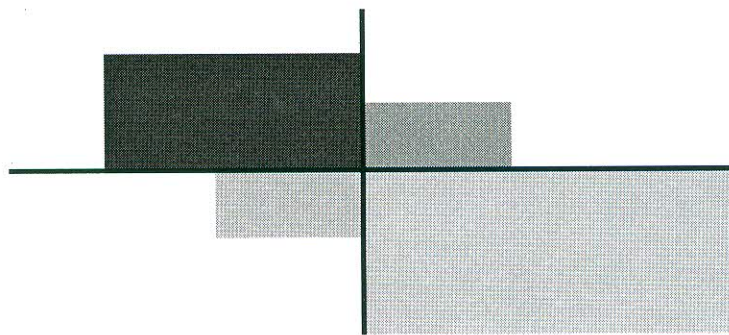


Question Bank, supplied to 'P' branch vide Lr. NO.
CM. 226. C&W. Vacancies. Vol. II. CI/ATC/EDM dtd. 08-12-11



*S. C. Railway
Mechanical Department
C&W Branch
Secunderabad Division*

*Syllabus - QUESTIONS
&
ANSWERS BANK*



SYLLABUS FOR WRITTEN EXAMINATION FOR THE POST OF INSTRUCTOR(C&W)-ATC/RDM**(A) C&W MAINTENANCE****1) Coaching Stock:**

- i) Design & Construction features of ICF & LHB Bogies & shells.
- ii) Passenger amenity fittings & Safety fittings
- iii) Train examination pattern and RPC 4 guide lines
- iv) Maintenance schedules and important maintenance instructions
- v) Design & working principle of CDTS in coaching stock
- vi) Operation & maintenance of H-type CBC in coaching stock
- vii) Latest developments & Modifications on coaching stock
- viii) Important provisions in IRCA part-III&IV

2) Freight stock:

- i) Design features of different types of wagons pertaining to BOX,BOXN&BLC wagons
- ii) Important features of stainless steel wagons and maintenance procedures
- iii) Design & construction features of different types of CASNUB Bogies.
- iv) Types of Train examination patterns and differences of each pattern
- v) Central discharge system in tank wagons
- vi) Door locking arrangement of BOBR wagons
- vii) ODC types and procedure for dealing
- viii) Remedial measures to be taken to avoid train partings

3) Brake system

- i) Introduction of Air brake system & Vacuum brake system
- ii) Working principles of Single & Twin pipe Air brake system
- iii) Design difference between the Bogie mounted and Under frame mounted air brake system
- iv) Working of DV & SAB regulator
- v) Brake binding investigation & preventive measures
- vi) Testing procedures of RTR,SWTR/CSTR and loco capability etc.

(B) SAFETY:

- i) Analysis of derailment of coaches/wagons on C&W account
- ii) Fundamentals of Railway track
- iii) Responsibilities/duties of C&W supervisor at accident/derailment site and restoration and various readings to be taken
- iv) Safety fitting, safety practices and safety precautions in C&W depots & other C&W working areas
- v) Safety parameters of wagons and coaches i.e., buffer heights, wheel base, wheelyre profiles clearance etc.

(C) STORES:

- i) Inventory control & ABC analysis
- ii) Types of stores i.e., Stock & Non-stock procurement
- iii) Types of Tenders & Tender committee levels.
- iv) Imprest store, recoupment and scheduling
- v) Condemnation of Rolling stock

(D) PLANNING:

- i) Knowledge of M&P programme, works programme and Rolling stock programme
- ii) Knowledge of Establishment rules like HOER, Leave, Pass, D&A Rules, WC Act, Factory Act, Minimum wages Act, and Contract labour Act.

Coaching stock

1. What is rolling in examination, and what are its advantages?

This is an examination conducted on an incoming train as it enters the yard or rolls into the platform. The TXR staff sit on both sides of the track and keep a careful watch especially on the under gear and running gear.

Advantages:

Defects which will show up only when the vehicle is on the run can be detected such as skidded wheel, rattling and unusual noises, screeching sound of hot box etc.

Any hanging fitting due to working out of securing pins and bolts can be noticed easily.

The platform side of a passenger train at a pass through station cannot be easily examined due to want of time and the movement of passengers, once the train has entered the platform. But in rolling in examination this side could be examined to a certain extent, outside the platform. And defects can be noted and attended within the available time.

2 Describe ICF all coil bogie?

The two main sole plates of I section are connected at either ends by head stocks and at the centre by the transoms.

The weight is taken at the side bearer on the top of the bolster.

No weight comes at the centre pivot. The pivot acts only as a point of rotation and guidance of the bogie.

The bolster is resting on bolster coil springs.

A vertical shock absorber is also provided between the bolster springs.

The bottom spring plank supports the bolster spring assembly. These spring planks are suspended from the bogie frame by means of stirrup links. The bogie frame is resting on axle box coil springs kept on the either side of the axle boxes.

The longitudinal movement of the bolster is controlled by anchor links connected diagonally between the bolster and the transom.

The lateral movement of the bolster is controlled by equalizing stays connecting the bolster and bottom spring plank.

Silent block bushes are provided at the centre pivot and at both ends of the anchor links of this bogie.

3. Define Hot Box and what are the causes for hot box and what are the common defects in R.B.

Hot Box: Every journal which runs warm necessitating a vehicle, wagon or brake van being detached from a train from the commencement of its journey to its booked destination inclusive should be considered a hot box

Causes for Hot Box:

- ODR : Over due for repacking & oiling
- Dry packing
- Loose packing
- Contaminated packing
- Over loading and uneven loading
- Tight packing
- Insufficient Oil
- Badly metallised brass.
- Defective slipper plate.

Common defects in RB

- Inner race cracked
- Outer race cracked
- Rollers out of alignment
- Rollers worn out and radial clearance
- Rollers loaded or unloaded i.e. taking or not taking load.
- Cage worked out or cracked
- Taper with drawl sleeve defects.
- End locking arrangements getting slack and working out
- Front cover or rear cover binding
- Grease oozing
- Examine the grease for de-colorization or contaminated with water or metal particles.

4. What are the various types of wheel defects, mention the condemning limit of each defect?*Write the additional wheel defects that are occurring recently?*

- Sharp flange - if radius at the tip of the flange reaches 5 mm or less is called as sharp flange.
- Thin flange – If the thickness of the flange is 16mm or less is called thin flange. For coaches running at 110 KMPH the condemning limit of flange thickness is 22mm.
- Less radius of root of the flange – if the root radius of the flange is 13mm or less is called less radius.
- Hollow tyre – If the wear on tread at center is 5mm or and above is called hollow tyre.
- Deep flange – If the depth of the flange is 35mm or more is called deep flange.
- Flat faces on tyre – If the length of flat faces on coaching stock is 50 mm or more is called flat faces. The limit of flat faces on bogie freight stock is 60 mm.
- Thin tyre – For solid wheel the condemning limit is 23mm.

In addition to the above the following defects are also noticed

| <i>Nature of the defect</i> | <i>Check for</i> | <i>Action</i> |
|-----------------------------|--|--|
| <i>Shelled tread:</i> | Pieces of metal breaking out of tread surface in between thermal checks a round the rim-generally, "Chain sliding" marks will also be visible. | Reject the wheel immediately send to the work shop |
| <i>Thermal cracks</i> | Rim crack visible on either face/tread Crack reaching either edge. Specially check wheels involved in brake binding or with a blackish blue tread. | Reject the wheel immediately send to the work shop |
| <i>Heat checks</i> | Super ficial cracks adjacent to the braking surface. Distinguish them from thermal cracks. | Allow wheels in service keep under surveillance. |
| <i>Shattered Rim</i> | Fractures on treads localized pitting / flaking and no other rejectable defects | Reject wheel immediately send to the work shop. |
| <i>Plate cracks</i> | Crack of any length on plate or hub | Reject wheel immediately send to the work shop. |
| <i>Spread rim</i> | Flattening / Widening of rim around the spot. There may or may not be a visible crack | Reject wheel immediately send to the work shop. |
| | Uniform curling over of metal over the outer edge of the rim (rim flow) | Allow wheel in service keep under surveillance |
| <i>Loose assembly</i> | Loose fitting on axle hub or bent axle | Reject wheel immediately send to the work shop. |

5. *What are passenger amenities provided in the coaching stock?*

A. The following are the amenity fittings fitted in coaches.

- | | |
|--|---|
| 1. Mirror & Mirror self- | 14. Wall protector. |
| 2. Soap dish | 15. Foot hold bracket |
| 3. Ash tray | 16. Rings below the berths for securing luggage. |
| 4. Push cock | 17. Cushioned seats & back rests. |
| 5. Wash basin | 18. Magazines pouch |
| 6. Tumbler holder | 19. Waster paper basket & dust bin |
| 7. Hand hold | 20. Inside door latches |
| 8. Upper berth hold | 21. Destination boards |
| 9. Coat hook | 22. Reservation display |
| 10. Flushing valve | 23. number plates for mail/express |
| 11. Window frame | 24. Number plates for Mail/Express |
| 12. Folding table | |
| 13. Shower rose & wheel valve. Coaches. | |

6. *What are the types of CDTs existing in coaching stock, Describe the system of working of CDTs?*

There two types of CDTs (Control Discharge Toilets System) in coaching stock namely 1. Vibhu 2. Aikon

The CDTs consists of the following main parts

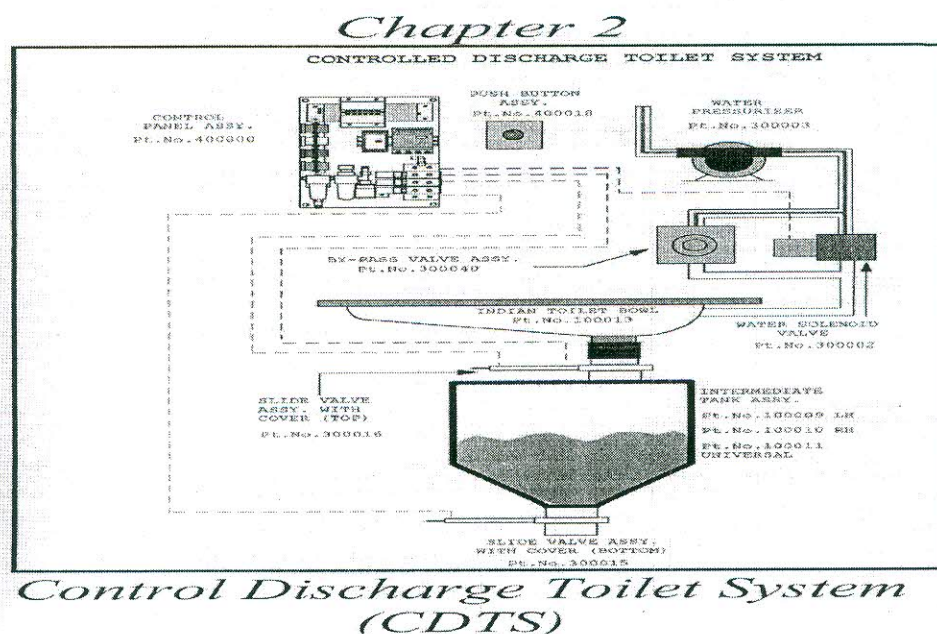
- Control panel board
- Water pressurizer –On (for a predetermined time)
- Water valve-On (for a predetermined time)
- Retention tank inlet slide valve-Open (for a predetermined time)
- Water pressurizer-off
- Water check valve-Off
- Retention tank inlet slide valve-Closed
- Flapper valve/upper slide valve

The toilet system is designed to operate with low quality and pressurized water bowl wash that covers nearly 100% of the toilet bowl area. The waste is removed from the toilet bowl and transferred to a retention tank with a minimal amount of water. Water consumption is only 2.5 liters per flush cycle for the Indian style toilet bowl and 1.5 liters for the European system toilet bowl.

Simply pressing a flush button activates a flush cycle. Depressing the flush button starts the flow of water into the toilet bowl and opens the slide valve connecting the toilet bowl to the waste retention tank. At the end of each flush cycle the wash water stops and the toilet is sealed off from the retention tank by the slide/flapper valve, which acts as an effective stench trap, preventing odour from entering the toilet room.

The waste is stored in the retention tank until the following two parameters are satisfied:

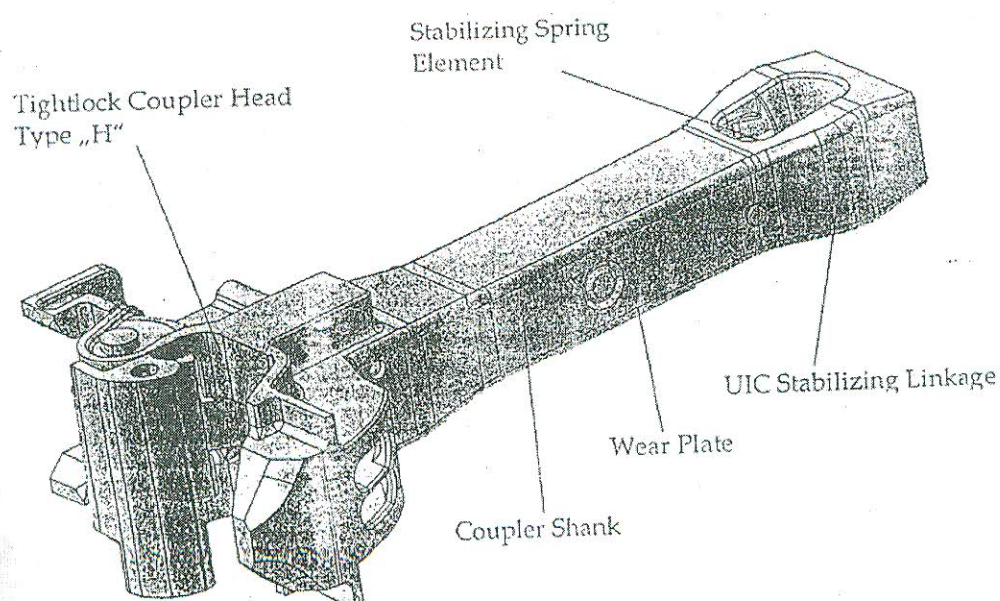
- ✓ A predetermined number of flush counts have been recorded and (2) the train has reached a minimum speed of above 30 km/h. At a time that the two parameters have been met, the retention tank discharge valve opens expelling the contents of the tank of the rail side, away from the railway stations and heavily populated areas.



The retention tank discharge valve remains open only for programme time long enough to completely drain the retention tank, then closes and remains closed until the above mentioned parameters are again satisfied.

7. *What are the types of CBC existing in coaching stock, Describe its components CBCs ?*
There are two types of CBCs existing in the coaching stock namely 1. *Faiveley make* 2. *Aikon make*

The coupler consists of the following main parts



1. Tight lock coupler head type 'H'

The coupler head has a shank/draw bar cast together with the head. Parts like knuckle, lock etc., are assembled in the coupler head to enable coupling and uncoupling. Tail end of the draw bar is provided with a UIC stabilizing link and connects to the draft gear (item 3 in the arrangement drawing) through the central pin. A backlash compensation device is assembled in the shank at tail end of coupler head. This device is held in position by two side bolts that are to be removed only after installation on the coach.

2. Draft gear

The draft gear (item 3 in the arrangement drawing) is a double acting device for energy absorption during coupling and during service. The device is designed to fit into the draft gear pocket of the coach and coach and absorbs the dynamic energy in both draw and buff modes. The stroke in tensile (draw) direction is limited to 58-5mm while that in the compressive (buff) direction is 80mm (max).

3. Supporting device

The supporting device (item 2 in the arrangement drawing) comprises of four preloaded compression springs. The device is placed on a platform and bolted to the car structure. The coupler head rests on the top wear plate of the supporting device and this device supports the coupler weight.

4. Manual uncoupling device

The manual uncoupling device (item 6 in the arrangement drawing) is mounted on one side near end wall of coach connecting the uncoupling mechanism on coupler head through the sliding rod. Handle of the device is unlocked, lifted and then rotated in the clockwise direction for uncoupling. After coupling locking of the handle has to be ensured to prevent unauthorized uncoupling. Special key for operating the lock is provided.

5. Mounting plates

Base plate and support plate (item 4&5 respectively in the arrangement drawing) are fastened to the under frame after mounting draft gear in the UIC pocket of coach. Base plate has a hole for inserting the central pin. A locking plate is fitted by sliding in between the central pin and base plate to prevent central pin from falling off. This arrangement facilitates fitment and removal of coupler head without removing the base plate. It is very important to use only M16 bolts Grade 10.9 for fastening the mounting plates.

8. How to check Anti Creep arrangement in CBC of coaching stock?

The Anti Creep arrangement to be checked and ensure it complies with specifications with the followings steps.

Step-1: Inspection for anti-creep protection is made through the front of the coupler.

