneumatic circuits.
11 Knowledge of logic circuits use in CNC machines.
12 Plan, preventive maintenance
13 Overhaul and reconditioning of various types of plants and equipment

SUBJECT NAME	**WORKSHOP THEORY -05**
SUBJECT CODE	**MWT-05**
MODULE	**MJP-W**
DURATION	**24 Days**

Sl. No	Topic	Duration in Hours
1	Organization setup of Railway from Board to workshop	02
2	Function of each department in short	02
3	Layout of workshop with important facilities for each shop functions	02
4	Role of workshop diff shops & its functions in brief	02
5	Reporting in Workshops- Targets, Planning, Statistics, Workshop Portal, 100 days failure statistics	02
6	Role of supervisors in workshop & their responsibilities	02
7	Material handling methods & Equipment	02
8	Jigs, Fixture & Gauges	02
9	Quality managements item (QMS) & TQM	03
10	ISO & EMS systems in workshop. Introduction to ISO 9001, ISO 14001 & ISO 50001, IMS 14001 & OHSAS 18001	06
11	Value Engineering types of needs and demands	03
12	Production planning and scheduling	06
13	Process inventory control	04
14	Industrial safety requirement & procedure	06
15	Drawings usage, preparation, Modification & its Record maintenance	03
16	Workshop Specific Labour laws, HOER, Workman Compensation Act	02
17	Pollution and its Control Measures in Workshops, Solid Waste Management, Effluent Treatment	03
18	Job costing	05
19	Standardization, Rationalization, Specification etc.	02
20	Inspection & Testing Procedure- DT & NDT Methods	02
21	CMT Lab functions	02
22	POH of different types of Wagons in Workshops. POH of Different types of Bogies of Wagons, Suspension System in wagon bogies, Spring failure: causes and remedies	02

Sl. No	Topic	Duration in Hours
23	POH of Stainless Wagons in Workshops, Rehabilitation and Conversion of Wagons	02
24	POH of ICF and LHB Coaches in Workshops	04
25	Details and Comparison of ICF and FIAT Bogies in Coaches, POH of Bogies and their components, Suspension system in coach bogies, Spring failure: causes and remedies	03
26	Coach Body Repair, Passenger Amenity Items. Bio Toilets & Bio-vacuum Toilet fitment during POH	04
27	POH of TL & AC system of Coaches (ICF & LHB)	04
28	Corrosion Repair Practice in Coaches & Wagons & Underframe	04
29	Air Brake System of Coaches & Wagons, Twin pipe brake system in wagons, Coupler: Balance draft Gears, POH Procedure & Testing methods	04
30	POH of different types of Locomotives in Workshops	02
31	Wheel Shop, Flow and Maintenance Wheels, POH Loco, Coaches and Wagon Bearings in Shops	06
32	NTXR Examination on Coaches & Wagons, NTXR reject able defects, Local Passing	03
33	Role of Stores Department in Workshops, Stock & Non-Stock Items. Stocking, EAC & AAC of Material	03
34	Stores drawl procedure	03
35	Stocking Application procedure for new stock items, Purchase Cycle	06
36	Procurement of Non-Stock Items; Indenting, Requisitions, Technical Suitability, Local Purchase, IREPS	02
37	Manufacture activities in Workshops	03
38	Workshop Manufacturing Suspense	02
39	Condemnation of Coaches, Wagons and Locomotives, Excluded Fittings	02
40	Condemnation of Ferrous & Non-Ferrous Scrap and its return to stores	02
41	Machinery, Plant & Equipment used in Workshops	03
42	Painting schedule and types of paints used in C&W, Powder Coating, Vinyl Wrapping, Grit Blasting	03
43	SPART/SPRMV & 140 T Crane maintenance practices	04
44	Industry 4.0, CNC machines	02
45	Workshop Visit	06
46	Revision	02
	Total	**144**

INDEX- GUIDELINES FOR PRACTICAL TRAINING

GENERAL

1. General directions for field training

- The trainees will report to CI/BTC and meet Principal/BTC on first day in Workshop and PU. In other units they have to meet the nominated Training In-charge.
- Nominated Instructor of BTC or supervisor should take around the premises on first day and will explain important areas of each sub unit.
- The detailed schedule of training will be given to the trainee with an awareness of organization, activities, products and technologies of the unit.
- Diaries should be meticulously maintained daily, based on observations made and periodically systematized in form of summaries/gist in organized manner. This will greatly assist in retention of knowledge gained, apart from being a mandatory requirement of training.

2. Broad guide lines for field training

During each field training the trainees are required to proceed from broad aspects to minor details as given below:

- Organization, Out turn, Layout, Flow of units and materials.
- Broad stages and processes of production /processes
- Detail of each stage and process.
- Important parameters *of* each process which affects quality.
- Critical look at ‘‘Actual practices” vis-a vis “Recommended” practices (Manual).
- Cycle time stage wise.
- Sketches and drawing in own hand for better understanding of assembly, component and processes.

3. The unit wise guidelines given below can be modified by unit in which training is imparted, to allow inclusion of other important areas considered relevant and exclusion of areas that may be redundant.

I. TRAINING GUIDELINES FOR ICF

1. DESIGN

a) Study of various aspects of Railway passenger coach designs- conventional and special stock- salient features of 'integral' design.
b) Design of metro coaches.
c) Study of design aspects of air brakes in EMU etc.

2. SHEET METAL SHOP

a) Study of 1000 T and 800 T Hyd. Presses with special emphasis on CNC and Plasma Turret Press.
b) Shearing machine with special emphasis on CNC shearing centre
c) Butt seam welding machines.
d) Spot welding machines.
e) Profile bending machines.
f) Notching machines.
g) Submerged arc welding machines.
   i. Side wall assembly.
   ii. End wall assembly.
   iii. Hot phosphating and cold phosphating procedures.

3. Study of following

a) Roof assembly Jig.
b) Underframe assembly jig.
c) Body shell assembly jig and Universal jig for body.
d) Bogie testing machines.
e) Roof assembly and welding sequence.
f) Under frame assembly and welding sequence
g) Camber setting.
h) Assembly of under frame, side wall, end wall and roof in jig stage and welding sequence.
i) Bogie frame Assy, and welding seq.
j) Bogie frame straightening.
k) Roller Bearing assembly.
l) Bogie assy. & air spring.
m) Bogie testing and final inspection.
n) Stainless steel welding of trough floor.

4. Study of following:

a) Grit blasting paint
b) Airless spray-painting equipment.
c) Surface preparation and grit blasting
d) Sequence of painting operations
e) Wheeling of coaches
f) Final assy., and Air Brake test.

5. SPRING MANUFACTURING

a) Bar peeling machines.
b) Bar straightening machines.
c) Spring coiling machines.
d) Spring manufacture (various sequences)
e) Spring testing
f) Heat treatment of springs.