Step-2: With the coupler in the locked position insert a pry bar through the front of the coupler between the knuckle tail shelf and lock, forcing lock upward.

Step:-3: Forcing the lock upward as far as it will go engages the top of the toggle with the bottom of the knuckle tail shelf.

Step:-4: Inset a pry bar between the leg of the lock and the front of the lock hole. Pull toward the front of the coupler to force the lock leg rearward.

Step:5 If the front edge of the toggle is 1/8" or more forward of the rear corner of the knuckle tail shelf the anti-creep is unacceptable, replace lock lift assembly.

Step:6 If an actual measurement is desired, inscribe a line on top of the toggle along the rear face of the knuckle tail shelf, measure at point "C" the measurement must not be less than 3/8". The complete coupler head overhaul is recommended at every 6 to 8 years interval.

9. *What are the gauges to be used during the IOH?*

The following gauges are to be used during IOH to ascertain the wear and tear and alignment of the bogie.

- Trammeling gauge
- Dash pot distance gauge
- Knuckle profile gauge
- Knuckle nose wear and stretch limit gauge.
- Aligning wing limit gauge.
- Vertical height aligning wing pocket and gauge arm gauge (Go gage)
- Vertical height aligning wing pocket and guard arm gauge (No-Go gauge)
- Buffer height gauge
- Wheel distant gauge
- Wheel profile gauge
- Tyre defect gauge.
- Comb gauge for flange thickness gauge

10. *What procedure to be followed on CBC rakes while attaching/detaching of loco/coaches on the formation?*

- After berthing the CBC rake on the platform and before releasing the rake by C&W staff, the first five coaches should be in brake applied condition.
- The loco shall be brought to the same line and to be stopped 20m from first coach (SR 5.13.3) and to move cautiously observing the hand signals.
- The first coach CBC and loco CBC should be aligned horizontally, so that they are in gathering range.
- The nominated supervisors of C&W and TRSO will ensure the following:
 “Vertical gathering between the two CBCs to be within the allowed range. If vertical gathering range is not within limits, the buffer heights of the loco and the coach should be checked (ie., Limits 1030mm to 1105mm). If buffer height of SLR is not within the prescribed limits due to over loading, the over load contents should be unloaded from SLR in accordance with the extant procedure with the permission obtained by Dy.SS (out door) from respective Sr.DCM/DCM of the division.
- S.C.Railway will not apply any lubricant on internal coupler parts of CBC of loco CBC in terms of RDSO manual No. G80 (inspection and maintenance of central buffer couplers for workshops staff). Since the practice of using lubricant on internal parts is in vogue in electrical and diesel maintenance points/loco sheds, thus in case any lubricant/grease is available will be wiped out by C&W staff before coupling. This instruction of non-application of lubricant has to be issued by RDSO/Railway Board to all Zonal Railways.

■ The coach CBC is H type and loco CBC is E type, following procedure to be ensured by C&W:

- a. Remove tell-tale pin (locking pin) of CBC of coach intended to be coupled.
 - b. Open the knuckle of CBC of coach wide open.
 - c. Remove locking pin of loco CBC intended to be coupled
 - d. Open the knuckle of CBC of loco wide open
 - e. Align both the CBCs in a line of gathering range.
 - f. Guide the loco driver/loc pilot/loc shunter who has stopped loco 20m before as in para (2) through hand signal to proceed with 2 to 3 kmph for coupling.
 - g. After coupling is made, check for the tell-tale pin of coach CBC cleared (i.e the lock lifts is fully fallen) and lock lift of loco CBC is dropped fully.
 - h. Ask loco driver/loco pilot/loco shunter to take notch and test proper coupling of knuckles.
 - i. Once coupling is ensured provide tell-tale pin in slot (complete in the position) and tie with GI wire to avoid accidental coming out on run. Provide washer on tail piece followed split pin. The split pin end to be opened up there after.
 - j. The locking pin of locomotive to be placed in position and to be tied up by GI wire to prevent any accidental falling out.
 - k. Ask loco pilot to take notches for checking the proper coupling by pulling apart the locomotive. Once it is pulled, C&W staff should insert the shims and fix the restrictor as per RDSO sketch and ensure proper coupling. The shims should be tied with GI wire by C&W staff.
- After ensuring proper coupling, the brakes of first five coaches should be released by C&W staff.
- The loco pilot and guard should ensure the required amount of BP & FP air pressure are built up in loco and rear SLR respectively as under:

| | BP | FP |
|-------------|------------------------|-------------------------|
| Loco | 5.0 Kg/Cm ² | 6.0 Kg/ Cm ² |
| SLR | 4.8 Kg/Cm ² | 5.8 Kg/Cm ² |

The above procedure should be followed at terminating station as well as at intermediate stations where the loco is reversed changed.

■ The CBC of the coaching stock should be maintained as per RDSO's maintenance instruction No. RDSO/2006/CG/CMI-01 dt. 16.10.06. The loco CBC should be maintained as per RDSO's technical booklet No. G.76.

11. What is pattern of train examination in coaching stock and RPC-IV guide lines?

| Sl. No. | Category of trains | Preventive Maintenance. schedules at pit line | Under gear examination and brake system maintenance at pit line | Internal cleaning pass. amenity attention and watering | External cleaning on nominated line with proper facilities | Enroute/Terminating examination | Brake system check prior to start at PF at the other end |
|---------|---|---|--|--|--|--|---|
| 1 | Mail/Exp. One-way run >3500 kms | At Primary end | At both the ends | At both ends | At both the ends | Enroute: After every 250 to 350 Kms of run at locations to be decided by Railway for each train Terminating Exam terminating station | Complete air/vacuum check with fresh BPC |
| 2 | Mail/Exp. One way run <3500 Kms. but Round trip run > 3500 kms | At Primary end | At both the ends | At both ends | At both ends | -do- | Complete air/vacuum check with fresh BPC |
| 3 (a) | Mail/Exp. Round trip run up to 3500 kms | At Primary end | Only at Primary end | At both the ends | At Primary ends | -do- | Only continuity check if stabled at platform, otherwise, brake power check with endorsement on original BPC |
| 3 (b) | Shuttles/Inter connected Mail/Exp. Round trip run upto 3500 kms | At Primary end | To be done after 3500 kms or 96 hours whichever is earlier only at Primary end | At Primary end and each terminal or as decided by the CME to ensure proper cleanliness | At Primary end once a day for shuttles. | Enroute: After every 250 to 350 kms of run at locations to be decided by Railway for each train. Terminating Exam each terminating station | Only continuity check if stabled at platform otherwise, brake power check with endorsement on original BPC |

| | | | | | | | |
|---|--|----------------|---|---|----------------|--|--|
| 4 | Passenger trains with toilets including interconnected passenger trains/shuttles | At Primary end | To be done after 3500 Kms or 7 days whichever is earlier at Primary end | At every terminal or as decided by the CME to ensure proper cleanliness | At Primary end | Enroute: After every 250 to 350 kms of run at locations to be decided by Railway for each train. Terminating Exam once a day at nominated terminating station | Only continuity check if stabled at platform otherwise, brake power check with endorsement on original BPC |
| 5 | Passenger trains without toilets | At Primary end | To be done after 3500 kms or 7 days whichever is earlier at Primary end | Once a day | At Primary end | Once a day at Primary or a nominated terminal | Only continuity check if stabled at platform, other wise brake power check with endorsement on original BPC. |

12. What are the different schedules attended on coaching stock? At what periodicities?

| <u>Type of Schedule</u> | <u>Periodicity</u> |
|-------------------------|------------------------|
| Trip schedule | -- Every trip |
| "A" Schedule | -- 1 Month +/- 3 days |
| "B" schedule | -- 3 months +/- 7 days |
| IOH schedule | -- 9 months +30 days |

POH periodicities:-

| | |
|--|---------------|
| Coaches running on Rajadhani Express rakes - | 18 months |
| PCVs / OCVs running on Mail / Express trains | - 18 months |
| Newly built coaches IST POH after | - 24 months |
| Inspection carriages | - 24 months |
| Coaches running on Passenger trains | - 18 months |
| Coaches running on ART/MRV spls. | - 3-1/2 years |

"A" Schedule:

- All items of trip schedule
- Intensive cleaning of coaches.
- Thorough flushing of water tanks.
- Checking and replenishing of oil in dash pots of ICF coaches.
- Checking and replenishing of oil in side bearers of ICF coaches.
- Thorough inspection and repairs of draw and buffing gear.
- Thorough disinfecting of all coaches.
- Cleaning of dirt collector filters of Air brake coaches.
- Cleaning of DA valve filter in Vacuum brake coaches.
- Checking of water pipes flush pipes, flushing cocks, push cocks etc. for ease of operation and free flow of water.
- Examination for wear and replacement where necessary brake hanger pins, brake blocks and brake heads etc.

"B" Schedule:

- All items of trip schedule and 'A' schedule
- Cleaning of water tanks and testing of water tanks for leakages.
- Thorough flushing of water tanks.
- Inspection of roller bearings for any cracks or loose bolts etc.
- Overhauling and testing of alarm chain apparatus.
- Examination of hose pipes brake cylinders
- Painting and through attention on water pipes lines.
- Greasing of laminated springs and equalizing stays.
- Check and inspection the trough floor for corrosion repairs.
- Touchup of paint wherever necessary.

"IOH" Schedule:

- All items of trip schedule, 'A' schedule, 'B' schedule.
- Thorough repairs of running gear including running out of bogies of coaches earning
- Examination of trough floor of ICF coaches, cleaning of drain holes and painting
- Touching of damaged paint of coaches on out side as well as inside.
- Thorough checks of slack adjuster and shock absorbers for damage and mal-functioning and replacing the defective ones.
- Over hauling of vacuum cylinders on vacuum brake coaches.
- Pocket between sole bar/and turn under should be thoroughly clean, through the inspection openings of sole bars and inspected with the help of torch lights are operation lands.
- Thorough examination and repairs of upholstery, cushions, curtains etc.
- Testing of brake cylinder and Air brake system for proper functioning.
- Checking of bogie frame for detection of cracks are deformation and necessary repairs/replacement should be under taken on coaches attended for IOH.
- Checking of vacuum/pressure gauges and replacement of defective or in accurate gauges with calibrated gauges.

13. How GPS works and what are its applications.

- GPS works by triangulating your position on the earth, based on satellite signals
- Satellites broadcast radio signals
- Receivers pick up the signals
- Receivers calculate geographic coordinates from the satellite signals
- GPS satellites are controlled and operated by the Dept. of Defense, but it is an open system
- 24 satellites in orbit dedicated to GPS
- 6 satellites are within view of any location at one time, provided that physical terrain, or structures do not block them
- Satellites constantly transmit their locational information, and time data

➤ **Receivers**

- Receiver picks up signals broadcast from satellites in known orbits
- Radio signals travel near the speed of light
- Receiver calculates how long the signal took to reach the earth
- Using velocity of the signal and time, receivers calculate distance to satellite

➤ **Calculating Distance with Speed and Time**

- Speed x time = distance
- Satellite radio transmission consists of a series of dots and dashes in a “pseudo-random” code
- All satellites transmit a unique code with a time stamp, synchronized by atomic clocks
- Receivers decode each signal to determine which satellite the signal is originating from
- Receiver compares time stamps with code to determine the time difference between satellite and ground position

➤ **The Mathematics**

- Once the first satellite distance is calculated, the receiver has narrowed its location down to a sphere with the radius of that distance.
- From the second satellite, the receiver can narrow its position to the intersection of the two possible spheres.
- Adding a third satellite narrows the receiver position down to two possible locations.
- The fourth satellite will provide more accuracy, narrowing to a single location.

➤ **Position Calculations**

- Adding a fourth satellite into the calculations helps calibrate timing of the atomic clocks
- The fourth satellite also greatly improves the level of accuracy on your positional data
- Four satellites = **3-D data collection** Accuracy +/- 1 meter
- Three satellites = **2-D data collection** Accuracy +/- 200 meters: **NOT RECOMMENDED**

➤ **GPS APPLICATIONS**

- **Vehicle Tracking Systems**
- **Passenger Information System**
- **Automated Destination Board**
- **Master Clock**
- **Digital Clock – LED Display**
- **Drum Clock – Servo Motor Technology**
- **Hand held GPS Tracker**
- **Patrol Monitoring System**
- **Audio Announcement System**
- **Time Synchronization**
- **Fail – Safe System**
- **Speedo – meter**
- Track the Vehicles on Real time basis
- Use of GPS & GPRS technology

14. How LED type destination boards works?

- **Passenger Information System**
- To display the information about the destination places
- Display in multilingual basis
- **Automated Destination Board**
- Automatically Display the train number, source and destination places .
- **Master Clock**
- Receive Automatic clock time by using Satellites
- If it is failure, local RTC is displayed

➤ **Digital Clock – LED Display**

Receive Automatic clock by using satellites ,display as Digital format

➤ **Drum – clock (Servo Motor Technology)**

Receive Automated clock from satellites by using Servo motor technology

➤ **Handheld GPS Tracker**

Used in Land or sea , tracking the destination place.

Used for Fishermen, and forest dept.

➤ **Patrol Monitoring System**

Monitoring the movements of Police personnel during Regular patrolling

➤ **Audio Announcement System**

Consists of Prerecorded Information of on approaching system, arrival at station, safety slogans .

➤ **Fail – Safe System**

It shall also replace/complement the use of mildly explosive detonators used at Fog Signal Posts to inform the locomotive driver that he is approaching a Home Signal, LC Gate, neutral section or permanent speed restriction etc. to allow him to take

➤ **Speedo meter**

Used to Measure and Monitor the speed of the locomotives

Create alert for speed violations

➤ **How to?**

LOCATE, TRACK, NAVIGATE

LOCATIONS

BECAUSE LIFE MOVES

Approach GPS

15. List out activities of rake maintenance during the following?

Primary maintenance

Secondary maintenance

Terminal maintenance

R&D

■ **Primary maintenance:-**

Primary maintenance will be done on all passenger carrying trains at primary maintenance depots on nominated trains notified by the Chief Mechanical Engineer of the Zone.

At primary maintenance depot all the primary maintenance schedule like schedule “A” or normally, schedule “B” or quarterly examination, IOH schedule (9 months) examination also trip schedule examination that is every trip will be done on the rakes in which they are running.

The attention during primary maintenance should be made more intensive with special emphasis train was terminated.

■ **Secondary maintenance:-**

Secondary maintenance will be done on primary maintained rakes other end which is nominated for this purpose.

At secondary maintenance depots where ;the primary maintained rakes on arrival depending upon the mandatory condition trip schedules, external washing , internal cleaning, issuing of fresh BPC will be done.

Terminal maintenance:-

All the terminating trains shall be examined at stations where the primary maintenance train was terminated.

At terminating examination rolling in examination and preliminary examination will be conducted before the primary maintenance rake placed in washing cum pit line.

R & D:-

R&D means receiving and dispatch. All the primary maintained rakes and passenger through trains shall be conducted rolling in examination examination on terminating /and pass through.

The R&D staff shall take up position on both sides of the line short of the platform on which the terminating train/pass through train is to be received and watch the condition of running gear, flat places on tyres , box, broken springs, defective brake gear etc.,

The R&D staff should also be checked the rakes after coming to halt and to be checked gear wise and ensure there should not be any rejectable defects.

The R&D staff should also be dispatch the originating trains on platform after the level of vacuum / air pressure ensured on the engine and brake van and certify the BPC and to handed over to guard and driver.