6. NEW BOGIE SHOP

a) Argon shield gas welding technique.
b) Photo mat gas cutting machines.
c) $C0_2$ welding plants
d) $C0_2$ welding techniques in comparison with other welding methods.
e) Argon shield gas techniques & advantages.

7. COMPONENT SHOP

a) Cam and Cam-less auto lathe.
b) Boring M/C.
c) Copy turning lathes.

8. MILLWRIGHT

a) Gear hobbing machines.
b) Gear shaping machines.
c) E.O.T Cranes.
d) Preventive maintenance and lubricating procedures.
e) Procedure for procurement of plant and machinery.
f) Procedure for condemnation and replacement.

9. TOOL ROOM

a) Jig boring machine
b) Die sinking machines
c) Maintenance of 1000 T and 800 T press tools.
d) Maintenance of pneumatic tools.
e) Tool grinding and small tool maintenance.
f) Manufacture of press tools, jigs and fixtures.
g) Periodic maintenance of jigs and fixtures.

10. INSPECTION

Study of various standard inspection procedures

a) Details stage.
b) Sub assy. stage
c) Major assy. stage.
d) Installation stage.
e) Final Inspection.
f) Issue of rolling stock certificate.

11. FURNISHING

Study of stage wise assembly of interior furnishing.
Preparation of laying of vermiculate, decolite mixing and coach flooring, roofing and roof wiring.
Interior paneling for sides and roof.
Plumbing and lavatory fittings.
Interior wiring, fitting of seats and berths, assembly of vestibule arrangements, fitting of windows etc.

Study of

a) Wood working techniques
b) Seasoning of timber.
c) Impregnation treatment.
d) Various paneling materials.
e) Manufacture of items with F.R.P

12. Study of

a) Window assy.
b) Vestibule assy.
c) Manufacture of aluminum water tank.

13. General study of trimming process.
14. Study of Air Brake arrangement for EMU, Metro & Rajdhani coaches & Train-Sets
15. Study of Electroplating and Anodizing process.
16. Planning Department
Study of
a) Work order system.
b) Planning for production
c) Preparation of design and drawings for new builds.
d) Process planning
e) Maintenance of computer master files.
f) Release of production documents
g) Accountal of shop manufactured items.

17. Production Control Department

Study of functioning of

a) Centralized P.C.D
b) Shop P.C.D

18. Data center: study of application of computer in production planning, Inventory control, preparation of wage bills, continuous monitoring of Production and stores position.

19. Material testing Department

a) Nondestructive and destructive testing of weld specimens.
b) Gamma rays, Magnaflux, X-ray, Ultrasonic testing procedures and applications.
c) Testing of Paints, Rubber items, Steel and Lubricants.
d) Testing of timber, paneling and other furnishing materials.
e) Testing of Electro Plates items.

II. GUIDELINES FOR RCF/KAPURTHALA

While visiting RCF/ Kapurthala, following items may be specifically looked into:

1. The production flow- Plant lay out, various stages of manufacturing of the Coaches

2. Important Manufacturing techniques and machinery & plant
   a) Production machines/ Shops,
      Under water plasma cutting machines,
      Cold roll forming and cut to length machines,
      Laser FMC (Flexible Machine Centre),
      Plasma punch press,
      CNC pipe bending machine,
      Roll bending & 1000-ton press,
      3-D measuring machine Automated painting system for shell painting

   b) Material handling equipment:
      CNC Auto- stacker system
      Remote control- Overhead cranes
      Rail-Cum Road Vehicle
      Roll Baw- Vacuum shop cleaning with scrubbers
      Palletizations
      Traverser for changing the line,
   c) Important jigs like Shell assembly, Side wall and roof

3. GAIT - A centralized computer centre having a mainframe & large no. of terminals
   The software packages under use like Plant maintenance, Personnel STORM Stores / Material management, Medical and finance management.
   Design Office, CAD/CAM work centers and other facilities.
   important softwares,
   Use of FEM analysis for developing new designs

4. Special features- Shed design and construction
   → Double roofing with aluminum sheets.
   → Lighting systems
   → Ventilation and heating system

5. Certification of ISO 9001 in bogie shop

6. Energy conservation
    - Street lighting with timers
    - Solar water heaters

7. Visit to staff canteen & training school

8. Design, Fabrication & Furnishing of LHB Coaches

9. Design and Fabrication of FIAT bogies

10. Non- AC variants of LHB coaches

11. Adoption of LHB features on ICF design coaches

III. GUIDELINES FOR RWF, BANGALORE

1. AXLE SHOP

a) Features of pressure pouring
b) Casting
c) Quality control

2. WHEEL SHOP

a) Features of pressure pouring
b) Casting
c) Quality control
d) Environmental aspects and impact

3. CMT

Destructive and Non-Destructive testing methods of Wheels and axles.

4. AQUANTANCE OF ISO 9000, ISO 14000

IV. GUIDELINES FOR DLW TRAINING

- Organization and functioning of DLW.
- Study and Understand flowchart of engine assembly.
- System of work order; Rolling stock program and latest product mix for manufacturing of various types of locomotives.
- Welder qualification at TTS, DLW.
- Procedure for bulk import indent of diesel spares.
- Special features of new locomotives.
- Study of various processes of manufacturing through following shops.

Light Machine Shop.

a) Important out turn/activity: Cylinder head, Cam shaft. Connecting rod, Gears, Statistical quality control of the processes involved.
b) Important machines: Cylinder head boring machine, Gear hobbing machine, Gear shaping machine, cam milling machine, cam grinding machine etc.

Heavy Weld Shop:

a) Important procedure: Submerged arc welding (Internal & External), 8 torch CNC flame cutting machine.
b) Important out turn: Cylinder block, Main base of engine, Turbo support.

Heavy Machine Shop:

a) Important out turn: Cylinder block, Main base of engine, Turbo support.
b) Important machine: Horizontal line boring machine (For crank shaft and cam shaft boring in cylinder block), Special purpose Angular Boring machine (For middle and top deck boring), Serration milling machine, CNC End drill.

CNC & Rotor Shop

a) Important machine: CNC Chucker and Bar feeder, Horizontal Machining Centre.
b) Important Outturn: Fuel pump support, main casing turbo super charger, Intermediate casing BG turbo supercharger.

Sub Assembly Shop

a) Activity: Assembly of cylinder head, Water pump, Fuel oil pump, OSTA etc.