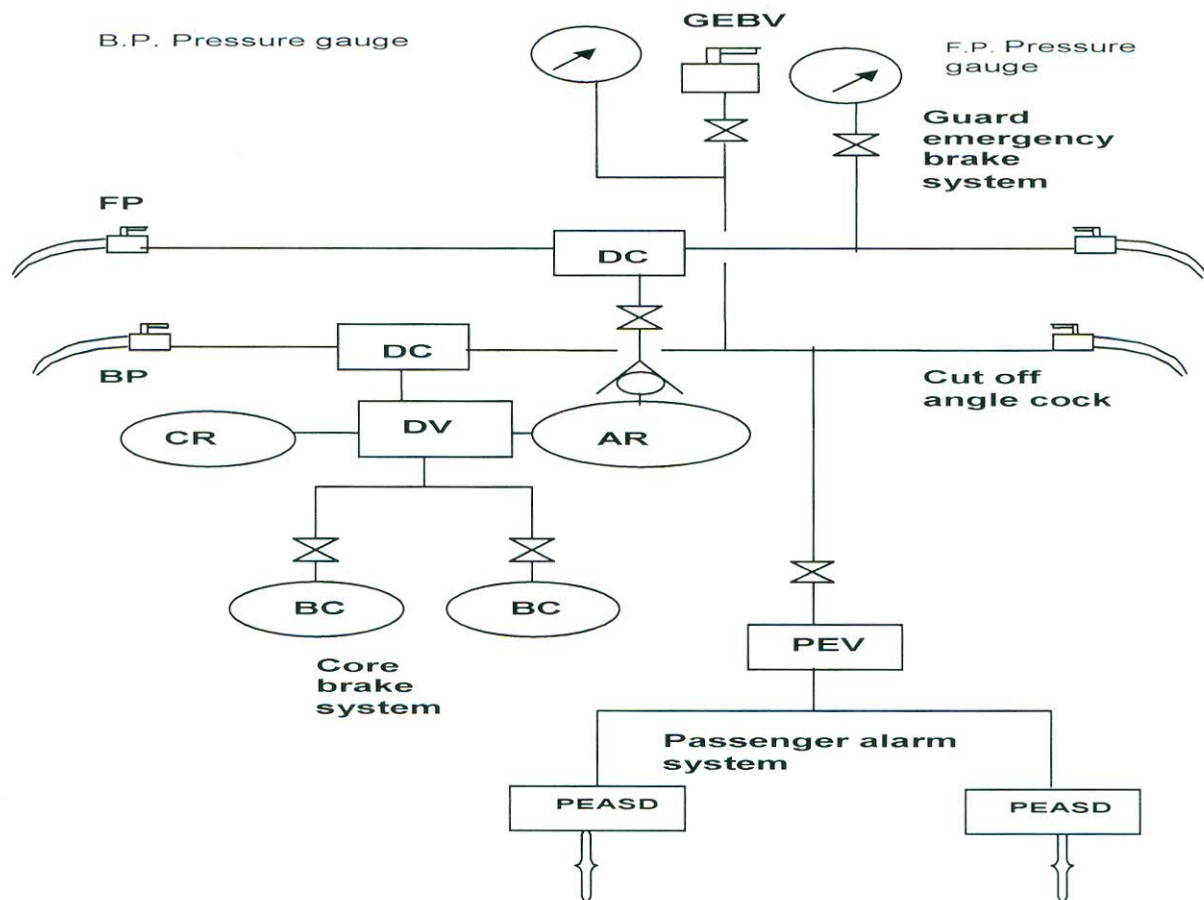
16. What are the important Rolling stock registers to be maintained by a TXR?

The following documents to be kept in coaching depot: -

- RS1 ⇔ Overall sick detention register
- RS2 ⇔ Repacking register
- RS3 ⇔ Oiling register
- RS4 ⇔ Vacuum brake maintenance register
- RS5 ⇔ Vacuum register for incoming train
- RS6 ⇔ Brake power certificate
- RS7 ⇔ Train examiner diary
- RS8 ⇔ Register for hot box
- RS9 ⇔ Wheel register
- RS10 ⇔ Sending to shops of coaching and wagon stock
- RS11 ⇔ Register of damage and deficiencies of rake
- RS12 ⇔ Register of wagons tested for leaking.
- RS13 ⇔ Register of fire extinguishers
- RS14 ⇔ Register of portable telephone in brake van
- RS.15 ⇔ Register of train examiner book (DVR)
- RS.16 ⇔ Sick memo book
- RS-17 ⇔ Fit memo book
- RS.18 ⇔ Report of damages caused by theft, mischief etc.
- RS.19 ⇔ Register of coaching treated with section code
- RS.20 ⇔ Tank wagon register
- RS.21 ⇔ sick label register
- RS.22 ⇔ Damage/deficiencies noted label
- RS.23 ⇔ Abstract of repacking and oiling of boxes
- RS.24 ⇔ Application for CME for condemning of rolling stock
- RS.36 ⇔ Rolling stock laid up and waiting for materials
- RS.61 ⇔ Theft of mechanical fittings of coaching stock
- RS.65 ⇔ Accident train parting register
- RS.68 ⇔ Label damage not to go

- RS.69 ⇔ Details of rake maintenance
- RS.70 ⇔ Hotbox report
- RS.71 ⇔ Coach maintenance history card
- RS.72 ⇔ Trip schedule card
- RS.73 ⇔ "B"schedules card
- RS.74 ⇔ "A"schedule card etc.,

17. Explain in detail the brake system on coaching and it's functioning with a neat Sketch and the name its parts?



Charging:

During charging or running position the MR in the loco is created upto 8 to 10 Kg/cm² of air pressure. This air pressure is taken through A-9 valve to the brake pipe at 5 kg/cm² and fed to the brake pipe and 6 kg/sqcm² to the feed pipe of the system. The brake pipe feeds the control reservoir and auxiliary reservoir with 5 kg/cm² through DV. During this time brake cylinder is connected to the exhaust port.

Application:

During application the driver reduces the brake pipe pressure from 5 kg/cm² through the drivers brake valve. This actuates the DV to connect the brake cylinder to auxiliary reservoir and to close the exhaust port. The DV reacts to the changes of pressure in the BP and applies the brakes by passing air from the AR to the BC and release it by exhausting the air from the BC to atmosphere.

Releasing:

During releasing the driver recharges the brake pipe with 5 kg/cm^2 , feed pipe recharges with 6 kg/cm^2 and AR also charged with 6 kg/cm^2 . The pressure again actuates at DV. The AR is disconnected from BC and BC is exhausted to atmosphere. The position is retarded by spring pressure and the brakes are released. For manual release of the brakes the quick release valve is pulled and the air in the CR is exhausted and the brakes are released manually.

18. Explain the procedure of single car testing of air brake system, the parameters tested?

Single Car Testing is done on a coach to see the efficiency of the brake system of the coach. It must be conducted whenever any air brake subassembly of the coach like distributor valve, brake cylinder etc is changed and during Schedules attention.

Procedure:

- The coach under testing is to be coupled at one end with the BP and FP head of the test rig and the other end should be closed with dummy coupling heads. On the brake cylinder the pressure gauge with flexible hose should be fitted.
- Couple the test rig to the main line of the compressor through a pipe. The compressor should have a capacity of 35 cfm and should have a 200 L reservoir and should be capable of developing a pressure of $8-10 \text{ kg/cm}^2$.
- Set the pressure regulator to $6 \pm 0.1 \text{ kg/cm}^2$. Open the Isolating Cocks of F.P. and B.P. and C.R. in the test rig and also the angle cocks of both the FP and the BP on both the ends of the Coach.
- Driver's brake valve should be in charging and release position. Wait for about 5 minutes in twin pipe system for charging the complete rake. Now check the pressures in the FP pressure gauge and the BP pressure gauge, pressure should be $6 \pm 0.1 \text{ kg/cm}^2$ in FP and $5 \pm 0.1 \text{ kg/cm}^2$ in BP.
- The system is now fully charged. Take the following steps and record the readings in the test proforma.
 - ◆ Close test rig F.P. isolating cock and check the leakage in the F.P. for one minute.
 - ◆ Close test rig B.P. and reservoir cocks and check the leakage in BP for one minute
 - ◆ Now open the test rig F.P and B.P. cocks
 - ◆ Bring drivers brake valve in full service application position.
 - ◆ Record the brake cylinder filling time from 0 to 3.6 kg/cm^2 in the brake cylinder pressure gauge.
 - ◆ Note down the maximum pressure in the brake cylinder
 - ◆ Note down the pressure drop in BP from pressure gauge
 - ◆ Note down the piston stroke of the brake cylinder
 - ◆ Bring driver's brake valve in position 2 for releasing the brakes.
 - ◆ Record the brake cylinder draining time from 3.8 to 0.4 kg/cm^2 in brake cylinder pressure gauge.
 - ◆ Check complete release of brakes i.e. piston of brake cylinder should reach its initial position and then proceed further for testing
 - ◆ Open test rig B.P. and Reservoir cock for charging the reservoir to 5 kg/cm^2
 - ◆ Close test rig BP cock and open Sensitivity cock for checking sensitivity of brakes. Record the time with in which brakes get applied.
 - ◆ Close Sensitivity cock and open B.P. cock. Wait till brakes are released.
 - ◆ Close B.P. cock and open Insensitivity cock for checking the insensitivity of brakes.
 - ◆ Close Insensitivity cock and Reservoir cock and open B.P. cock. B.P. should rise to 5 kg/cm^2

- ◆ Close test rig B.P. isolating cock and open emergency isolating cock for checking the Emergency application.
- ◆ Record the brake cylinder charging time from 0 to 3.6 kg/cm² in BC pressure gauge.
- ◆ Record maximum BC pressure
- ◆ Check the leakage in BC for 5 minutes.
- ◆ Pull the manual release lever of distributor valve for about 10 sec. Brake cylinder pressure should be become zero automatically.

19. *What are the standard infrastructure facilities required for depot handling 250 coaches? List out M&P also.*

Infrastructural facilities required for coaching depot:

Coaching depots are classified as following based no. of coaches they hold.

| | | |
|------------------------|---|---------------|
| Up to 100 coaches | - | minor depot. |
| 100-250 coaches | - | Medium depot. |
| More than 250 coaches- | | Major depot. |

Basic infrastructure required:

i) Covered accommodation ii) Sick line iii) Washing line iv) Machinery & plant

- i) **Covered accommodation:** For any depot, the covered accommodation should be able to house 4% of its holdings and each line should be of maximum 4 coaches accommodation. Therefore for a depot holding 250 coaches the requirement is as follows.

| | | |
|--------------------------|---|-----------------------------------|
| Coach holding | - | 250 |
| 4% of coach holding | - | $250 \times 4 / 100 = 10$ coaches |
| Length of each coach | - | 23 mts. |
| Accommodation for bogies | - | 12 mts. |

or either side.

∴ Requirement for one coach - $23 + 12 = 35$ mtr.

∴ No. of coaches / line = 4 - $35 \times 4 = 140$ mtr. Say 150 mtr.

The clearance between the lines (centre to centre) should be a minimum of 8m.

No. of lines required to accommodate 10 coaches - 3

∴ Width of the covered accommodation considering 3 lines = $8 \times 3 = 24-30$ mts.

∴ The covered accommodation should of 150x30m with sufficient height for each lifting $4 + 2 = 6$ m.

The following should be of 150mm thick concrete reinforced to with stand the stress. The lifting jack base should be further reinforced to take heavier loads. There should be a pathway of 5m wide along the periphery of the shed for easy movement of material handling equipment, 50% of the each time should have pit for under-gear examination proper ventilation should be provided, natural lighting should be utilized to the max, extent possible, sufficient lighting arrangements also should be provided. The shed should have a hoist or lifting of bogies & wheels,. For a major depot EOT crane of 20T capacity is desirable.

- ii) **Sick line:** The sick line should accommodate 3 times the covered accommodation. Therefore, for a depot with 250 holdings the sick line should accommodate $10 \times 3 = 30$ coaches. This can be in single/double line.

iii) **Washing line:** No. of washing lines required depends on the rakes of PM/SM and their schedule, with a clear maintenance time of 6 hrs. for each rake. The washing line should have the following facilities.

- a) Watering line for coach watering /exterior/interior washing.
- b) HP water jet facility with suitable tappings.
- c) Compressed air line for air brake testing with suitable tapping points.
- d) Rake test rig.
- e) Sufficient lighting arrangement for examination during night.
- f) Power points for tapping supply to mechanized cleaning equipment.
- g) Pit line with proper drainage
- h) Catwalk on either side.
- i) Pathways for easy movement of man & material.
- j) Preferably it should have double entry.

iv. **Machinery & plan:** Coaching depot should be equipped with the following M&P.

- | | |
|---|---|
| a) Welding plant | b) Whiting jacks for lifting the coach. |
| c) Hoist for bogie dismantling | d) Centre lathe |
| e) Gas cutting equipment | f) Drilling machine |
| g) Sewing machine | h) Lister truck |
| i) Fork lift truck | j) Toad vehicle (lorry) |
| k) Bogie manipulators | l) Air compressor |
| m) DV test bench | n) SCTR |
| p) Test benches for brake system components | o) RTR |
| q) CO2 welding plant | |
| r) Pneumatic grinder | s) HP jet system |
| t) Pit wheel lathe etc... | |

In addition to above, general accommodation for CDO, supervisors and staff should be available. A store room with storage racks, time office accommodation. Staff rest room, washing facilities, separate toilets for women / male employees, cool drinking water supply should be provided in a coaching depot.

20. *What are the various activities under taken by IR to improve condition of PCVs?*

A. Indian railways is the largest network under taking transportation of Passengers and goods. Of late importance is given to the safety and aesthetics of coaching stock. The various modifications and activities under taken to improve the condition of Rolling stock are.

- Provision of Air brakes and disc brakes
- Introduction of Composite brake blocks.
- Intensive cleaning of Coaches/Mechanised coach cleaning.
- Attention to Cleanliness on enroute trains.
- Steam cleaning of Pantry cars.
- Periodic Dis infestation and pest control treatment.
- Attention of Zero missing of amenity fitting.
- Provision of shock absorbers in Primary suspension.
- On Board House Keeping services.

21. List out the requirements of high speed trains?**General:-**

- Should preferably with bogies of box type transom that is all coil bogie ICF coaches.
- Should be fitted with DA valves.
- Should be fitted with SAB/BMBC.
- Should have brake rigging with long brake shaft arm 830mm.
- Should have center pivot with silent block bushes.
- Should have anchor links with silent block bushes.

Period of attention:-

POH – all coaches are to be given a through POH every 18 months and IOH Every 9 months.

Attention required on open line:-

- Wheels with less than 22mm thickness should not be permitted
- Broken / weak springs should not be permitted
- The control dimension “A” in the case of SAB should be maintained
- For all ICF coaches having a bogie leverage ratio of 1:5:5 “A” dimension Will be 22mm
- For bogie leverage ratio of 1:4 “A” dimension will be 16mm
- DA valve filters should be cleaned and 53cms in brake van should be maintained.
- A vacuum level of 56cms in loco and 53cms in brakevan should be maintained.
- No defective cylinder should be permitted from the starting station.
- The oil level in dash pot and side bearer should be checked and replaced once in 15days.
- Equalizing stay rod should be greased once in 15 days.
- All screw couplings should have enhanced couplings.

22. *What do you understand by Air continuity test? How is it carried out and under what conditions?*

Ensuring the through connection of air pipes from the Engine to that of Guard compartment or a last vehicle on a formation is termed as continuity. If the continuity is disrupted the brake power will not be effective and it becomes very difficult for a driver to control the train on run. In order to ensure the through connection the air continuity test is performed by the Driver and guard (in the presence of TXR if it is a nominated point). This test has to be done at originating station, enroute if any attachment /detachment of loco, carriages, any brake defect attend closing the angle cocks. The procedure for the test is as follows:

- ✦ The Driver and guard should have means of communication and confirm to each other the readiness to perform the continuity test.
- ✦ Driver must charge the BP and FP to 5kg/6kg respectively and confirm with guard the corresponding pressures in the guard compartment as 4.8kg/5.8kg respectively in BP & FP
- ✦ The BP pressure should be reduced to 3.5kg by operating A9 by the driver and the corresponding drop of 1.5kg to be confirmed by the guard. Under this condition the brakes must apply. Or else the continuity does not exist. The formation should be checked and attended to accordingly. Repeat the process again.

- ✦ After successful completion of the above, the driver should recharge the system again by operating the A9 valve back to original position and confirm the pressures in guard compartment with guard.
- ✦ The guard should open the GEV for one minute and the driver should observe the deflection/overshooting of air flow indicator along with audiovisual indication and confirm the same to the guard. If the test fails, indicates discontinuity. The formation to be checked and attended to, the test to be repeated.
- ✦ If the guard compartment is not the last vehicle of the formation, then the cut off angle cock of BP of last vehicle to be opened for one minute for exhausting the air from BP.

23. *What is procedure for booking a coach to shops for POH?*

All the coaches needs periodical attention to maintain the rolling stock good fettle, to improve the reliability of asset and to sustain the passenger satisfaction and comfort. Therefore the coaches are given POH at nominated workshops at a prescribed intervals.

The coaches which are due for POH are to be identified and detached from the formation and sent to workshops by the base depot. The following procedure to be adopted .

- A joint check should be carried out by the representatives of Mechanical, Electrical and Security department and DRS card should be prepared under joint signature. A copy of the DRS should be pasted in the coach, two copies will be with RPF escort, one copy each will be retained with mechanical and electrical departments. Any further removal of fitment is prohibited after the DRS is made.
- All the coaches booked to POH should be moved to shops by passenger/parcel/coaching special only. Normally in lots of 3 coaches will be moved with RPF escort.
- On arrival at the workshops, the joint check should be carried out by the representatives of the all the departments at the workshops and verify the DRS prepared by the base depot. Addition if any to the DRS is communicated to base depot with a copy to RPF who investigates and fix the responsibility. The base depot should process for write off of additional deficiencies to DRS.
- In case of un escorted coaches, the difference of items of two checkings should be treated as theft.
- Workshop should have a proper organization to check the coaches immediately on arrival.