Chrome plating shop

a) Outturn: Chrome plated cylinder liners
b) Important Machine / Procedure: Plating bath, etching baths Honing machine, surface finish RMS measuring equipment,

Engine Erection shop: Engine Assembly

Engine Test Shop:Load Box Test

Loco Frame Shop:

Important activity: Under frame Fabrication
Important Machines: Fabrication jigs, Shearing, Bending and flame Cutting machines

Traction assembly:

Assembly of traction motors: Control panel and control stand of locomotives

Loco Assembly Shop: Assembly of the locomotive

Loco Testing Shop:

Power pack with Traction Alternator and control equipment testing, Pneumatic testing

Pre-Departure Inspection:

- Understanding of various Inspection Checklist
- Vendor development system
- Marketing wing of DLW- Organization, Working etc, DG Sets

V. GUIDELINES FOR TRAINING AT DMW, PATIALA

- Organization & Layout
- Out turn of DMW on the whole and of important shops like T.M shop, Cylinder plating shop, Carbon brush shop etc
- Rewinding of T.M armatures
- Reconditioning of Engine blocks
- Chrome plating of cylinder liners
- Procedure and steps of rebuilding
- Important assemblies and components replaced during rebuilding
- Important modifications during rebuilding (with special emphasis on fuel efficient kit)

- System of warranty of locomotive and components
- Important diesel components manufactured for all Indian Railways and procedure of manufacturing
- Carbon brush manufacturing: - Important characteristics of Carbon brush material.
- Electronics Lab: Maintenance of CNC machines
- Rail cum Road vehicle
- Hands on practice on CNC trainer machines

VI. GUIDELINES FOR DIESEL SHED TRAINING

- Organization chart
- Shed layout
- Power plan, Outage and other Shed performance characteristics.
- Study schedule forms for minor and medium schedules (Mech. & Elec.)
- Study the history cards of locomotives and method or forecasting and planning their schedules.
- Yearly schedule- Details of activities, their PERT chart and execution.
- Attend one shift each with Shift in Charge (M) & Shift in Charge (E) and observe their working.
- Observe load box test of Loco after major schedule and study the records. Plot control chart for some important characteristics.
- Study and observe the complete failure investigation of a Locomotive.
- Study the availability of staff, Infrastructure and M&P items in the shed and their adequacy.
- Study the system of receipt & issue of fuel oil and the details of various monthly statements sent to HQ
- Study the calculation of S.F.C (Loco wise and service wise) and shed consumption.
- Study schedule forms for various minor & medium schedules (Mech. & Elec.) Attend various maintenance section (Mech. & Elec.). Study M.Is for the section and observe details of various checks and measurements.
- Study the system of Drawl of items from stores and their accountal.
- Study the system of procurement of various items (Imprest, Stock & Nonstock)
- Foot plate a Locomotive out from shed and observe the working of crew.
- Facilities- infrastructure, staff, training and M&P items- available & required
- Technical Cell - History cards. Failure investigation, Schedule planning. Performance indices, Technical instructions.
- Spares Cell - Systems of procurement of (a) imprest items, (b) Stock items & (c) Non stock items, System of drawal of items from Stores and their accountal.
- Fuel and statistical cell - System of receipt and issue of fuel oil, Calculation of S.F.C (Loco wise & Service wise) and Shed consumption, details of monthly statements.

VII. GUIDELINES FOR DIESEL POH WORKSHOP TRAINING

- Organization, lay-out of the shop and outturn.
- Facilities required of M&P etc.
- Unit spares requirement criteria and actual available.
- Various maintenance sections (Mech. & Elec.)- Study M.I.s for the section and observe details of various checks and measurements.
- Analyze critically at least three assembly overhauling (actual vs. ideal as given in manual) and prepare report after discussion with officer in charge of the section.
- Study various N.D.T methods in use and other lab activities like UST of axles.
- Observe load box test and study the records.
- Study the system of customer service (feedback failure of locomotive within one year of POH).
- Accompany a loco on field trial after POH.

VIII. GUIDELINES FOR CARRIAGE POH SHOP

1. Trainees have to go through Carriage manual and prepare correct procedure, layout, Flow of material vis- a-vis actual practices of the sheds. Reason for deviation and constraints.
2. Wheel Shop: Process of wheel assembly, Disassembly, wheel press and other Equipment, UST
3. Roller Bearing section: Process of dismounting, Cleaning, Inspection, Rejection and Mounting.
4. Bogie Section: Trammeling of Bogie dashpot and rectification.
5. Air Brake Section: Specifically, D.V overhaul, system of checking of alarm chain pull and brake rigging pay in and pay out of SAB.
6. Coach Body Repair Section: Corrosion prone areas and its repair, Phosphating, Overhead tank overhauling, Roof testing, Cleaning and paint schedule of coach.
7. Important modifications: Use of compreg for coach flooring, FRP Windows etc,
8. MISC.: Heat treatment of hook, Draw bar, Springs, Screw couplings etc. NTXR passing, UIC vestibule.
9. Paint shop
10. Furnishing shop,
11. Activities at Bahr line
12. Maintenance of Bio-Tanks

IX. GUIDELINE FOR WAGON POH

GENERAL

1. Preparation of Inspection Sheets.
2. Study of Incentive scheme with special emphasis on manpower planning in relation to revised allowed time of various operations.
3. Study of ISO-9000 areas like CTRB, SAB Brake Regulator & Air brake maintenance.
4. Method of receiving wagons for POH inside workshop.
5. Material management

WAGON

1. Types of wagons, a particular workshop handling.
2. Target of workshop.
3. Man hours required-Type wise.
4. POH cycle & wheel flow cycle.
5. Infrastructure available.
6. Safety involved with cleaning of tank wagons; Testing & adjustment of discharge valve and security fitting of safety valve.
7. Bogie repair - CASNUB
8. Air Brake equipment's overhauling with emphasis on Distributor valve and SAB Brake Regulator.
9. Overhauling of draft gear.
10. Unit exchange practice.
11. Reprofiling of wheels and reaxling/rediscing of wheel sets.
12. Paint schedules.
13. Ultrasonic testing of Axle and testing of springs.
14. Painting and Stenciling of wagons
15. Neutral examination.

REPORT

1. Make a report showing the actual POH cycle of any air braked wagon POHed at the workshop during your visit.
2. Make a report describing in detail on Re-axling/Re-discing of wheel sets in the workshop you visited.
3. Prepare a duplicate inspection sheet of any wagon and make network for POH cycle.
4. Categorization of wagons in A, B & C category.

DO IT YOURSELF

1. Assemble traction unit on the adjuster tube of a SAB brake regulator.
2. Assemble cut off valve sub assembly of C3 W type distributor valve.

Involve yourself in preparing inspection sheet.

X. GUIDELINES ON COACHING DEPOT/DIVISION WORKING

Understand

i) Organization structure of Mechanical department of the division
ii) Spread of division indicating C&W facility & important features of the particular division.
iii) Contents of Sr. DME's stock position
iv) Analysis of loss of punctuality of Mail and Express trains.
v) Pit occupation chart
vi) Layout of coaching maintenance yard.
vii) Layout of sick line.
viii) Procedure for sending coaches for POH/IOH.
x) Examination of date and sick marking of coaches.
x) Maintenance of Distributor valve.
xi) Study the system for maintenance of coach history cards and forecast of maintenance schedules to be done.
xii) Maintenance of Brake gear.
xiii) Testing of air brake system.
xiv) Rake links.
xv) Distribution of staff in sick line.
xvi) Function of batch in maintenance yard.
xvii) Replacement of primary spring and secondary spring
xviii) Maintenance and upkeep of Bio-toilets
xix) Foot plate inspection.
xx) Plants & equipment in maintenance yard and sick line.
xxi) Schedule maintenance of coaches.
xxii) Cleaning agents used in washing line.
xxiii) Provision in ART.
xxiv) Analysis of en route detachments.
xxv) Derailment enquiry.
xxvi) Corrosion prone areas of coaches.
xxvii) Marshalling in a rake
xxviii) Study the system for maintenance of coach history cards and forecast of maintenance schedules to be done.
xxix) Study of CMM portal, BPC generation and data analysis through MIS.
xxx) Effluent Testing Procedure and parameters.
xxxi) Monitoring of Works contract related to Mechanized Cleaning of Coaches, CTS, OBHS, AMOC of Bio Toilet, Pest & Rodent Control etc. GCC and Special Terms & Conditions of contract.
xxxii) Maintenance of AC & Non-AC type LHB coaches
xxxiii) Maintenance of Critical components of LHB coaches, WSP, Disc Brake, BDG, Air Spring, etc
xxxiv) Overview of Special type Rolling Stock: - Deen Dayalu Coaches, Utkrisht Coaches, Humsafar Coaches, Anubhuti Coaches and Train18 trainset, etc.
xxxv) Introduction to Machinery and Plants used in Coaching Maintenance Depot: - Screw Compressors, RTR, SCTR, Fork Lift, Lister Truck, EOT Crane, Gantry Hoist, Diesel Hydraulic Road Crane, ACPW, WILD, Hot Axle Detector System, Enroute Quick Coach Watering System, Water Recycling Plant, ETP etc
xxxvi) Mechanized Laundry-operation and maintenance.

xxxvii) Linen Management.
xxxviii) Online Complain Management System- Rail Madad portal and Coach-mitra.
xxxix) Project work: - Framing of Proposal, Feasibility Report, ROR, Tendering
xxxx) EnHM- Objective, organization structure and functioning.
Primary, Secondary & Turn Around Maintenance schedule as per RPC-IV

DO IT YOURSELF

1. Replace MU washer, Connect & disconnect BP air hose.
2. Replace brake block, Brake Pads particularly
3. Carryout Rolling in and rolling out inspection of a passenger train followed by a detailed inspection of the rake at the washing lines. Attach a detailed report of your observations covering the coach interior furnishing, bathrooms and lavatories lights and fans on the superstructure and wheels, roller bearings, springs, brake gear, draw and buffing gear on the under gear (attach report)
4. Associate and supervise complete washing and cleaning of a rake, both internally and externally. Internally at the washing lines including bathrooms. Determine and personally check, efficiency of on-train; safaiwallah operation.
5. Associate and supervise complete pit line examination of a passenger rake along with the maintenance staff. Do you feel that the time, space, light, hand tools and other facilities are adequate to ensure safety land passenger amenities? Do you feel the work is going on all the time when a rake is on the pit cum washing lines? Determine whether maintenance of any rake is done on a non-pit line such as platform line or yard line. Can it be avoided?
6. Study the rake links for passenger trains originating on your railway and work out the average kilometer earning for each link taking into account the spare stock. Suggest revised rake links to improve the utilization without affecting maintenance.
7. What is the allotment of spare stock your division? What system exists for you to ensure that stock belonging to your division and to your railway is with you and that the other divisions/ railways coaches are returned back to them? Are there any cases of under load running on your division due to non-returning of coaches? What percentages of coaches in use on the division are over aged? Can their use be avoided?

Prepare Report

i) Summarize loss of punctuality of mail & express train for the last 6 months. Suggest methods *to* reduce loss of punctuality.
ii) Prepare report or overdue POH coaches of or coaching depot. Suggest methods to reduce overdue coaches in trains services.
iii) Prepare sick making of coaches for the last 6 months. Make Parches Paretos analysis and suggest methods to reduce coach ineffectiveness.
iv) Prepare report of sick making of coaches within 100 days of POH. Suggest to improve such incidents.
v) Prepare report on major plants and equipment of the coaching depot and highlight maintenance practice adopted and suggest any improvement on present method of maintenance practice.
vi) Prepare report on critical items of the coaching depot. Suggest methods to

improve problem of “Stock out”.

vii) Prepare a chart for the occupation of washing and pit lines. Attach a complete report of activities undertaken in your coaching sick line under different headings

viii) Write a failure report and your own analysis for two coaching stock failures resulting in detention and/ or detachments en route, (attach sheets).

XI. GUIDELINES OF ROH DEPOT

1. Observe lifting of body.
2. Observe stripping of bogie component.
3. Observe checking of frame alignment.
4. Observe repair of bogie and its reassembly.
5. Observe maintenance of distributor valve.
6. Observe maintenance of SAB brake regulator.
7. Observe air brake testing using SWTR.
8. Study interception of BOXN wagon for ROH
9. Study interaction with neutral control office.
10. Observe replacement of draft gear.
11. Observe replacement of CTRB.
12. Observe in-situ injection of CTRB.
13. Observe manual adjustment of brake rigging.
14. Study corrosion repair,

DO IT YOURSELF

i) Replace MV user.
ii) Isolate DV.
iii) Perform Take up/Pay out test.
iv) Connect Air Hose Pipe.
v) Release Brake Binding