24. *What do you understand by cross trammel gauge? How you would you check ICF trolley with this gauge?*

This gauge is like a long pipe one end of which is pointed and fixed. The other end is also pointed but sliding one. One set screw is provided over this end also as to take readings by tightening this end. Scale is also provided towards this end of the pipe. This gauge is used to check the square-ness of the trolley frame.

25. *How to check ICF trolley?*

A punch mark is provided on every pedstal jaw of the said frame of the ICF trolley. This mark is cleaned with the help of a scraper to improve its visibility.

Pointe fixed end of the gauge is placed on this mark and the other sliding end pointed is placed diagonally on the other mark. Take reading on the scale after tightening the set screw. The same procedure should be followed on the other end also. Cross trammel in ICF trolley should be

.....mm. Journal center should also be seen by placing the gauge on the directly opposite punch marks, which should bemm and wheel journal center to should be 2896mm

26. *What are latest modifications & carriage alteration instructions?*

The following are the modifications and alterations:-

- Provision of hammer in all A.C coaches for breaking the window glass in case of emergency.
- Provision of swiveling type ladder in AC-I class coaches to facilitate passengers for easy climbing on to the upper berth.
- Maintenance of air brake hose coupling for BP and FP on air brake coaches. To test BP as freight stock by testing air house after coupling head with an air pressure of 10 Kg/Cm² in melting the hose in water no leakages in permitted.
- Replacing of 100 lts. of AR by providing 200lts of AR and strengthening of AR suspension arrangement to avoid dropping of AR on run.
- Retro-fitment of enhanced high capacity tensile screw coupling and draft gear in BG coaches. Since present screw coupling is having 60T cap. After enchasing fitted with 75T and to run 24 coaches.
- Side buffer capacity increases from 1000 Kg/CM² to 1225 Kg/CM² with rubber spring and magnifying polyurethane pads.
- Modification in fever and bottom plank and bracket in brake rigging arrangement on under frame mounted air brake coaches for both AC and Non-AC coaches to increase the periodicity of the coaches of the reduce the brake for minimizing the brake binding cases.
- Provision of stopper assembling on brake block hanger bracket to avoid working and of brake block hanger pin.
- Two way dirt collector is replaced by 3 way dirt collector to avoid detachment coaches when failure occurrence on DC.
- Provision of isolating coaches OHP type with air went hole (or) 3mm dia brake cylinder only.
- Provision of bulb cotter in change and freight stock by splitting to 90⁰ to avoid to dropping of brake gear pin due to unplugged splitting of cotters.
- Safety lap for in coupling rod of CBC on BG wagons to avoid working cut and dropping of lever.
- Adoption of anti roof climbing feature to avoid roof climbing of coaches by passenger.
- Adoption (or) injury free feature for reducing provinces to injury passenger's chief accidents.

Freight Stock**27. What the important feature of stainless steel type of wagons****Salient features of stainless steel type of wagons**

| Sl.No. | Parameters | BCNHL |
|--------|---|--|
| 1 | Tare weight (design) in tonnes | 20.8t |
| 2 | Payload in tonnes | 70.8t |
| 3 | Gross weight to tones | 91.6t |
| 4 | Axle load | 22.9t |
| 5 | Volumeric capacity (without heap loading) | 92.54m3 |
| 6 | Length over buffers (3487mm less) | 10963mm |
| 7 | Length over headstock (3487mm less) | 10034mm |
| 8 | Overall width (250mm more) | 3450mm |
| 9 | Inside width (401mm more) | 3345mm |
| 10 | Over height (288mm more) | 4305mm |
| 11 | Inside height (347mm more) | 3024mm |
| 12 | Number of wagon in 636 meters length | 58 |
| 13 | Centre sill | Fabricated from CRF section at end |
| 14 | Stringers (longitudinals) | CRF (IRSM44) chanel Sec 100x 50x4mm |
| 15 | Cross stringers (cross members) | Fabricated sec. of IRSM44 |
| 16 | Sole bar | CRF (IRSM44) channel sec of 215x140x7 with stiffener 77 x 73 x 7 |
| 17 | Head stock | Fabricated from IRSM44 steel |
| 18 | Side stanchions | Fabricated from IRSM44 steel |
| 19 | Side body sheet | 2.5mm thick IRSM44 |
| 20 | End stanchion (Middle & bottom) | CRF hat sec. (IRSM44) 210x80x6mm |
| 21 | Side top coping | CRF (IRSM44) angle 100x56x6 |
| 22 | End coping, End stiffening centre & End top stanchion | CRF hot section (IRSM44) 150x80x6 |
| 23 | Door | Fabrication of CRF section |
| 24 | Corner stanchions | CRF (IRSM44) Angle sec 160x100x8 |
| 25 | Cross member of roof | CRF (IRSM:44)channel sec.75x50x6 |
| 26 | Corner roof carline | CRF(IRSM44) single sec 100x100x6 |
| 27 | End body sheet | 2.5mm thick IRSM44 |
| 28 | Floor plate | 4mm thick IRSM44 |
| 29 | Bolster | Fabricated box section (IRSM44) |

28 *What do you understand by IRCA? What does part III and Part IV deals with?*

IRCA :The acronym of IRCA is Indian Railway conference association. It contains Two parts namely viz., Part III & Part IV.

- IRCA part.III containing rules for maintenance, examination and inter change of goods stock BG & MG system of Indian Government Railways.

- IRCA Part.IV deals containing rules for maintenance, examination and inter change of coaching stock BG & MG system of Indian Government Railways.

The above rules contained in IRCA rules should be followed without fail by every Railway servant who was deputed for the same.

IRCA part IV

Coaching stock containing the following chapters: -

Chapter I:

Definitions in alphabetical order.

Chapter II:

Repair practices

Chapter.III:

Procedure for examination, maintenance and interchange.

Chapter IV:

Rejections - conditions for work shop repairs

- Condition for sick line repairs
- Responsibility of yard C&W supervisors
- rejectable defects for axle boxes, axle quick.

Body, compartment, floor, brake gear etc.

Appendix A- I:

Particulars of spring suspension.

Appendix A - II

Procedure for dismantling, Inspection and repairs of different types of coaching stock bogies.

Appendix B

Transportation codes

Appendix C

Method of periodical inspection and testing of Automatic vacuum brake.

Appendix D

Method of periodical inspection of Air brake system

Appendix E

Instructions for primary and secondary maintenance schedules for mechanical staff and revised maintenance pattern for coaching stock.

Appendix F

Instructions for primary and secondary maintenance schedule for electrical staff.

Appendix G

- Schedule of charges for damages and deficiencies on coaching stock.

IRCA rule no.4.3 of part III and Part IV: *Not with standing any provisions in the rules, coaching stock must not be allowed to run if in the opinion of C&W supervisor it is in such a condition as it may cause an accident.*

29. What are the different types of design features of wagons?

| SL.No. | Type | Length over Buffers/CBC | Length over headstock | Length inside | Width inside | Height inside | Wheel base bogies centers | Journal size length & Dia | Distance between journal centers | Wheel dia | Axle load | Tare | Pay load | Gross load | Ratio bet. gross load/Tare | Loading density | Floor Area | Cubic capacity |
|--------|-------|----------------------------|--------------------------|---------------|--------------|---------------|------------------------------|------------------------------|--|-----------|-----------|-------|----------|------------|-------------------------------|-----------------|------------|----------------|
| 1 | O | 7214 | 5944 | 5934 | 2845 | 1000 | 3504 | 255 x 127 | 2235 | 1090 | 16.3 | 10.31 | 22.19 | 32.5 | 3.15 | 4.5 | 16.88 | 27 |
| 2 | CR | 8432 | 7162 | 7162 | 2946 | 2445 | 4572 | 255 X 127 | 2235 | 1090 | 16.3 | 10.77 | 21.73 | 32.5 | 3.14 | 3.8 | 21.15 | 51.4 |
| 3 | TO | 8280 | 7010 | 6156 | 2362 | | 4572 | 255 X 127 | 2235 | 1090 | 16.3 | 13.9 | 18.61 | 32.51 | 1.34 | 3.93 | 23280 | 25.65 |
| 4 | TORY | 8280 | 7010 | 6156 | 2362 | | 4572 | 120 | 2235 | 1090 | 16.3 | 12.1 | 20.5 | 32.6 | 1.68 | 3.93 | 25400 | 26.04 |
| 5 | TORXT | 7942 | 7010 | 6156 | 2362 | | 4572 | 120 | 2235 | 1090 | 16.3 | 11.74 | 20.86 | 32.6 | 1.77 | 4.11 | 25400 | 26.04 |
| 6 | TOH | 7215 | 5945 | 5639 | 2362 | | 4572 | 120 | 2235 | 1090 | 16.3 | 11.24 | 21.27 | 32.51 | 1.8 | 4.51 | 23000 | 20.57 |
| 7 | TP | 8280 | 7010 | 6156 | 2362 | | 4572 | 255 X 127 | 2235 | 1090 | 16.3 | 12.85 | 17.63 | 30.41 | 1.37 | 3.68 | 24980 | 25.65 |
| 8 | TPR | 8280 | 7010 | 6766 | 2362 | | 452 | 120 | 2235 | 1090 | 16.3 | 12.2 | 20.3 | 32.5 | 1.66 | 3.92 | 27490 | 28.64 |
| 9 | BOXC | 13729 | 12800 | 12792 | 2852 | 1880 | 8800 | 130 | 2240 | 1000 | 20.32 | 25.1 | 56.18 | 81.18 | 3.24 | 5.91 | 36.5 | 68.58 |
| 10 | BOXT | 14082 | 12800 | 12792 | 2852 | 1880 | 8800 | 130 | 2240 | 1000 | 20.32 | 26.33 | 54.95 | 81.28 | 3.09 | 5.79 | 36.5 | 68.58 |
| 11 | BOXR | 13729 | 12800 | 12792 | 2852 | 1880 | 8800 | 130 | 2240 | 1000 | 20.32 | 28.1 | 53.18 | 81.28 | 2.89 | 5.92 | 36.5 | 68.58 |

| | | | | | | | | | | | | | | | | | | |
|----|------|-------|-------|-------|------|------|------|-------|------|------|-------|-------|-------|-------|-------|------|-------|--------|
| 12 | BOI | 11629 | 10700 | 10690 | 2850 | 1050 | 6700 | 144.5 | 2240 | 1000 | 20.32 | 22.8 | 58.48 | 81.28 | 3.56 | 7 | 30.47 | 32 |
| 13 | BOX | 13192 | 11910 | 11902 | 2926 | 1880 | 8060 | 130 | 2260 | 1000 | 20.32 | 23.55 | 57.73 | 81.28 | 3.45 | 6.17 | 34.82 | 65.5 |
| 14 | BOY | 11930 | 11000 | 10990 | 2924 | 1175 | 7330 | 144.5 | 2260 | 1000 | 22.60 | 19.9 | 71.49 | 91.39 | 4.59 | 7.66 | 32.13 | 37.8 |
| 15 | BOXN | 10713 | 9784 | 9784 | 2852 | 2460 | 6524 | 144.5 | 2260 | 1000 | 20.32 | 23.58 | 57.7 | 81.28 | 3.44 | 7.59 | 27.9 | 68.6 |
| 16 | BOBR | 11600 | 10671 | 8732 | 3340 | 2461 | 2000 | | | | 20.32 | 26.00 | 55.28 | 81.28 | | 7.0 | | 57.2 |
| 17 | BCNA | 14450 | -- | 13521 | 2944 | 2677 | 2000 | | | 1000 | 20.32 | 24.5 | 56.78 | 81.28 | | | | |
| 18 | BCN | 15429 | -- | 14500 | 2944 | 2446 | 2000 | | | 1000 | 20.32 | 25.5 | 55.77 | 81.28 | | | | |
| 19 | BRN | 14645 | -- | 13716 | 2845 | | 2000 | | 2260 | 1000 | 20.32 | 23.37 | 57.91 | 81.28 | | | | |
| 20 | BTPN | 12420 | 11491 | -- | 3046 | | | | | | | | | | | | | |
| 21 | BCXR | 12192 | 13462 | 12192 | 2946 | 2445 | 8534 | 130 | 2235 | | | | | | | | | |
| 22 | BCXT | 15000 | 15929 | 14992 | 2987 | 2583 | 9500 | 130 | 2240 | 1000 | 20.32 | 25.93 | 55.35 | 81.28 | 3.134 | 5.1 | 44.78 | 109.13 |
| 23 | BCX | 14500 | 15782 | 14494 | 2944 | 2446 | 1000 | 130 | 2240 | 1000 | 20.32 | 28.5 | 52.78 | 81.28 | 2.85 | 5.15 | 42.67 | 104.00 |
| 23 | BRH | 13716 | 14986 | 13716 | 2845 | | 9144 | 130 | 2240 | 1000 | 20.32 | 24.38 | 56.90 | 81.28 | 3.33 | 5.42 | 39.02 | |
| 24 | BRHT | 13716 | 14986 | 13716 | 2845 | | 9144 | 130 | 2240 | 1000 | 20.32 | 25.92 | 55.36 | 81.28 | 3.14 | 5.42 | 39.02 | |

| | | | | | | | | | | | | | | | | | | |
|----|------|-------|-------|-------|------|------|-------|-----------------|------|------|-------|-------|--------|--------|------|------|-------|--|
| 25 | BRS | 13716 | 14986 | 13716 | 2845 | | 9144 | 130 | 2240 | 1000 | 20.32 | 25.10 | 56.18 | 81.28 | 3.26 | 5.42 | 39.02 | |
| 26 | BOBX | 10668 | 11597 | 7672 | 2910 | | 7112 | 305 X 152 | 2260 | 915 | 22.9 | 26.16 | 65.44 | 91.6 | 3.5 | 7.9 | | |
| 27 | BOBS | 10668 | 11678 | 9296 | 2743 | | 7112 | 160 | 2260 | 915 | 22.9 | 29.46 | 62.14 | 91.6 | 3.1 | 7.84 | | |
| 28 | BWX | 14326 | 15596 | 13962 | 3048 | 705 | 10668 | 255 X 127 | 2235 | 1090 | 16.3 | 24.13 | 40.87 | 65.00 | 2.69 | 4.2 | | |
| 29 | BWS | 26289 | 27559 | 6706 | 2946 | 699 | 17247 | 140 | 1360 | 9015 | 18.7 | 91.44 | 132.08 | 232.52 | 2.44 | 8.11 | | |
| 30 | BWL | 17374 | 18644 | 9449 | 2743 | 864 | 13716 | 120 | 2260 | 915 | 20.32 | 29.92 | 51.36 | 81.28 | 2.71 | 4.35 | | |
| 31 | BWH | 19202 | 20472 | 8046 | 2743 | 1042 | 14172 | 305 X 152 | 2260 | 915 | 22.9 | 43.94 | 94.06 | 138.00 | 3.14 | 6.72 | | |
| 32 | BWT | 15240 | 16510 | 6100 | 3048 | 1060 | 11580 | 150 | 2260 | 915 | 22.9 | 35.56 | 55.88 | 91.44 | 2.57 | 5.57 | | |
| 33 | BHS | 17530 | 18800 | 6250 | 2440 | | 12700 | 305 X 152 | 2260 | 915 | 22.9 | 45.72 | 91.68 | 137.04 | 3 | 7.3 | | |
| 34 | BWM | 22850 | 24120 | 15400 | 2750 | 360 | 19200 | 255 X 127 | 2235 | 1090 | 11 | 24 | 20 | 44 | 1.83 | 1.82 | | |
| 35 | BWZ | 28000 | 29270 | 7930 | 2340 | 615 | 19000 | 305 X 152 | 2260 | 915 | 22.5 | 87.2 | 182.8 | 270.0 | 3.1 | 9.22 | | |
| 36 | BVG | 5943 | 7213 | | | 2396 | 3505 | 255 X 127 | 2235 | 1090 | 16.3 | 10.77 | | 10.77 | 1.00 | 1.5 | | |

| | | | | | | | | | | | | | | | | | | |
|----|------|-------|-------|--|------|--------|------|-----------------|------|------|-------|-------|------|-------|------|------|--|--|
| 37 | BVM | 5943 | 7225 | | | 2396 | 3505 | 255 X 127 | 2235 | 1090 | 16.3 | 12.7 | 0.00 | 12.7 | 1.00 | 1.76 | | |
| 38 | BVGT | 5943 | 7225 | | | 2396 | 3505 | 255 X 127 | 2235 | 1090 | 16.3 | | | | | | | |
| 39 | BVZT | 8540 | 9822 | | | 2448 | 5400 | 130 | 2240 | 1000 | 20.32 | 15.00 | | 15.00 | 1.00 | 1.53 | | |
| 40 | BVZC | 9469 | 8540 | | 2670 | 2670 | 5400 | | | | | | | | | | | |
| 41 | WFAC | 21337 | 22297 | | 3250 | 147830 | 2896 | | | | 16.25 | 46.9 | | | | | | |

30. *What are the design features and construction of CBC and name the part of CBC assembly?*

Centre Buffer Coupler & Draft Gear

- a. Indian Railway uses AAR type centre buffer couplers having E-type head and F-type shank for freight stock on board gauge system. These couplers are generally as per requirements of AAR specifications M-201, M-205 and M-211.
- b. The draft capacity of the AAR coupler depends on the strength of knuckle, which is weakest in the assembly. The yield strength of knuckle of material AAR M-201 grade 'C' & grade 'E' is 132t and 180t respectively.

c. **ADVANTAGES OF AAR CENTRE BUFFER COUPLER**

- Coupler and buffing gear are both located together at the centre of the wagon.
- Centre buffer coupler is identical at either end of the wagon and hence wagon direction is immaterial.
- Coupling action between wagons is automatic.
- With transition arrangement, coupling with screw coupling is possible.