XII. GUIDELINES FOR TRAINING IN GOODS YARD

1. Examine one originating, one terminating and one by-pass goods train in each of the three shifts, from the stage of receipt of a train examination memo from the yard master till the issue of BPC or release memo. Write your observations about time taken, defects noticed, inadequacy of tools, light, C&W duplicates and observations due to unclean yards with date, yard, shift, name of TXR, train no., event times etc. (attach sheets).
2. Perform a complete brake power check on a train load in yard. Note the sticky or defective cylinders, overdue POH cylinders, leaky cylinders, repairs attended at site and the percentage of operative cylinders (Attach sheets).
3. Observe the functioning of NTXR flying squad if provided on your division and follow up the report of NTXR for its implementation.
4. Deal with a clearance of ODC consignment fully and write a two-page report. How it is important for a heavy consignment to be carefully loaded and why? How should shifting of a heavy consignment during run be prevented? (Attach sheets).
5. What are the pros and cons for a train examination being conducted on an originating train or a terminating train? What system is being followed on your division? How is it related to the yard operations?
6. What are the average figures of POH booking from your yards and how the figure is to be kept in check? Make a critical study over a 15-day period to access the wagons awaiting heavy repairs on your division to indicate whether it is showing an increasing trend. Do you consider the existing repair facilities on your division adequate for the load arising? Are there an original foundation in your work load arising (attach sheet)?
7. Critically study detachments en-route due to wagon defects. Analyze them cause-wise and write a report to suggest remedial action. Are there some seasonal variations?
8. What is the procedure adopted to clear way side detached wagons? What is the average detention at way side stations? What is the incidence of repeated detachment of such wagons? (Attach sheets)
9. Study the ineffective wagons lying on your division and categorize them according to the no of days they have been lying ineffective. Propose a plan action to deal with the problem in two-page report with facts and figures (Attach sheets).
10. What are the rules regarding booking of heavy repair NPOH wagons to shops? Examine the repair facilities provided on your division to deal with such heavy repairs arising if this work load is considered important.
11. Spend a full day at a major siding say FCI or an OIL siding or a tippler siding. Examine the records of placement and removal of loads, loading/unloading facilities, system of handing over and taking over for working out the damages and efficiencies and any other point of managerial interest (Attached sheets)
12. Study LPG loading/unloading facilities, if any provided on your division including the safety aspects.
13. Study the special precautions for loading/unloading or passing of POL rakes through your division including a personal examination of all the fittings of a petrol tank wagon on the diaphragm and the bottom discharge point. Examine the calibration, dipstick measurements and commercial aspects of POL traffic. Mention important observations (Attach sheets).

14. Inspect the complete provision in ARTs of different classes and ARMEs on your division and the complete system on pressing them into service in case of accidents. Study the monetary incentives to the break-down staff. Are these adequate, inadequate or contra productive?
15. Accompany a break-down special from beginning to end to attend (a) a yard derailment, (b) a mid section derailment and write your individual report for inadequacies observed, avoidable delays encountered, unsafe practices noticed and your suggestions for remedial action (Attach sheets).
16. Examine critically and attach your complete report in case of failure of (i) roller bearing axle box. (ii) screw couplings etc (attach sheets).
17. Attend a case of train parting at site if possible or follow up a train parting enquiry case fully from first information to imposition of penalty to the staff held responsible.
18. Over a seven-day period analyze the cases of sick marking cause-wise location-wise, type-wise and component-wise. Analyze also whether generation of sick marking for time-based repair/replacement etc. is commensurate with your total wagon dealing (attach sheets).
19. Study in detail the material control system including the sanctioned imprest, their recoupment generation of timely alarms etc. Write your assessment of equipment of 50 most vital items and the system for ensuring continuous supply (attach sheets).
20. Study critically the following services available in your sick line and write descriptive brief with your suggestions for improvements (a) hand tools, (b) pneumatic tools, (c) compressed air supply, (d) welding plants, (e) industrial gases, (f) material handling equipment (attach sheets).
21. Study of FMM portal, BPC generation and data analysis through MIS.

XIII. Training in drawing office

1. Familiarization with the drawing making procedure
2. Filing / storing of drawings, knowledge of various specifications, STRs / TSO etc
3. Works programme/RSP/M&P section

XIV. Training in CMT laboratories

1. Familiarization with the various types of non-destructive and destructive testing, testing of paints, Acids, Polymers and rubbers with their specifications.
2. Testing of failed Rolling Stock components and their reporting. Statistical quality control.

XV. Training in stores organization

1. Receipt, dispatch and issue of Stores.
2. Storage of stock items, issue, method of accountable, ground and card balance, regularization of short supply.
3. Inventory control practice based on ABC analysis.
4. Storage procedure of Acid, Paints, Lubricants, oil. Rubber etc.
5. Processing of N.S items
6. Different sections like tally Board/Ledger, Progress. Tender etc
7. Hands-on practice in placing order in GeM
8. Visit various features on iMMIS website

Annexure – III

EXAMINATION

SENIOR SECTON ENGINEER (MSE-C, MSE-D, MSE-W)

		C&W				DIESEL				WORKSHOP			
Session	**Type**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**
I	Theory	I	MRT–01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-06	25			MRT-06	25			MRT-06	25	
		II	MRT-02	25	100	II	MRT-02	25	100	II	MRT-02	25	100
			MRT-03	25			MRT-03	25			MRT-03	25	
			MRT-04	25			MRT-04	25			MRT-04	25	
			MRT-05	25			MRT-05	25			MRT-05	25	
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
II	Theory	I	MRT-07	25	75	I	MRT-07	25	75	I	MRT-07	25	75
			MRT-09	50			MRT-09	50			MRT-09	50	
		II	MCT-01	100	100	II	MDT-01	100	100	II	MWT-01	100	100
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**225**	TOTAL			**225**	TOTAL			**225**

		C&W				DIESEL				WORKSHOP			
Session	**Type**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**
III	Theory	I	MCT-02/I	100	100	I	MDT-02/I	100	100	I	MWT-02	100	100
		II	MCT-02/II	50	50	II	MDT-02/II	50	50	II	MWT-04	50	50
		III	MRT-08	25	25	III	MRT-08	25	25	III	MRT-08	25	25
		IV	MRT-11	50	50	IV	MRT-11	50	50	IV	MRT-11	50	50
	Pract	V		50	50	V		50	50	V		50	50
	TOTAL				**275**	TOTAL			**275**	TOTAL			**275**
IV	Theory	I	MRT-12	100	100	I	MRT-12	100	100	I	MRT-12	100	100
	Pract	II		50	50	II		50	50	II		50	50
	Posting	III		100	100	III		100	100	III		100	100
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
	GRAND TOTAL				**1000**	GRAND TOTAL			**1000**	GRAND TOTAL			**1000**

Marks*: Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER (RRB) (MJR-C, MJR-D, MJR-W)

		C&W				DIESEL				WORKSHOP			
Session	**Type**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**
I	Theory	I	MRT–01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-06	25			MRT-06	25			MRT-06	25	
		II	MRT-02	25	100	II	MRT-02	25	100	II	MRT-02	25	100
			MRT-03	25			MRT-03	25			MRT-03	25	
			MRT-04	25			MRT-04	25			MRT-04	25	
			MRT-05	25			MRT-05	25			MRT-05	25	
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
II	Theory	I	MRT-07	25	75	I	MRT-07	25	75	I	MRT-07	25	75
			MRT-09	25			MRT-09	25			MRT-09	25	
			MRT-10	25			MRT-10	25			MRT-10	25	
		II	MCT-01	100	100	II	MDT-01	100	100	II	MWT-01	100	100
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**225**	TOTAL			**225**	TOTAL			**225**