PARTS OF CENTRE BUFFER COUPLER ASSEMBLY

- Coupler body
- Knuckle
- Knuckle pivot pin with washer
- Lock
- Knuckle thrower
- Toggle
- Universal lock lift lever connector
- Lock lift lever hook
- Lock lift rivet
- Lock lift lever rivet
- Top lifter lever rivet
- Yoke pin
- Yoke
- Yoke pin support
- Striker casting
- Sticker casting war please
- Shank wear plate
- Yoke support plate
- Draft gear arrangement with front follower
- Safety bracket gear arrangement
- Uncoupling gear arrangement
- Back stop
- Clevis for transition type coupler only
- Screw coupling for transition type coupler only
- Clevis pin for transition type coupler only

valve is a gravity discharge valve fitted with hand wheel in the dome for manual operation. In a BG tank wagon bottom discharge valve drawing No. WA/TF-88 & WD-93066-S/01) are provided with a single bottom discharge valve situated underneath the master valve while on BG/MG eight wheeler stock two bottom discharge valves are fitted, one on either side and connected with the master valve through a tee pipe. The main function of the valve is to control the flow of the contents and also to serve as an additional safety stop in case the master valve fails or breaks. The bottom discharge valve openings are also provided with blank flanges to be used with 2mm compressed asbestos fiber jointing material to IS:2712-65 to serve as a further check on accidental leakage of contents.

32. *What are the design differences between bogie mounted and under frame mounted air brake system?*

This type of system is exactly similar to the standard air brake system except for the following:

- a) External slack adjuster is removed/eliminated.
- b) Four cylinder of 8" size is provided for each coach in place of two cylinders of 14" in standard air brake system. These cylinders have built in single acting slack adjuster for taking the slack created between wheel and brake block on account of wheel/brake block wear. Mounting of cylinders is done one either side of the bogie frame in between central longitudinal members connecting the bogie transom to the headstocks. Each cylinder controls the braking on one wheel set. Each cylinder has a piston take up stroke of **32mm** and adjustment capacity of **305mm** (Ref.Drg/RDSO SK-81057)
- c) High friction composite brake blocks of 'K' type have been used.
- d) Bogie brake rigging has been modified to incorporate a total mechanical advantage of 7.644 per bogie for non-AC coaches and 8.40 per bogie for AC coaches.
- e) Curved profile pull rods have been used to interconnect levers controlling braking one wheel set. These pull rods provided with one additional hole for the adjustment of slack between wheel and block after specified amount of wear.
- f) Since brake cylinders have been mounted on the bogie frame, 15mm before pneumatic pipeline has been laid over bogie frame to inter connect the brake cylinders of one bogie. Output pipe line of distributor valve has been connected to bogie pneumatic line through flexible hoses to provide flexibility to alround dynamic movement.

33. List out the Rejectable items for goods stock as per part III

- ◆ Wheel defects such as sharp flange, thin flange, deep flange, hollow tyre, skidded wheel etc.
- ◆ CBC coupler body broken / cracked.
- ◆ Center pivots broken / cracked.
- ◆ Trolley frame cracked or broken.
- ◆ Hotbox.
- ◆ Sliding type brake beam broken / bent.
- ◆ Suspension bracket broken on UIC stock.
- ◆ Trolley frame broken at horn gap stiffer & Bridle bar breakage.
- ◆ CBC yoke broken.
- ◆ CBC draft gear defect.

34. Rejectable items for passenger Stock as per Part IV?

Body repairs: door repairs, corrosion repairs of under frame near lavatory and trough floor repairs, repairs to sole bar, repairs to head stock. Repairs to draw and buffing gear.

Under gear repairs: Loose centre pivot bolts, crack in center pivot, center pivot bent.

Axle box defects: Any cover broken, nonstandard, deficient sealing arrangement defective, oozing of lubricant, any hot box.

Bogie repairs: Cracks in sole plate of bogie, bogie transom etc. Cracks in lower spring seat of dash pot, bent axle guide. Bogie out of square.

Breakage of any coil springs of axle box, breakage of bolster coil springs, anchor links, equalizing stay, shock absorber, suspension links, bottom spring plank.

Brake gear: In effective DV, brake cylinder, leakage in isolating cock, cut-off angle cock, Defective PEASD and PEAV. Breakage of any pipe line.

Wheel defects: any tyre defect as prescribed in IRCA manual including the latest RDSO – CMI – K003 technical pamphlet.

Any coach due for POH, IOH and schedules, APDs provided for brake gear suspension arrangement are considered as rejectable items under IRCA part IV.

35. *Salient features of BOX (UIC) Bogie?*

- The UIC bogie is a fabricated bogie in which 8 thick plate is used in welding of complete bogie.
- There is no secondary suspension in this, since it is not having a swing bolster.
- The weight is directly taken on the transom of the bogie frame on which IRS Spherical Pivot is provided.
- The bogie frame is provided with primary suspension on four laminated 10 plated bearing springs kept on the crown of the roller bearing axle boxes.
- The bogie is provided with hanger type brake beams and connected with vacuum brake system.
- The wheel base of the bogie is 2000 +/-5 mm.
- The axle load of the wagons is 20.3 Tonnes.
- Two side bearer plates are provided on the bogie transom.
- Journal Centres is 2240 mm
- Cast Iron Brake Blocks are used. However, L-type composite brake blocks are used.

36. *Salient features of CASNUB Bogie*

- It is a Cast Steel Bogie.
- Two Cast Steel side frames are connected together with a spring plank.
- It is having a floating bolster with load proportionate friction damping system.
- The wheel base of the bogie is 2000 +/-5 mm.
- Two side bearers are provided on the floating bolster at a distance of 1474mm. The side bearers are provided with CCMBR pads. However, in latest versions, PU pads are provided.
- The journal centres is 2260 mm
- The bogie is provided with hemispherical centre pivot which takes the load. However, in latest versions the load is shared by side bearers also.
- The bogie is not having any primary suspension. However, E.M. pads have been interposed in between adopter and side frame.
- Anti rotation lugs have been provided between bogie bolster and side frame.
- The bogie hoes 22.9 tonne axles with CTRB.
- All the versions of the bogies are having sliding type brake beams in the brake system. Except in CASNUB 22 W (M).
- L-Type Composite Brake Blocks are used.

37. *Write short notes on SAB?*

SAB: It is a mechanical devise fitted in the brake system of a coach/wagon which automatically takes up and pay out the slack while the brake blocks, wheels, brake gear pins and bushes gets worn.

It maintains pre determined distance between brake blocks and wheel tread and restricts piston travel.

The functioning of SAB mainly depends up on 'A' dimension and its 'e' dimension.

38. *Write short notes on Empty Load Box?*

Empty load box:

- It is a simple device connected to brake rigging of wagons to obtain to different brake leverage ratio according to the load or empty condition of the wagon.
- It consists of load empty box connected with levers and bell crank arrangement with a shaft connected with a handle.
- When the handle is set to empty position the empty tie rod is connected to the brake system. The leverage is reduced. Less brake power is obtained.
- When the handle is set to loaded position the empty tie rod is disconnected and the braking takes place on the load tie rod. Leverage is increased more brake power is obtained.
- When the gross tonnage is above 42.5 tonnes the handle should be set to loaded position.

39. *What is ODC?*

Over Dimensional Consignments (ODC) or Infringing Standard Moving Dimensions (ISMD)

From Rail level to top centre = More than 4115 mm

From Rail level top sides = 3505 mm; width = 3200 mm

There are three classes of ODCs.

1. 'A' Class ODC.
2. 'B' Class ODC.
3. 'C' Class ODC.

'A' Class ODC:

Clearance between fixed structure and load = 9" and above. Can be moved day and night. No speed restriction without TXR Staff Escort.

'B' Class ODC:

The clearance between fixed structure and load is in between 6"-9" (150mm and above) should be moved in day light only. Speed 32 kmph. TXR staff escort required.

'C' Class ODC:

Clearance between fixed structure and load is in between 3"-6" (below 150 mm) should be moved in day light only. Speed 25 kmph. PWI, CWI, TI & RE staff escort required.

The precautions to be taken for the movement of an I.S.M.D. are

Load is measured or measurements are received from the Station Master.

- Find out whether the load is infringing or not. If infringing find out the infringement.
- Make out a sketch showing the load on the wagon. Mark the various dimensions and the infringements.
- Address a letter to S.M. with-copy to COM., asking S.M. to obtain the necessary sanction for loading.
- COM. intimates the sanction.
- On receipt of the sanction, loading is done.
- Instructions in the sanction letter with regard to type of wagon, various dimensions of the load, packing and lashing should be strictly followed.

After the loading and lashing are over, the load is measured if the measurements are as per the sanction letter, a fit memo is issued to S.M. with copy to COM. if the measurements exceed the sanctioned measurements, a fresh sanction should be moved from its loading station.

40. *What is an accident & what setup is available to attend accidents?*

“Any occurrence in the course of working in Railway which affects or may affect the safety of the railway, its engines, rolling stock, permanent way, works, passengers, servants or others or which interferes with the normal working of the Railway is termed as an accident.”

Accident relief trains with hydraulic rerailing equipment, self propelled accident relief trains with rerailing equipment, cranes and medical relief vans are provided at nominated points in each division/Railways for attending the accidents.

Classification of accidents:

Class A – Collision (A1 to A5)

Class B - Fire or explosion in trains (B1 to B7)

Class C - trains running into Road traffic/traffic running into trains at level crossing (C1 to C9)

Class D - Derailments (D1 to D6)

Class E - Other train accidents.

Indicative accidents:

Class F - Averted collision

Class G - Breach of Block rules

Class H - Train passing signal at danger

Class J - Failure of engine and Rolling stock

Class K - Failure of permanent way

Class L - Failure of Electrical equipments

Class M - Failure of signal and telecommunication

Unusual incidents:

Class N - Train wrecking

Class P - Causalities

Class Q - Other incidents

Class R - Miscellaneous

41. *What is role of C&W department in the division in case of accident?*

- Whenever any accident occurs the C&W supervisor with brake down gang must immediately leave for the site of accident along with MRV/ART. The supervisor accompanying the gang must assess the requirement of men and material on receipt of the information so that he may not in any way be handicapped for want of any item.
- On reaching the site of accident the accident site must be protected properly from both ends.
- First aid must be rendered to the injured person if any.
- The cause of the accidents should be assessed, any broken or damaged part of an engine, coach, wagon or permanent way which may have been the cause of accident must be secured and retained safely for the inspection of members of the enquiry committee.
- The site plan should be prepared to show the condition of derailed stock and their position from the engine. All the particulars of the stock involved must be carefully noted down.
- Re railing operations are to be under taken with proper planning and should be completed with in the least possible time.
- Examination of derailed stock after re railing work is completed and the stock should be made fit to run for clearing the sections.
- Recording the joint observations, joint track readings and joint wagon/coach readings.

42. *What are the duties of a C&W Supervisor at the site of the accident?*

- Whenever any accident occurs the C&W supervisor with brake down gang must immediately present at the site of accident along with MRV/ART as quick as possible.
- The supervisor with gang must assess the requirement of men and material on receipt of the information.
- On reaching the site of accident the accident site must be protected properly from both ends.
- First aid must be rendered to the injured person if any.
- The cause of the accidents should be assessed.
- All clues available at the site including any broken or damaged part of an engine, coach, wagon or permanent way at the site of accident should be secured and retained safely for the inspection of members of the enquiry committee.
- The site plan should be prepared to show the condition of derailed stock and their position from the engine
- Re-railing operations are to be under taken with proper planning and should be completed with in the least possible time.
- Examination of derailed stock after re railing work is completed and the stock should be made fit to run for clearing the sections.
- Recording the joint observations, joint track readings and joint wagon/coach readings

44. *What are the track defects can be observed at the site of accident?*

1. Density of the sleepers to sleeper gauge should not be more than 2mm.
2. Ballast provided at the site of accident.
3. Fixtures and fasteners
4. Vertical wear of rail
5. Angular and lateral wear on rail to be measured below 13mm of rail table.
6. Gauge between two rails
 - a. Straight $\pm 6\text{mm}$
 - b. On curves with radius 350mts and above- $6\text{mm} + 15\text{mm}$
 - c. On curves with radius less than 350mm- $0\text{mm}+20\text{mm}$
7. Cross levels, difference should not be more than 4mm
8. Twist: Can be defined as the ratio of change of cross levels
Twist=algebraic sum of cross levels/Wheel base
9. Versine, super elevation, degree of curvature and layout of curves
 1^0 curves is denoted as 1750mts of radius
 2^0 curves is denoted as $1750/2=875$
 3^0 curves is denoted as $1750/3=583.6\text{mts.}$ and so on
10. Creep of the rails , towards the longitudinal directional of movement and should be 150mm.
11. Buckling of rails
12. Staggered rails

45. *What are different types of rolling stock and their periodicity of POH and ROH?*

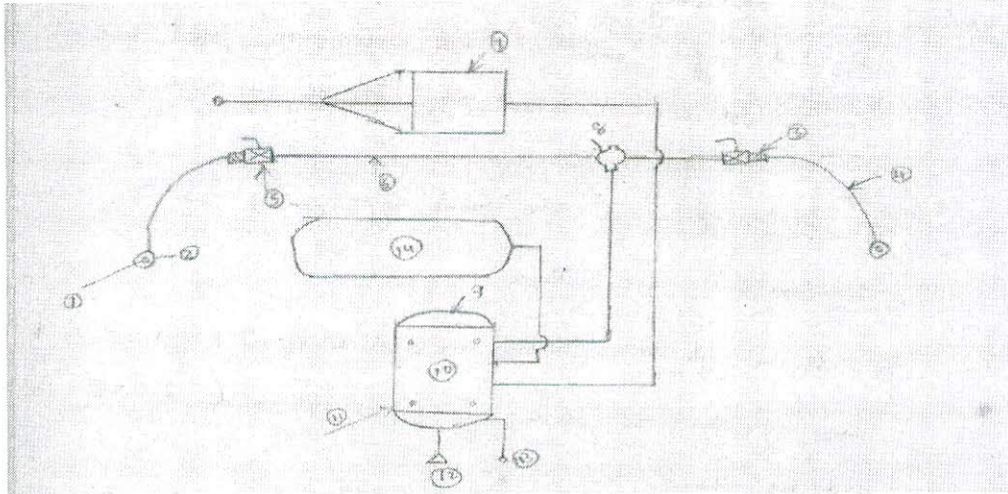
| S. No. | Type of stock | POH | ROH |
|--------|-----------------------|-----|------------|
| a). | Mail/Express Coaches. | -- | 18 Months |
| b). | Passenger Coaches. | -- | 18 Months |
| c). | Inspection carriages. | -- | 24 Months |
| d). | ART/MRV coaches. | -- | 3-1/2 Yrs. |
| e). | BCN | -- | 6 Yrs. |
| f). | BOXN | -- | 4-1/2 Yrs. |
| h). | BCX | -- | 4-1/2 Yrs. |
| i). | TK | -- | 3-1/2 Yrs. |
| j). | BVZC | -- | 2 Yrs. |
| k). | BTPN | -- | 6 Yrs. |

46. *List out the activities of ROH of BCN wagon?*

- Lift the body, keep it on trestles and run out bogies.
- Strip bogie component for examination and repair.
- Strip spring and spring suspension arrangement including snubbing device.
- Check springs for free height and other defects. Replace where required.
- Examine bogie frame alignment as per instructions
- Examine pivot for welding defects/cracks/abnormal depth due to wear, replace where necessary and lubricate with graphite flakes in dry condition.
- Strip brake gear levers and rods for examination of worn out/damaged parts.
- Lubrication of brake cylinder.
- Check for easy operation of isolating cock, cut-off angle cock, manual quick release valve.
- Examine side bearers.
- Dirt Collector to be cleaned
- Secure pull rods and levers by tack welding the split pins with the washers. Modified pull rod to be fitted.
- Worn out brake blocks to be renewed.
- Refit brake gear levers and rods and bearings springs.
- Examine head stock for damage, bent/cracks
- Check wheel profile, turn the wheels as needed. UST of Axle to be carried out and turning of wheel to worn wheel profile during ROH
- CBC knuckles are to be checked by contour gauge, anti creep/articulated rotary operation of locking arrangement to be checked.
- Manual adjustment of brake gear to be done in accordance with wheel diameter.
- Modification work is to be attended as issued by RDSO from time to time.