		C&W				DIESEL				WORKSHOP			
Session	**Type**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**	**Paper**	**Subjects**	**Marks ***	**Total**
III	Theory	I	MCT-02/I	100	100	I	MDT-02/I	100	100	I	MWT-02	100	100
		II	MCT-02/II	50	50	II	MDT-02/II	50	50	II	MWT-04	50	50
		III	MRT-08	25	25	III	MRT-08	25	25	III	MRT-08	25	25
		IV	MRT-11	50	50	IV	MRT-11	50	50	IV	MRT-11	50	50
	Pract	V		50	50	V		50	50	V		50	50
	TOTAL				**275**	TOTAL			**275**	TOTAL			**275**
IV	Theory	I	MRT-12	100	100	I	MRT-12	100	100	I	MRT-12	100	100
	Pract	II		50	50	II		50	50	II		50	50
	Posting	III		100	100	III		100	100	III		100	100
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
	GRAND TOTAL				**1000**	GRAND TOTAL			**1000**	GRAND TOTAL			**1000**

Marks*: Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER (INTERMEDIATE) (MJI-C, MJI-D, MJI-W)

		C&W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
I	Theory	I	MRT-01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-02	25			MRT-02	25			MRT-02	25	
		II	MET-01	100	100	II	MET-01	100	100	II	MET-01	100	100
		III	MET-02	100	100	III	MET-02	100	100	III	MET-02	100	100
		IV	MET-03	100	100	IV	MET-03	100	100	IV	MET-03	100	100
		V	MET-04	100	100	V	MET-04	100	100	V	MET-04	100	100
		VI	MET-05	100	100	VI	MET-05	100	100	VI	MET-05	100	100
		VII	MET-08	100	100	VII	MET-08	100	100	VII	MET-08	100	100
	TOTAL				**700**	TOTAL			**700**	TOTAL			**700**
II	Theory	I	MET-06	100	100	I	MET-06	100	100	I	MET-06	100	100
		II	MET-07	100	100	II	MET-07	100	100	II	MET-07	100	100
		III	MET-09	100	100	III	MET-09	100	100	III	MET-09	100	100
		IV	MET-10	100	100	IV	MET-10	100	100	IV	MET-10	100	100
		V	MET-11	50	50	V	MET-11	50	50	V	MET-11	50	50
		VI	MRT-08	25	25	VI	MRT-08	25	25	VI	MRT-08	25	25
		VII	MRT-11	50	50	VII	MRT-11	50	50	VII	MRT-10	50	50
		VIII	MRT-13	50	50	VIII	MRT-13	50	50	VIII	MRT-13	50	50
	TOTAL				**575**	TOTAL			**575**	TOTAL			**575**

		C&W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
III	Theory	I	MRT-06, 07, 09, 14 & 15	25 EACH	125	I	MRT-06, 07, 09, 14 & 15	25 EACH	125	I	MRT-06, 07, 09, 14 & 15	25 EACH	125
		II	MCT-01	100	100	II	MDT-01	100	100	II	MWT-03/I	100	100
	TOTAL				**225**	TOTAL			**225**	TOTAL			**225**
IV	Theory	I	MCT-02/I	100	100	I	MDT-03 M/E	100	100	I	MWT-03/II	100	100
		II	MCT-02/II	100	100	II	MDT-04 M/E	100	100	II	MWT-04	100	100
	Pract	III		50	50	III		50	50	III		50	50
	Posting	IV		50	50	IV		50	50	IV		50	50
	TOTAL				**300**	TOTAL			**300**	TOTAL			**300**
	GRAND TOTAL				**1800**	GRAND TOTAL			**1800**	GRAND TOTAL			**1800**

Marks*: Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER (PROMOTIONAL) (MJP-C, MJP-D, MJP-W)

		C&W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
I	THEO	I	MRT-14	30	150	I	MRT-14	30	150	I	MRT-14	30	150
			MRT-16	30			MRT-16	30			MRT-16	30	
			MRT-17	30			MRT-17	30			MRT-17	30	
			MRT-18	30			MRT-18	30			MRT-18	30	
			MRT-19	30			MRT-19	30			MRT-19	30	
		II	MET-12	75	150	II	MET-12	75	150	II	MET-12	75	150
			MET-13	25			MET-13	25			MET-13	25	
			MET-14	50			MET-14	50			MET-14	50	
	TOTAL				**300**	TOTAL			**300**	TOTAL			**300**
II & III	THEO	I	MCT-03 & 04	100	100	I	MDT-05 M/E	100	100	I	MWT-05	100	100
	Pract	II		50	50	II		50	50	II		50	50
	Posting	III		50	50	III		50	50	III		50	50
	TOTAL				**200**	TOTAL			**200**	TOTAL			**200**
	GRAND TOTAL				**500**	GRAND TOTAL			**500**	GRAND TOTAL			**500**

Marks*: Showing the approximate weightage of subject topic in the examination paper.

Annexure IV

QUESTION BANK

QUESTION BANK OF POSTING EXAM /INTERVIEW

A) C&W

1. What *is* ROH meant for?
2. What are the checks done on bogie? How are cracks checked? Which are the vulnerable locations where cracks are generally found?
3. How is brake beam reclaimed during POH?
4. How is Staffing done for ROH depot?
5. Why is ROH *of* BOXN/BCN wagons done at a periodicity of 18 months? What are the major items which require attention after this period?
6. Why is there a plank in the Casnub bogie?
7. CC Rakes are required to run for 4500 KMs before train examination. Do the brake blocks last for this distance?
8. What are the major causes of defects on coaches noticed *at* PM depots and how can they be reduced?
9. What are the reasons for biased wear on wheels?
10. In ICF Coach how is correct bogie height & the correct gap between bogie and under frame obtained?
11. Describe the shell construction of ICF & LHB Coach?
12. Reasons of waviness in ICF coach remedies.
13. Various welding processes used in ICF. Advantages of CO_2 and Argon welding.
14. ICF & LHB shell fabrication.
15. Painting ICF/LHB shell. Sole bar painting.
16. Use of choke in ACP and in Guard's van.
17. Steps in Bogie manufacture at ICF
18. How sound insulation is provided in coaches.
19. Payload of BOXN rake.
20. What are mechanical and Electrical reasons of detachment and sick marking? Percentage of Electrical/Mechanical.
21. What is C.C. rake and its B.C.P?
22. How much brake power is required for CC rake?
23. What is there in ICF? Any major problem being faced in ICF these days?
24. Is derailment possible due to breakage of spring?
25. Is there any CC rake and its B.C.P?
26. What is Shatabdi's max. speed and in which section?
27. How the bogie of Swaran Shatabdi different from other bogies?
28. Why spring is larger for Swaran Shatabdi? How does it increase riding comfort?
29. What have you seen in coaching depot?
30. What is difference between passenger and goods outage?
31. What are reasons of train parting?
32. What is difference between single and twin pipe system?
33. Have you gone to RDSO? Have you seen Coaching Directorate?
34. What is the material of side wall plane in coach furnishing? (Sun mica). Don't you think it is too fragile?
35. Have you seen cartridge bearing? What type of rollers it has?
36. What is the shock bearing member inside buffer casing (destruction tube)? How does it function?
37. What are reasons of sick marking?
38. Tell about any case of sick marking?

39. What are reasons of bias wear and flange wear?
40. How load is transferred in BOXN?
41. Why no cases of bias wear found in BEML coaches?
42. How high-speed wagons are different from normal wagons?
43. What are reasons of spring breakage?
44. Where is dash pot located?
45. Types of Air Brake system, Explain.
46. Was twin pipe system used in Wagons? Why single pipe now?
47. Why waviness is coming in ICF coaches these days?
48. What are the problems faced in bogie welding? What are various radiographic defects?
49. What is difference between UIC and Casnub bogies? Why is bias wear found in Casnub bogie?
50. Have you seen BEML coaches?
51. What do you know about LHB coaches?
52. Tell about the differences between the maintenance practices of Shatabdi and normal trains?
53. What are different types of Casnub bogies and their differences?
54. What are the reasons of derailment of goods train*?*
55. What is cross trammeling? What is done to rectify the defect found during cross trammeling?
56. Mention various defects found in coach*es.*
57. Tell about suspension system of various coaches?
58. How is adjustment of side bearer done?
59. Have you seen the POH of dash pot is done?
60. How POH of dash pot is done.
61. What is loading line?
62. Which Rakes are being maintained in the Coaching depot you visited?
63. What are RDSO guidelines for Shatabdi coaches maintenance.
64. In the washing line, is there a list prepared for consumables required for each coach. What are the items in such list?
65. What were the salient feature of the freight depot you visited?
66. What is the periodicity of ROH? What are the items of maintenance carried out in ROH?
67. What is the most corrosion prone area in BLC wagon?
68. Why are elastomeric pads fitted in BCN wagon?
69. What is secondary detachment of coaches? What are the causes of secondary detachment?
70. What is axle box canting? Why does it happen?
71. What is the periodicity of dash pot oil check? When is oil filled in the dashpots? What damage would occur if dash pot oil is less?
72. What sizes of wheel flat are allowed on coaches and freight stock? Why is the allowance higher for freight stock?
73. What are the composite brake blocks and what are their advantages and disadvantages?
74. In ROH of Casnub bogies, what attention is given to pedestals?
75. What are A, B and C classes of unloadable wagon repairs?
76. What are CC rakes? Can wagon of CC rakes be re-positioned within the same rake before return for maintenance?

77. What are the types of detachment for coaching stock?
78. What is the significance of sick marking of coaches within 90 days of POH?
79. Give details of project given to you at ICF?
80. If at ICF Coach is to be lifted by one crane only, how will you calculate the location of the lifting slings?
81. Describe bogie manufacture at ICF?
82. What is the quantum of rejection in radiographic testing of welds at ICF?
83. How stress is relieving carried out on bogie frame after fabrication/welding at ICF?
84. What is the maximum time given between primer application and painting on coach at ICF? What is the harm if this exceeded?
85. Describe the procedure for water tank fitment on a coach at RCF.
86. Why are cross sheets welded on the side of the shell of an RCF coach?
87. What is the reason for waviness on the skin of the shell of RCF and ICF coach?
88. How are CTRBs fitted on axles of RWF?
89. Draw a neat layout of Twin pipe Air Brake System on ICF-SLR Coach indicating all the components.
90. How the Coaching trains are categorized as per RPC-IV? Explain the maintenance pattern of Coaching stock as per RPC-IV.
91. Explain the different tests that are to be conducted with SCTR.
92. Draw a neat diagram of Tyre defect gauge, indicate tyre defects with standard and condemning dimensions.
93. Write the different parts of a Coaching CBC? Explain Anti-climbing and Anti-creep mechanism in H-Type CBC.
94. Explain the salient features of LHB Coach?
95. How the load, Tractive and Braking forces transmitted in ICF coach (or) LHB coach?
96. Explain how do you conduct rolling – in Examination. What are the defects that can be detected during Rolling-in Examination?
97. Write differences between PM Depot, SM Depot and OEM? What category trains shall that undergo Secondary Maintenance as per RPC-IV?
98. Draw a typical layout of Air Suspension system. Explain how Buffer Height will be adjusted automatically with varying loads.
99. What do you mean by ODC? Classify ODC, speed, movement, staff and permission required for different types of ODC.
100. Write short notes about WILD?
101. What are the duties of C&W Supervisor at Accident site?
102. What are the different Track readings to be taken at the time of derailment?
103. Write about classification of accidents.
104. Write short notes about EIMWB?
105. What are the different C&W and Loco readings to be taken at the time of derailment?
106. Write short note on Wheel Shelling.
107. Write down the flowchart of making a Non –stock item to Stock item.
108. Write down the types of Incentive Schemes in force in Workshops/Production Units in Indian Railways Enumerate the difference between them.

109. Write Flow charts of Weight Transfer and Tractive Effort Transfer in ICF and LHB Coach.
110. What are the main features of FIAT bogie? Describe its advantages over ICF bogie.
111. Describe the Crashworthiness of a vehicle. How the crashworthiness is achieved in the coach.
112. Write down the functions and necessity of wheel slide Protection provided in LHB Coach. Also write down the logics used for wheel slide protection working.
113. What are the defects found during POH of CTRB in a workshop? How are these defects checked?
114. Why were Air Springs introduced in DEMU? Explain with necessary sketches.
115. Describe in brief facilities required for an ICF Coach Sick Line.
116. Describe the content of important contractual activities undertaken by Primary Maintenance Coaching Depot.
117. Explain Twin Pipe Braking System for Passenger Stock with Sketch.
118. Write Flow chart to weight Transfer and tractive Effort Transfer in BOXN wagon. List out the facilities required in A Category Freight Examination Yard.
119. List out the facilities required in a sick line of a major coaching depot handling IOH of ICF coaches
120. Write down the Revised Maintenance Policy of Coaching Train Examination issued in 2017