47. *Explain in detail the brake system on Freight stock and it's functioning with a neat Sketch?*

Layout of single pipe graduated release air brake system



- | | |
|----------------------|-------------------------|
| 1. MU washer | 8. Dirt collector |
| 2. Palm end | 9. Control reservoir |
| 3. Nipple | 10. Common pipe bracket |
| 4. Air hose | 11. Distributor valve |
| 5. Cut of angle cock | 12. Quick release valve |
| 6. Brake Pipe | 13. Isolating handle |
| 7. Brake cylinder | 14. Auxiliary reservoir |

Charging:

During charging or running position the MR in the loco is created upto 8 to 10 Kg/cm² of air pressure. This air pressure is taken through A-9 valve to the brake pipe at 5 Kg/cm² and fed to the brake pipes of the system. The brake pipe feeds the control reservoir and auxiliary reservoir with 5 kg/cm² through DV. During this time brake cylinder is connected to the exhaust port.

Application:

During application the driver reduces the brake pipe pressure from 5 kg/cm² through the drivers brake valve. This actuates the DV to connect the brake cylinder to auxiliary reservoir and to close the exhaust port. The DV reacts to the changes of pressure in the BP and applies the brakes by passing air from the AR to the BC and release it by exhausting the air from the BC to atmosphere.

Releasing:

During releasing the driver recharges the brake pipe with 5 kg/cm². The pressure again actuates at DV. The AR is disconnected from BC and BC is exhausted to atmosphere. The position is retarded by spring pressure and the brakes are released. For manual release of the brakes the quick release valve is pulled and the air in the CR is exhausted and the brakes are released manually.

48. ***What are the modifications to be carried out to make a BOXN are BCN fit for CC+ 8+2 explain in brief?***

The existing BOXN / BCN wagons are provided with suspension system designed for 20.3T. Axle load for making the wagons for higher carrying capacity i.e.

CC+8+2 the axle load can be upgraded to 22.9T by providing 2 outer springs 2 inner springs per bogie. The above modifications are to be carried out during ROH / POH.

All the roller bearings (CTRB) shall be provided with AAR approved grease in place of existing grease, which is to be carried out during overhauling of CTRB in POH shops. The above modifications are essential to increase the carrying capacity by 10T i.e. CC+8+2.

49. ***What are the salient features of CASNUB Bogie?***

- It is a Cast Steel Bogie.
- Two Cast Steel side frames are connected together with a spring plank.
- It is having a floating bolster with load proportionate friction damping system.
- The wheel base of the bogie is 2000+/-5 mm.
- Two side bearers are provided on the floating bolster at a distance of 1474mm. The side bearers are provided with CCMBR pads. However, in latest versions, PU pads are provided.
- The journal centres is 2260 mm
- The bogie is provided with hemispherical centre pivot which takes the load. However, in latest versions the load is shared by side bearers also.
- The bogie is not having any primary suspension. However, E.M. pads have been interposed in between adopter and side frame.
- Anti rotation lugs have been provided between bogie bolster and side frame.
- The bogie hoses 22.9 tonne axles with CTRB.
- All the versions of the bogies are having sliding type brake beams in the brake system. Except in CASNUB 22 W (M).
- L-Type Composite Brake Blocks are used.

50. Silent features of BOX (UIC) Bogie?

- The UIC bogie is a fabricated bogie in which 8 thick plate is used in welding of complete bogie.
- There is no secondary suspension in this, since it is not having a swing bolster.
- The weight is directly taken on the transom of the bogie frame on which IRS Spherical Pivot is provided.
- The bogie frame is provided with primary suspension on four laminated 10 plated bearing springs kept on the crown of the roller bearing axle boxes.
- The bogie is provided with hanger type brake beams and connected with vacuum brake system.
- The wheel base of the bogie is 2000 +/-5 mm.
- The axle load of the wagons is 20.3 Tonnes.
- Two side bearer plates are provided on the bogie transom.
- Journal Centres is 2240 mm
- Cast Iron Brake Blocks are used. However, L-type composite brake blocks are used.

51. What are the categories of freight train examination? Explain in Brief (10 marks)?

A. There are only three types of examinations

1. End to end examination
2. CC rake examination
3. Premium rake examination

1. End-to-End Examination:

- ⊕ The rake should normally be intensively examined in empty condition after unloading and after such intensive examination; the empty shall be moved to the loading station as per the requirement of traffic.
- ⊕ The BPC of empty rake may have no destination mentioned. But, after loading of the rake, the operating staff (commercial staff, if no operating is posted at the station) shall ensure that the destination of the loaded train is clearly mentioned on the BPC and only then the BPC will become valid up to such destination only.
- ⊕ Pink colour BPC shall be used for such rakes.
- ⊕ Minimum brake power should be 85% after intensive examination.

2. CC rake Examination:

- ⊕ Only OFF POH/OFF ROH rake should be inducted as CC rake under normal circumstance. For formation of CC rake than this Hqrs approval in case to case basis be obtained through Hqrs control.
- ⊕ Validity of BPC is 7500 Kms or 30 days which ever is earlier.
- ⊕ Colour of BPC shall be yellow.
- ⊕ The CC BPC becomes invalid under the following conditions. These rakes have to be cleared upto next examination point in the direction of movement for examination and issuance of a fresh BPC. Hqrs operating and C&W control should be appraised of all such cases so that the rake can be brought to the SCR system.
- ❖ Rake integrity disturbed by more than 4 VUs within the validity of the BPC. Only upto 4 VUs attachment is permitted enroute during the validity of the BPC.
- ❖ The rake shall not be stabling for more than 24 hours at nominated TXR examination yard,.
- ❖ CC rakes moved to any other zone not mentioned in the circuit.
- ❖ Over due CC rake is not moved in the direction of PME depot.

3. Premium rake examination

- Premium End-to-End rakes will be formed out of air brake open stock (BOXN, BOXNHS, BOXNHS) and covered stock (BCN, BCNA, BCNAHS). On S.C.Railway premium End-to-End rakes will be intensively examined in empty condition.
- Brake power certificate issued for such premium End-to-End rakes will be valid for 12 days from the date of issue. During this 12 day period, the rakes will be allowed multiple loading/unloading. A grace of period of 3 days permitted.
- Brake power certificate for premium End-to-End rakes to be issued on the proper format in green colour paper.

52. *What are the comparative advantages of air brake system over vacuum brake system?*

| <i>Vacuum brake system</i> | <i>Air brake system</i> |
|---|---|
| The braking distance on a level stretch with an initial speed of 75 Kmph would be 1780m with emergency application for a load of 4500T and will be further increased with full service application. | Braking distance under emergency at 75 KMPH is 870 to 1000 mts. only. |
| The brake power deterioration after 400 Kms run ranges from 6.5 to 16% requiring the train to be stopped for examination of an attention to brake power | In the case of air brake, such a deterioration is negligible and therefore extended runs without only intermediate halts for brake power attention would possible |
| There is no possibility in the vacuum system to go in for a train longer than about 600m | In air brake system 1500-2000m trains can be operated |

| | |
|---|---|
| With a 600m long train, there is a reduction in brake power by 18+020% between first and last wagon, therefore it would not be possible to run trains longer than the standard loop lengths | With air braked trains, the train power is almost constant throughout without any limitations to the length of the train. |
| While descending heavy downgrades, there is a considerable amount of brake fade in vacuum brake system due to continuous cyclic operation requiring the train to be stopped compulsorily and frequently to recharge the system. | With graduated release system air brake, such stoppages are not required |
| The improved vacuum brake system fitted with QA/DA valves reduces fail safe characteristics considerably due to dirt deposit on the filter, choke and the cylinder for prolonged period | In case of air brake the fail safe characteristic is ensured with the auxiliary reservoir feeding the brake cylinder for prolonged period |
| The terminal pre-departure brake service time with vacuum brake train occupies about 10 to 0.18% of the daily train time | With air brakes the time required would be almost 50% less. |
| The wagon ineffectiveness attributable to vacuum brake defects have been found to be 10 times more compared with air brake trains | The wagons in effectiveness attributable to air brake defects are 1/10 th compared to vacuum brake trains. |
| The spare parts required per vacuum brake system is Rs. 112/- per wagon per annum | With air brake system, spare parts consumption will be Rs. 38.56 per wagon per annum |
| The total weight of vacuum brake equipment in each wagon is 683.5Kg | While in case of air brake system supplied by escorts it will be 308 Kgs. |
| Changes of partial blockages | No partial blockages will be there |
| No uniform brake forces | Brake forces will be uniform throughout the length of the formation |

53. What is train parting? Reasons and remedies?

A train after starting its journey from a station and during run parts in two or more causing stalling of the train and blocking of the line is called Train parting.

Reasons:

- ❑ Defective CBC and its components.
- ❑ Poor enginemanship of the driver.
- ❑ Improper marshalling/ shunting by operating staff.
- ❑ Act of miscreants.

Remedies:

- The TXR should check the CBC with all prescribed gauges during ROH and sick line attention.
- The knuckle should be tested with knuckle stretch and nose wear gauge.
- The CBC should be checked with sickline contour wear limit gauge for guard arm expansion.
- The anti creep arrangement should be checked invariably during every sickline/ROH inspection.
- The draft gear pocket should be checked for loose/dead draft gear.
- Any surface cracks on knuckle and CBC body should be detected by dye penetrant test during ROH.
- Shank wear, wear on stricker casting, drooped buffers should be checked for.
- Repeated failures of particular make of knuckle should be watched for.
- h. Provision of modified operating lever to avoid hitting of high level platform.
- Drivers should be given learning in engine and train dynamics and adequate learning of the route by LI.
- Driver should allow adequate release time for different type of stock to ensure full release of the brakes.
- Driver should not resort to injudicious application of brakes.
- After completion of shunting, the shunting staff should pull and push the formation for two wagon length and ensure coupling of all wagons.
- A minimum gap of 19 mm between CBC body bottom and center of the toggle rivet should be ensured for proper locking.
- Cases of miscreants intervention to be reported to RPF from time to time.

54. *What are the advantages of Air brake system?*

- Shorter braking distances.
- Longer and heavier trains can be hauled due to more effective brake power.
- Higher braking force.
- Uniform brake power over train length.
- Reduced brake power deterioration.
- Compact and easy to maintain resulting better utilization of rolling stock.
- Less detentions to trains.
- At higher altitudes same brake power can be maintained.
- In exhaustibility feature.

55. *What is the procedure for rake testing of Air Brake Train?*

- Prior to starting the testing, connect the pressure gauge to the brake cylinder in last coach for noting down the brake cylinder pressure.
- Connect the rake to the rake testing by connecting the BP and FP of the rig to the BP and FP of the coach which is nearest to the rig.
- Close angle cocks of BP and FP on the coach at the other end of the rake. Charge the BP to 5 Kg/cm² and FP to 6 kg/cm².
- Check the leakage rate of the complete rake by putting isolating valve of the rig in off position in both BP and FP lines.
- Service brake application is effected by bringing the handle of the driver's brake valve to application position. As a result, BP pressure reduces to 3.4 kg/cm² and hence brakes get applied.
- The application time can be noted from the moment of the handle operation to the brake cylinder pressure rising from 0 to 3.6kg/cm² in the last vehicle of the rake.

- When driver's brake valve is brought back to release position, the BP rises to 5 kg/cm^2 . The release time can be noted from the moment of the handle operation to the brake cylinder pressure dropping up to 0.4 kg/cm^2 .
- For applying the emergency brakes, driver's brake valve is brought to emergency position. The BP pressure reduces to zero and hence brakes will be applied.

56. *Describe the procedure for Single Car Test of Air Brake Coaches?*

Single Car Testing is done on a coach to see the efficiency of the brake system of the coach. It must be conducted whenever any air brake subassembly of the coach like distributor valve, brake cylinder etc is changed.

Procedure:

1. The coach under testing is to be coupled at one end with the BP and FP head of the test rig and the other end should be closed with dummy coupling heads. On the brake cylinder the pressure gauge with flexible hose should be fitted.
2. Couple the test rig to the main line of the compressor through a pipe. The compressor should have a capacity of 35 cfm and should have a 200 L reservoir and should be capable of developing a pressure of $8\text{-}10 \text{ kg/cm}^2$.
3. Set the pressure regulator to $6 \pm 0.1 \text{ kg/cm}^2$. Open the Isolating Cocks of F.P. and B.P. and C.R. in the test rig and also the angle cocks of both the FP and the BP on both the ends of the Coach.
4. Driver's brake valve should be in charging and release position. Wait for about 5 minutes in twin pipe system for charging the complete rake. Now check the pressures in the FP pressure gauge and the BP pressure gauge, pressure should be $6 \pm 0.1 \text{ kg/cm}^2$ in FP and $5 \pm 0.1 \text{ kg/cm}^2$ in BP.

57. *Write the procedure for isolation of DV?*

For isolation of DV close isolation cock between FP & AR. This will not be applicable in single pipe working system. Isolate distribute valve by keeping isolating handling of DV in horizontal position. Pull the quick release valve. Ensure that BC pressure is the released. This is essential as in most practical cases BC pressure is not released with single pull of the QRV, though it is supposed to be so.

58. *Describe the locking arrangement of BOBRN wagons*

The principal lock is the primary lock, which is done with all the doors closed and with the piston rod completely retracted. In this position, there should be no gap between the connecting link and the end levers. For the central locking lever, there should be no gap at least on one side and a maximum of 5 cm on the other side Any deviation will result in non-attainment of the over center position and failure of the primary lock. This gap between the lever and the link can be adjusted with the help of the turnbuckle for some levers and with the help of the adjusting levers for the remaining doors.

Secondary lock

A secondary locking arrangement is also provided at the top of the air cylinder. This arrangement serves the following purpose.

- ⊕ It prevents any forward movement of the piston rod due to jerk developed during wagon movement.
- ⊕ It ensures the correct position of the main operating lever and therefore brings the door links over centre.

- ✦ It ensures sufficient free movement of the piston rod before activating the door operating mechanism. This is achieved through the elliptical slot in the piston rod clevis.
- ✦ It also ensures the detection of any residual air pressure, which may causes the forward movement of the piston rod resulting in door opening. This is achieved by keeping a gap of 2mm with air released and a gap of 6 to 10 with air applied between the operating lever lock lug and the hook pin of the secondary lock hook.

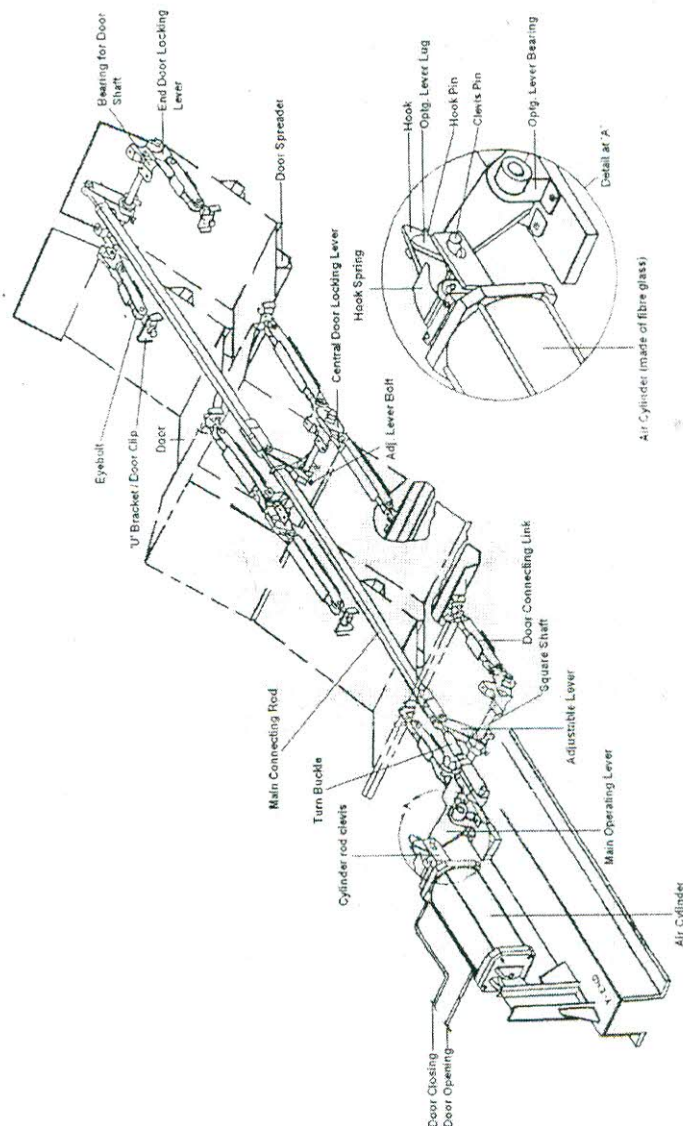


Fig-1

DOOR OPERATING MECHANISM

59. *What was the main purpose in designing BOBR and BOBRN wagons? What are their salient features?*

The Kumara Mangalam Committee on wagon handling systems and terminal facilities recommended the deployment of a dedicated fleet of hopper wagons for the bulk transport of coal on account of assurance of wagon availability, achieving substantial reduction in loading and unloading time and cheaper unloading terminals as also reduction in maintenance costs. With this end in view the bogie open bottom rapid discharge hopper wagon type "BOBR" has been designed by RDSO for the bulk movement of coal from the collieries to major users who are located within relatively shorter leads from the collieries. The main feature of this hopper wagon is the automatic rapid discharge of coal with the help of electro-pneumatic operation of the bottom doors. With the opening of doors, almost the entire bottom of the wagon opens out facilitating quick and complete discharge. The wagon is fitted with an automatic door operating system which causes opening and closing of the doors with the help of compressed air supplied by the locomotive through the door operating pipe is released to actuate the system when the pick up shoes, provided on the side rail provided at the unloading terminals. During loading and unloading the train consisting of these wagons remains in motion at crawling speed.