B. Diesel locomotives

1. What is the most important item checked during trip schedule of Diesel Locomotive? What are the steps which have been taken for increasing schedule interval for diesel loco?
2. Describe the bogies arrangement of WDG4, WDP4B, WDG4D and WDG4G loco.
3. Slip in WDG4.
4. Steps in loco POH.
5. Cleaning of crank shaft.
6. Functions of flasher light.
7. What are three tiers of pit line?
8. What do you know about dynamic braking principle?
9. Where have you seen pit line?
10. What is the difference between passenger and good outage?
11. Where have you done divisional Training?
12. What is engine block manufacturing sequence?
13. What is flow meter?
14. What are various types of side bearers?
15. What are various loco schedules?
16. What are trip schedule items of loco?
17. How GTKM is calculated?
18. How is crank pin tightened?
19. How is axle surface finish checked?
20. What do you know about UST testing of axles?
21. How goods loco outage is calculated?
22. What are various types of side bearers? Why are they used?
23. What is a Traction motor winding sequence?
24. What are the features of WDG4 loco?
25. What are the maintenance advantages of a WDG4 loco?
26. How is speed controlled in a locomotive fitted with AC traction motors?
27. What are the differences between WDG4 and WDP4 loco?
28. What are the special features of GE (WDG4G) locomotives?
29. What is an air flow indicator?
30. What is roster hour of driver?
31. What are the functions of Power controller?
32. What are the reasons for train parting?
33. How is crew booked?
34. How can you calculate and reduce OT of crew?
35. What is crew balancing?
36. What is 10-hour rule?
37. How is loco utilization calculated in the division you have visited?
38. On foot plate, what indications have you observed for run through train being received on loop line at a B class station.?
39. What does the driver do in case of leakage indicated on air flow indicator?
40. What are the duty hours of driver?
41. What will the driver do if there is brake binding after ACP?
42. Why does a wheel derail?
43. Why EMD engine piston is called as fully floating? what is its benefit?

44. How Crank case vacuum maintaining arrangement in GM locos is different than that of Alco?
45. What is special in GM Turbo supercharger and what is its importance?
46. Why adjustment of Tappet clearance is not required in GM loco?
47. What do you understand by Mechanical Unit Injector? How do they benefit in GM loco?
48. Why oil is supplied to TSC after stopping of the engine?
49. What arrangement is made in Crank shaft of GM loco to control the excessive longitudinal movement?
50. If By pass sight glass (2) is full of fuel then what can be the possible reason.
51. What do you mean by “Power assembly” of HHP loco? What is its benefit?
52. How Relief valve protect the Fuel booster Pump in fuel oil system of WDM2?
53. What do you mean” fuel dilution”? Write four major reason of it.
54. How dribbling in Fuel injector affects engine horse power?
55. If oil is coming out from TSC chimney, what can be the two major reasons?
56. How Relief valve protect the Fuel booster P/p in fuel oil system of WDM2?
57. How many ventilation fans are used in DEMU?
58. How Radiator fan is driven in DEMU?
59. How many Piston rings are provided in GM loco?
60. How many main bearings are there in 16-cylinder GM loco engine (4500HP)?
61. How Aux Gen. is driven in GM loco?
62. How many Main Bearing journals are in the crankshaft of WDM-3A locos?
63. How many cam shaft bushes are fitted in WDG3A engine block?
64. In WDG3A loco split gear is mounted on crankshaft near main bearing No.
65. How many cam lobs are there in unit cam shaft?
66. What is the importance of “Crank case exhaust motor” in Alco locomotive?
67. What are the purposes of Transition system in Alco locomotives? Explain different type of transition system in WDM2 Alco locomotive.
68. Describe the Role of Auxiliary Generator in WDM3A.
69. What are the roles of Excitation control system in Alco locomotives?
70. In AC-AC transmission, Why AC generated from Tr. Alternator in not directly sent to Tr. Motor?
71. What is the importance of Automatic flasher light in Diesel locomotives?
72. Explain the Reason of “Power ground “from Tr. Motor in Alco loco.
73. Cyl. Head hydraulic testing is done for checking…….
74. No. of thrust collar bearing in WDM3A loco crankshaft is …….
75. Firing order is maintained to minimize ……
76. TDC stands for…….
77. OST is a ……. item of diesel loco
78. Compressed air pressure in diesel loco maintained between 8-10 Kg/cm2 by……
79. Independent brake is applied through ……valve handle.
80. ……. helps in minimizing moisture contents in compressed air.
81. Feed pipe pressure is set at …….
82. B.P. charging pressure is set at…….
83. MR safety valve is set at …….
84. Where is the compressed air stored?

85. For synchronization brake in Air Brake loco……valve is used
86. DEMU coaches are coupled with ……. coupling.
87. Recent developing 1600HP DEMU has ……transmission system.
88. In the GM locomotive the Turbo charger is driven by ……
89. Designed Horse power of Newly introduced WDG5 loco is ……
90. EMD engine per cylinder displacement volume is……. cubic inch.
91. In HHP loco Main Alternator is excited by----------
92. Radiator fan motor of GM loco are ----------motor.
93. In HHP locos Battery charger& Aux gen. CB are located in----------.
94. In Alco loco, Rotational direction of Tr. Motor changed by changing----------.
95. Tacho generator output voltage is----------three phase. (AC/DC)

Descriptive type questions

1. What are the functions of Engine Governor fitted on diesel locos? Name the various types of engine governors used on diesel locos.
2. What is MCBG? Draw a block diagram for MCBG fitted on ALCO Diesel loco.
3. What are the various advantages of MCBGs over other Governors?
4. What is the significance of gap between the fuel control shaft end & OST shaft? What do you understand by a two stroke and a four-stroke cycle engine?
5. What is scavenging period? How is it related to efficiency? What changes has been made in the scavenging period of Fuel-efficient engine.
6. What is the difference between a natural aspirated and a supercharged engine? What are the various methods of supercharging?
7. What is the importance of firing order of a multi-cylinder engine? Mention the firing order of WDM2 locomotive engine.
8. What are the main components housed in the Engine Block to form the complete Diesel Engine?
9. What is crank web deflection? How it is adjusted?
10. What are the functions of a Camshaft? Each section of camshaft serves how many cylinders? How it is driven?
11. What are the common defects noticed in the liners in course of service?
12. What checks and measurements are required to be done during overhauling of Cylinder heads?
13. Describe Fuel efficient kit, justify each element of the fuel-efficient kit towards fuel efficiency in ALCO loco.
14. Describe Fuel oil system of Alco loco with neat sketch. What can be the reason of low fuel oil pressure?
15. What do you understand by a two stroke and a four-stroke cycle engine?
16. What do you learn from the Valve Timing Diagram?
17. What are the duties of a Camshaft? Each section of camshaft serves how many cylinders? How it is driven?
18. What is stiffer unit camshaft? How is it advantageous over conventional one?
19. What is ALCO modification? Describe the role of these modifications carried out in ALCO locos?