Salient features:

- ◆ Provided with cast steel bogie type Casnub-2Q(M) in BOBR and CASNUB-22NLB in BOBRN.
- ◆ Provided with cartridge taper roller bearings.
- ◆ Provided with high tensile center buffer coupler (Non-transition)
- ◆ Provided with bottom discharge doors having double link mechanism operated by pneumatic systems.
- ◆ Provided with graduated release air brake system with single pipe
- ◆ Provided with Automatic load sensing device.
- ◆ Provided with pull rod in BOBR and slack adjuster type IRSA-600J (Jaw type)

60. *Evaluation of braking force and braking distance?*

Evaluation of braking force on BG wagons in Air brake system:

Procedure:

| | |
|---|--|
| Diameter of the cylinder | =355mm |
| Area of the cylinder | $= \frac{\pi D^2}{4} = \frac{\pi \times 355^2}{4}$ |
| Pressure in the cylinder | = 3.8 Kg/Cm ² |
| Brake force generated in the brake cylinder | = pressure x Area = $3.8 \times \frac{\pi \times 355^2}{4} = 3761$ kgs. |
| Net force coming out of the cylinder | = $3761 - 0.162 \times 3761 = 3591$ to ≈ 3.6 t approx (0.162 is loss of force is due to release spring in cylinder) |
| Now the force available at SAB | = $3.6 \times 335 / 620 = 1.95$ t (Under empty condition) |
| Net force available at SAB pull rod | = $1.95 - 0.2 = 1.75$ (0.2 is the SAB spring loss) |
| Force available at brake beam | = $1.75 \times 356 / 178 = 5.25$ t |
| Force available at each brake block | = $5.25 / 2 = 2.625$ t |
| Brake force under empty condition | = $8 \times 2.625 = 21$ t |
| Net brake force under empty condition | = $21 \times 0.9 = 18.9$ t |

(Under any circumstances the brake force should not exceed more than 90% of the wagons tare weight)

(Considering that 10% of brake force loss is due to slackness)

Force available at SAB under load condition = $3.6 \times 458/497 = 3.317t$

Net force available at SAB under load condition = $3.317 - 0.2 = 3.117t$

Force at each brake beam = $3.117(356+178)/178 = 9.531t$

Force at each brake block = $9.35/2 = 4.675$

Brake force under load condition = $8 \times 4.675 = 37.4t$

Net brake force under load condition = $37.4 \times 0.9 = 33.66t$

Evaluation of braking force on BG wagons in Vacuum brake system:

Diameter of brake cylinder D = 56cms

Area of brake cylinder A = $\pi D^2/4 = \pi \times 56 \times 56/4$

Pressure of brake cylinder P = $51 \times 1.032/76 = 0.7 \text{ Kg/cm}^2$

Force acting on the piston PxA = $0.7 \times \pi \times 56 \times 56/4 = 1.724t$

Force generated by two cylinders = $1.724 \times 2 = 3.448t$

Net force available on brake shaft = $3.448 - 0.44 = 3.008t$

(0.44t is loss due to release spring on brake shaft)

Force at short pull rod = $3.008 \times 4108/275 = 4.48t$

Forced SAB in empty condition = $4.48 \times 365/550 = 2.77t$

Net force available at SAB pull rod = $2.77 - 0.1$ (0.1t is loss due to SAB spring)

Force available at each brake beam = $2.67 \times 190/190 = 2.67t$

Force available at each brake block = $2.67/2 = 1.335t$

Brake force under empty = $1.335 \times 16 = 12.4t$

Considering 10% loss due to slack in leverage efficiency as 90% brake force under empty
= $21.4 \times 0.9 = 19.26t$

(Under any circumstances the brake force should not exceed more than 90% of the wagons tare weight)

Force at SAB pull rod under load condition = $4.48 \times 500/455 = 4.92t$

Net force available at SAB pull rod = $4.92 - 1 = 4.82$

Force available at each block = $482/2 = 2.41$

Total brake force available under load condition = $16 \times 2.41 = 38.56t$

Net force available under load condition = $38.56 \times 0.9 = 34.7 \text{ tons}$

61. What is brakes binding? Mentioned the causes of brakes binding and their remedials?

Definition:

While controlling the train enroute or during run, if the applied brake is not released smoothly and automatically on some of the vehicles or the entire train soon after the BP pressure is raised by driver and the wheels are dragged in locked condition by clasped brake blocks is termed as brakes binding.

Causes of brakes binding:

- Excessive leakage rate on the formation than the prescribed on 0.25 Kg/Cm²/mt for freight and 0.2 Kg/Cm²/mt on coaching.
- Insufficient release time allowed by drivers in case of single pipe system.
- Breakage of dirt collectors/branch pipe lines on run due to misalignment/hitting of flying ballast.
- Leakage on the individual DVs.
- Defective Distributor valves.
- Defective slack adjusters.
- Brake cylinder defects
- Accumulation of heavy dirt and water in dirt collector and auxiliary reservoirs.
- Failure of rubber components in DVs
- Working out of air hose palm end coupling head and failure of rubber air hoses.
- Heavy corrosion of pipe lines causing leaking.
- Incorrect positioning of rubber gasket in between common pipe bracket and DV body.
- Failure of over charging protection feature in DVs resulting into brakes binding.
- Injudicious adjustment of A-9 valve by drivers on run.
- Not ensuring the E/L box operating handles.
- Brakes blocks with uneven thickness allowed in service.
- Lack of knowledge to drivers/assists. In releasing brakes binding.

Remedies:

- Check and ensure every rake, every trip with RTR.
- Ensure DV release time on to test bench as well as while checking coach with SCTR.
- Draining of ARs at every trip examination.
- Cleaning of dirt collector filters periodically (monthly schedule).
- Isolating cocks and cut off angle cocks shall be tested for easy operation and any light oil may be applied to the spindle in A-schedule.
- Whenever the BP pressure is raising more than 5 kg/sq.cm on run abruptly, the crew should not resorts to restore the BP pressure to 5 kg/sq.cm with out cut off the BP supply to the formation. Even after cut off supply and adjusted the A-9 entire formation must be invariably released manually duly securing the formation.
- Entire formation should be manually released at power interception points.
- Ensure empty load box handle empty position before unloading the contents at sidings to avoid severe brake binding.
- Over charging protection of DVs shall be reviewed.
- The depots should test new DVs before fitment on a coach.
- Brake blocks should be changed as bogie sets. Brake blocks with uneven thickness shall not be allowed in service.
- The slack adjuster A-dimension and e-dimensions shall be maintained accurately during rake maintenance.
- The depots should lodge warranty claims on manufacturers of DVs as well as air brake components failing under warranty.
- DVs sent to workshops should accompany with completely filled standard RS-62 format.
- It has been observed that in the quite number of cases that if the coach had been released/attended properly at the first instance, subsequent detentions and coach detachments could have been avoided. Hence, training of running staff on C&W aspects is required.

62. What are types of brakes provided in diesel/air brake locos? Describe the procedure of testing of Diesel/Electrical locos in case of Vacuum/Air trouble?

The following are the brakes provided in the Diesel/Electrical locos

- ◆ A9 automatic brake: with the application of A9 brake valve, formation and conjunctional brakes will come.
- ◆ SA9 independent brake: With the application of SA9 brake valve, loco brakes only will come.
- ◆ Hand brake: During securing the loco, by application of the hand brake, one brake cylinder will come in to action and applies three brake blocks.
- ◆ Dynamic brake: it is an electrical brake. By application of DB, traction motors will work as generator and train speed will be controlled.

| S. No. | Type of brake | | | | | RDSO Ref. |
|--------|-------------------------------|-------|--------------|----------------------|------------------------|--|
| | | Dummy | Disc 8mm dia | Angle cock closed | 7.5mm leak adapter | |
| 1 | Vacuum brake | 580mm | 530mm | --- | ---- | MP.TP.019/81/revised, Jan 94 para No.5.2) |
| 2 | Air brake system (dual brake) | 580mm | 530mm | 5 Kg/cm ² | 4 Kg/cm ² | MP.TP.019/81/revised, Jan 94 para No.6.10) |
| 3 | Pure air brake system IRAB-I | --- | --- | 5 Kg/cm ² | 4.8 Kg/cm ² | MP.TP.029/87/revised, Apr 97 para No.5.11) |

- ◆ **The amount of vacuum to be maintained on 8mm leak hole disc plate shall be as follows”-**

| | BG | Remarks |
|--------------|--------|---|
| Electric loc | 52.5cm | With one exhauster working, 45 cms of vacuum should be created and maintained within the first one minute of switching on the exhauster |

METHOD OF TESTING CAPABILITY OF VACUUM BRAKE:

- ⊕ Close the brake pipe angle cocks before starting the test.
- ⊕ Allow at least 5 minutes for brake system to charge completely.
- ⊕ With brake system fully charged the automatic brake valve and independent brake valve handle in ‘release position
- ⊕ Check the vacuum on dummy which should be 580mm. Drop vacuum to zero and attach disc with 8mm hole. Bring A9 to release position; vacuum level should come to 530mm in 3 to 5 seconds.

⊕

◆ **METHODS OF TESTING CAPABILITY OF AIR BRAKE LOCOMOTIVES**

- ⊕ Place the automatic loco pilot’s brake valve handle in ‘emergency’ position and start the engine/s for building air pressure.
- ⊕ Allow the main reservoir pressure to build upto 10+0.1 kg/cm². Close the engine cock for the brake pipe and couple 7.5mm dia leak hole special test coupling.

- ✦ Move the automatic brake valve handle from 'emergency' to release' position to charge brake pipe to 5 kg/cm²
- ✦ Open the angle cock of the brake pipe where leak hole plate has been provided. Note the pressure in the brake pipe gauge in the cap which should not fall below 4.8 kg/cm² for pure air brake locos and 4 kg/cm² pressure for dual brake locos in 20 to 25 seconds.

Note: (a) If the locomotive fails to satisfy these test results, it should be considered defective.

(b) All locos leaving shed should have the test results entered in the log book/engine repair book with date and time of testing under the supervisor's signature. Whenever there is a dispute, loc inspector and TXR should jointly check the locomotive.

◆ **TESTING OF LOCOMOTIVE IN CASE OF VACUUM TROUBLE**

Guidelines for diesel locomotives when desired vacuum level is not created, have already been issued vide Railway Board's letter No. 83/M (N)/951/34 dated 27.5.09. In case the desired vacuum level is not created, the identification of problem on diesel and electric locomotives is to be carried out with the help of following test—

- (i) **Blockage test:-** With one exhauster on electric loco/diesel loco running at idle, remove vacuum hose pipe on one side of the loco from dummy and raise it upward (to avoid suction of dirt etc). Normally with hosepipe open, the vacuum should drop to zero but if it is more than 8 cm, it indicates blockage in the system. Repeat the procedure from the other end of the loco.
- (ii) **Efficiency test:** Electric/Diesel locomotives be tested to ascertain that on 5/16" dia (8mm) leak hole in 3mm plate, with single exhauster working at slow speed on electric locomotives and with engine working at idle speed on diesel locomotive, the vacuum level of 53cm is achieved.

| Loco | Vacuum loco | | Dual brake loco | |
|----------|-------------|----------------------|-----------------|---------------------|
| | Dummy | Disc 3 mm (8mm hole) | Dummy | Disc 3mm (8mm hole) |
| Diesel | 56 | 53 | 58 | 53 |
| Electric | 56 | 53 | 58 | 53 |

On newly manufactured, rebuilt and POH attended locomotives, the difference between the dummy and 8mm hole disc should not be more than 3 cms.

- (iii) **Leakage test:** If the above conditions are achieved, then tests may be carried out to ensure that maximum leakage rate on diesel/electric locomotives is not more than 7 cm/min. The blockage and efficiency tests on diesel and electric locomotives should be carried out not only before turning it out from the shed but also in the yard to rule out loco defects whenever the train is held up for creation of vacuum. The leakage test on both the locomotives should be carried out in the shed only.

◆ **Testing of train in case of vacuum trouble:**

✦ **Coaching train:**

On passenger carrying train maximum leakage rate should not be more than 5 cm/min on one vehicle and 13 cm/min for the full rake as per IRCA part-IV appendix D para 2.2 (d).

✦ **Freight train**

On goods trains maximum leakage rate should not be more than 5 cm/min on one vehicle, as per IRCA part III appendix E clause E-54

The above instructions are applicable to BG diesel and AC electric loco hauled trains only.

.Official Language

63 What are the incentives under official language policy? List out the regions under OL and its documents?

Answer:

General Manager's Individual Cash Award Scheme, Home Ministry's Award Scheme, Collective Cash Award Scheme, Award for writing original Hindi books on Technical subject, Indira Gandhi Rajbhasha Award Scheme, Cash Award Scheme for writing story, Novel and Poetry in Hindi.

Incentives on passing Hindi Prabosh, Praveen and Pragya examinations. Cash Award for meritorious marks, an advance increment for 12 months and Lumpsum Awards for passing privately.

States are classified into A,B and C regions under official language rules.

Region A – H.P, U.P, Utteranchal, Chattisgarh, Jharkhand, Bihar, M.P, Haryana, Rajasthan, Delhi, Andaman Nichobar Islands.

Region B - Maharashtra, Gujarat, Punjab, UT of Chandigarh.

Region C - Other than those mentioned in A&B.

The following documents should be in bilingual under section 3(3) of O.L.

- a. Resolutions
- b. General orders
- c. Rules
- d. Notifications
- e. Notices
- f. Permits
- g. Licenses
- h. Tenders
- i. Press communiques.
- j. Reports placed on the floor of parliament.
- k. Agreements

OBJECTIVE TYPE OF QUESTIONS

TRUE/FALSE STATEMENT

1. AR feeds brake cylinder: **True**
2. SAB brake regulator lengthens in taking up operation: **False**
3. SAB brake regulator rotates in application to take up: **False**
4. Brake pipe pressure of the leading coach vents when BP angle cock of adjacent trailing coach is closed: **False**
5. Brake pipe pressure of the trailing coach vents when BP angle cock of adjacent leading coach is closed: **True**
6. It is necessary to check CR pressure in flowing to BP pressure in released position: **False**
7. It is necessary to check AR pressure in flowing to BP pressure in application position: **True**
8. BP pressure vents to atmosphere while isolating C₃W type distributor valve: **True**
9. Simultaneous brake propagation is achieved by the expansion of BP pressure locally by the DV: **True**
10. The difference in wheel diameter permitted on the ICF coach is ?
a) 10mm b) 5mm c) 13mm d) 25mm (c)
11. BOXN wagons are fitted with what type of axle load ?
a) 20.3 T b) 16.3 T c) 16.25T d) 22.9T (d)
12. The minimum brake power to be ensured on BOXN Non-cc rake at originating station is?
a) 85% b) 90% c) 100% d) 80% (b)
13. The amount of vacuum level in brake van of a goods train is ?
a) 48cm b) 52cm c) 38cm d) 30cm (c)
14. BP pressure to be recorded in the brake van of an Air brake train of 58 BOXN?
a) 4.8 Cm² b) 4.7 Kg/Cm² c) 5.7 Kg/Cm² d) 4.6 Kg/Cm² (b)
15. ROH of BOXN wagon is done once in?
a) 18 months b) 22 months c) 21 months d) 20 months (a)
16. The permissible variation in wheel diameter on BOXT wagon on the same wagon ?
a) 13mm b) 10 mm c) 25 mm d) 5mm (c)

17. In an Air brake system the capacity of CR?
a) 100lbs b) 6lbs c) 0lbs d) 5lbs. (d)
18. The condemning wheel diameter of BCN wheel is ?
a) 906mm b) 925mm c) 915mm d) 860mm (a)
19. Vacuum level when tested with 8mm disc plate on BG loco is
a) 50cm b) 54cm c) 51cm d) 52.5cm (d)
20. difference in wheel diameter permitted on the ICF coach is ?
a) 10mm b) 5mm c) 13mm d) 25mm (c)
21. Carrying capacity of BOXN wagon is ?
a) 55 tonnes b) 58.3 tonnes c) 56.2 tonnes d) 59.5 tonnes (b)
22. The inclination given on wheel flange is
a) 1 in 2.5 b) 1 in 20 c) 1 in 7.5 d) 1 in 3.5 (a)
23. Newly built coaches should go for first POH after?
a) 12 months b) 18 months c) 24 months d) 36 months (c)
24. For detecting a defective locomotive, the Air Brake should be tested with a test plate having a leak hole of ?
a) 7.5mm b) 8 mm c) 8.5mm d) 10mm (a)
25. While testing Air Brake formation, the leakage on the formation should not exceed?
a) 0.4 Cm^2 b) 0.25Kg/ Cm^2/min c) 0.1 d) 0.5 (b)
26. The maximum pressure that can be built up in a brake cylinder of BCN wagon is ?
a) 3 Kg/ Cm^2 b) 2.5 Kg/ Cm^2 c) 3.8Kg/ Cm^2 d) 5Kg/ Cm^2 (c)
27. The periodicity of schedule 'A' in coaching stock is?
a) 3 months b) 1 month c) 6 months d) 12 months (b)
28. Composite brake block condemning thickness for coaching stock?
a) 10mm b) 25mm c) 20mm d) 12mm (d)
29. Condemning diameter of ICF solid wheel?
a) 915mm b) 913mm c) 860mm d) 813mm (d)
30. SAB 'A' dimension for 16.25 t Axle load
a) 18mm b) 20mm+2-0 c) 22mm d) 16mm (c)

31. Empty load lever to be set in loaded position when gross load is?
a) 25 T b) 42.5 T. c) 50 T d) 60 T (b)
32. Brake adjustment on CASNUB bogie is to be done for every reduction in wheel dia of?
a) 20mm b) 28mm c) 18mm d) 13mm (c)
33. ICF coach axle load Non AC coach?
a) 13T. b) 16.5T c) 18 T d) 20.3t (a)
34. ICF coach axle load AC coach?
a) 16.25T b) 18 T c) 13T d) 20.3T (a)
35. Piston stroke for ICF coach (Vac) ?
a) 85-115mm b) 60-95mm c) 90-127mm d) 75-125mm (a)
36. ICF coach buffer capacity is ?
a) 1105Kg-m b) 1030 Kg-m c) 515Kg-m d) 1090Kg-m (b)
37. Auxiliary Reservoir capacity in wagon stock?
a) 150 lts. b) 100 lts c) 200lts d) 450lts (b)
38. Capacity of Auxiliary reservoir in coaching trains?
a) 200 lts b) 100 lts c) 150 lts d) 450 lts (a)
39. Air Brake Train pipe diameter in goods stock?
a) 32mm b) 25mm c) 50mm d) 36mm (a)
40. On the high speed trains the minimum flange thickness permitted?
a) 20mm b) 18mm c) 22mm d) 30mm (c)
41. What is BPC?
a) Brake pipe certificate b) Brake pressure certificate (c)
c) Brake power certificate d) Brake power centre
42. What is the New wheel diameter of ICF coach?
a) 915mm b) 813mm c) 1000mm d) 1090mm (a)
43. What is the coach intensive cleaning schedule?
a) Once in 6 months b) Once in 3 months (c)
c) Once in 1 month d) Once in 4 months
44. No. of gauges prescribed to check CBC is?
a) 9 b) 10 c) 7 d) 8 (d)

45. Two tonne are how many Kgs?
a) 100 Kg b) 2000 Kg c) 1000 Kg d) 1500 Kg (b)
46. One Inch equal to how many mm?
a) 24.5mm b) 25.4mm c) 2.54mm d) 25.4mm (d)
47. What is the length of coach (from buffer to buffer)?
a) 22297mm b) 22264mm c) 22400mm d) 23000mm (a)
48. Water tank capacity of ICF coach (Each one)?
a) 1800 L b) 450 L c) 900 L d) 375 L (b)
49. What is the diameter of coaching branch pipe in Air brake stock?
a) 10mm b) 15 mm c) 20 mm d) 18mm (c)
50. How much BP pressure to be registered in SLR?
a) 5 Kg/Cm² b) 6 Kg/Sq. Cm c) 5.8 Kg/cm² d) 4.8 Kg/cm² (d)
51. Rail wheel factory (wheel and axle plant) situated at?
a) Yelahanka b) Bangalore c) Chittaranjan d) Patiala (a)
52. Which one of the following is an air brake wagon?
a) KC b) CGIRS c) BCN d) TK (c)
53. What gauge is used to measure wheel defect?
a) Wheel gauge b) Broad gauge c) tyre gauge d) Tyre defect gauge (d)
54. Where the electric locos are manufacturing?
a) Varanasi b) Bangalore c) Chittarangan d) Patiala (c)
55. How many DVs are there in Air brake system of a coach?
a) 3 b) 2 c) 1 d) 4 (c)
56. Under slung water tank capacity of AC coach?
a) 1480 L b) 370 L c) 740 L d) 1000L (b)
57. Which tool is used to measure wheel diameter?
a) Outside caliper b) Inside caliper c) Screw gauge d) Wheel gauge (a)
58. What is the distance between two rails of a B.G track?
a) 1000mm b) 1676mm c) 1766mm d) 1600mm (b)

59. The free lift of vacuum cylinder is?
a) 16 mm b) 13mm c) 15mm d) 17 mm (b)
60. Wheel base for BOXN is?
a) 12000+_6 b) 2000+_5 c) 1266+_2 d) 2430+_ (b)
61. Wheel tread is provided with how much taper?
a) 1 in 30 b) 1 in 25 c) 1 in 12 d) 1 in 20 (d)
62. BOXN wagon is provided with which type of coupler?
a) BT CBC b) HT CBC c) NT CBC d) MT CBC (b)
63. Inter communication valve (alarm chain) should be tested with a load of?
a) 7 and 10 Kgs b) 8 and 15 Kgs c) 9 and 12 Kgs (a)
d) 12 and 24 Kgs.
64. Piston stroke of BOXN wagon on empty?
a) 75+_10mm b) 95+_10mm c) 85+_10mm d) 60+_10mm (c)
65. Where the Integral coach factory is situated ?
a) Mumbai b) Kolkata c) Bangalore d) Chennai (d)
66. Indian Railways have how many zones?
a) 16 b) 9 c) 10 d) 15 (a)
67. Where the Rail Coach Factory (RCF) is situated ?
a) Lacknow b) Kapurtala c) New Delhi d) Varanasi (b)
68. Soaking period of FRLP is ?
a) 10 hrs. b) 16 hrs. c) 12 hrs d) 8 hrs. (c)
69. The projection of buffer from head stock for BG ICF coach is maximum?
a) 600mm b) 700mm c) 635mm d) 735mm (c)
70. The body of the BOX wagon rest on the ?
a) Centre pivot b) Carriage c) Back pivot (a)
d) Wheel
71. Leakage in AR can be arrested by ?
a) DV isolating cock b) Cylinder c) Nozzle d) Washer (a)
72. ROH periodicity of BRNHA?
a) 24 months b) 18 months c) 21 months d) 36 month (b)

- 73 Length over coupler faces of BOXN?
a) 15782mm b) 15429mm c) 14450mm d) 10713mm (d)
74. At what speed the wagons fitted with CASNUB 22 HS bogies are fit to run?
a) 75 KMPH b) 90 KMPH c) 100 KMPH d) Tare weight (c)
- 75 In a CASNUB 22 NLB bogie the 22 indicates?
a) Year built b) Trolley number c) Axle load d) Tare weight (c)
76. The function of EM pad in CASNUB bogie?
a) Cushioning b) Smooth running c) Reduces flange wear (c)
d) Increases buffer height
- 77 The function of cut off valve in C3W distributor valve?
a) CR charging b) AR charging c) BC release d) BC charging (a)
- 78 In BMBS during which stage the slack will be taken up? (c)
a) During application b) During charging c) During return stroke
d) Always
79. The empty load device handle can be set when gross load exceeds?
a) 25.5t b) 58.8t c) 40.5t d) 42.5t (d)
- 80 IRCA part IV book is for?
a) Goods rejection b) C&W rejection c) Coaching rejection (c)
d) ICF rejection
81. The capacity of AR in coaching trains? (a)
a) 200lts b) 75 lts c) 100lts d) 400lts.
82. The function of AR is ? (c)
a) Charges DV b) Charges CR c) Charges BC
d) Charges BP
- 83 Ideal piston stroke for under frame mounted AB system coaching?
a) 90mm b) 50mm c) 100mm d) 65mm (d)
- 84 The size of vacuum cylinder used for ICF AC coach on Dhanbad express?
a) 21 inches b) 24 inches c) 22 inches d) 18 inches (b)
- 85 To check the internal leakages in vacuum cylinder what type of examination is to be carried out?
a) RTR test b) SWTR test c) BVT test d) ACP test (c)

Filling the blanks

1. Buffer height max for wagons is 1105mm
2. Minimum buffer height for wagons in loaded condition is 1030mm
3. Buffer height of coaching stock in tare condition is 1105 to 1090mm
4. Which laminated spring is used for IRS TK wagons 13 plated
5. 10 plated springs are used for BOXC, BCXC wagons.
6. Free camber of 13 plated bearing springs is 76mm
7. Tare camber of 13mm plated spring is 64mm,
8. Load camber of 13mm plated laminated bearing is 28mm
9. Free camber of 10 plated L bearing spring is 47mm
10. Tare camber of 10 plated L bearing spring is 35mm
11. Camber of 10 plated L bearing spring in loaded condition is -4mm
12. IRS wagon new wheel diameter is 1090mm
13. IRS wagon condemning diameter (solid) is 990mm
14. BOXC wagon new wheel diameter 1000mm
15. BOXC wagon wheel condemning diameter of is 860mm
16. Wheel gauge for wagons 1600+2mm - 1
17. What is the difference of wheel diameters permitted between two wheel sets on IRS 4 wheeler wagon?
25MM
18. How much is the variation in wheel dia can be allowed in one trolley (bogie) of BOXC wagon?
13MM
19. Variation in wheel dia of BOXC on a wagon can be allowed up to 25mm
20. Wheel defects can be checked with ty re defect gauge

21. What is the condemning limit for radius at the root of the flange (less root radius)?
13mm
22. Permitted flat faces on BOXC wagons is **60mm**
23. Permitted Flat faces on ICF wheels is **50mm**
24. Condemning limit for sharp flange on wagons **5mm**
25. Condemning limit for deep flange is **35mm**
26. Hollow tyre of wheel tread is **5mm**
27. Condemning limit of thin flange on freight stock is **16mm**
28. When oil oozing noticed in between wheel seat and axle it is called **loose axle**
29. When pull rod is grazing on axle forms the **Notched axle**
30. 'E' type vacuum cylinder (For IRS) diameter is **18" or 457 mm**
31. 'F' type vacuum cylinder (for BOXC diameter is 22" or **549mm**
32. POH periodicity of BOXC wagon is **4 1/2 years.**
33. Train pipe dia for vacuum braked stock is **50mm**
34. SAB 'A' dimension for BOXC wagon is **50mm+ 2**
35. Piston stroke for BOXC wagon in empty & load condition **130mm & 180mm**
36. The overhauling period of vacuum cylinder is **18 months** for wagon stock.
37. The axle load for BOXC wagon is **20.3t**
38. Brake gear should be adjusted for every **28mm** reduction in wheel dia on BOXC wagons.
39. What is PRIO?
P : Periodical overhauling
R : Repacking.
I : Inspection.
O : Oiling.
40. The minimum thin flange thickness for High speed trains in coaching is **22mm**

41. Wheel gauge for ICF coach wheel **1600+2-1mm**
42. IN twin pipe air brake train the pressure readings on engine and SLR is
 BP pressure: Engine: 5 Kg/Cm²
 SLR 4.8 Kg/Cm²
 FP pressure: Engine : 6 Kg/Cm²
 SLR : 5.8 Kg/Cm²
43. The functioning of DV is tested with Single Car Test Rig for a single wagon/coach.
44. The sensitivity pressure of DV is 0.6 Kg/Cm² (BP pressure dropping) the brake **should apply** within 6 Sec.
45. The insensitivity pressure of DV is 0.3 Kg/Cm² (Drop of BP pressure) at which the brake **should not apply** within 60 seconds
46. SAB 'A' dimension for AC coaches is 22+2-0mm
47. SAB 'A' dimension for BEML coach is 25mm+2/-0(stock not existing)
48. SAB 'E' dimension for coaching is 375+ 25mm
49. The distance between adjuster tube and the mark on the spindle towards its end is called '**SAB' 'E' dimension**'.
50. SAB 'E' dimension for BOX wagon is 555 to 575mm and should not be less than 480mm
51. SAB 'A' dimension for 13 T axle load coach is 16+2-0mm (leverage ratio 1:4)
52. SAB 'A' dimension for ICF coach with brake leverage ratio of 1:5.5 is **22+2-0mm (AC coach)**
53. The diameter of vacuum cylinder of ICF/BEML coach is 'F' type 24" or 610mm
54. When 'E' dimension of SAB decreases it indicates brake block work, Worn out wheels, pins and bushes.
55. The mark 'S' on end body of BCNA/BOXN denotes the sheet surface is **shot/grit blasted** before painting by manufacturer.

56. The type of grease used in ICF spherical roller bearings is **lithium base** grease.
57. The torque value for end locking studs is **8 to 9 M-Kg for 6mm bolts and 15 to 16 Kg for M 20 bolts.**
58. The dash pot oil level under tare condition is **40mm**
59. Draw and braking forces will be taken by **Anchor links** in ICF coaches.
60. Silent Block (Rubber bush) has been fitted in bogie components to **reduce noise**
61. To control the lateral swing of the bolster **Equalizing stays** have been provided on ICF bogies.
62. The longitudinal movement of the axles is controlled by **Axle holding arm** in BEML coaches(stock not existing).
63. The lateral Movement of the axles is controlled by **Guide rollers** in BEML
64. The 'A-X' after the coach number denotes **Air brake** and **110 volts DC supply**
65. Piston stroke in vacuum brake coaches is 115mm (4 ½") max. and 89mm (3 ½") Min.
66. Codal life of ICF steel bodied coach is **25 years**
67. Codal life of wagon is **35 years**
68. Life of other coaching vehicles (light usage) is **40 years**
69. The gap between brake block and wheel on BOX/BCX wagons to be maintained is **6.25mm**
70. The gap between brake block and wheel tread on ICF coach to be maintained is **5mm**
71. Brake power to be adjusted on BOXC/BCXC wagon for every **28mm** reduction of wheel diameter.
72. ICF solid wheel diameter is **915mm**
73. 'A' schedule to be done once in **a month +/-3days**

74. 'C' schedule to be done once in 6 months +30 days -0 days
75. The POH period for Rajadhani/Shatabdi express coaches is after 4 lakh Kms or 18 months which ever is earlier.
76. The IOH period for Rajadhani/Shtabdi coaches is 2 lakh Kms or 9 months which ever is earlier.
77. All AC coaches shall be booked for POH for every 12 months
78. OCVs other than Mail/Express coaches the POH period is 24 months
79. A four wheeled wagon equals **ONE** unit.
80. A Six wheeled wagon equals **TWO AND HALF** units
81. A Bogie or wagon with transportation and mechanical code "BOY" equals **TWO AND HALF** units.
82. Fast train open wagon, coal(four or six wheeled) is denoted with code X
83. Ordinary brake van tare net **6 t.**
84. Medium brake van tare net **13t.**
85. Heavy brake van tare net **18t.** exceeding.
86. IRCA .Part.III plate Drg.No. **57** BG tyre defect gauge spread.
87. Inflammable fluid tank wagons are checked with **BATTERY CHARGES** torches.
88. Hot axle can be detected through **VISUAL OBSERVATION** in rolling in examination.
89. Maximum dimension of loads between **FLOOR** and **WHEEL** above rail level.
90. Vacuum cylinders are of **TWO** types i.e **F & E**
91. In "E" type of vacuum cylinder or hemispherical shape is given at the top for **AIR SPACE.**
92. Damaged vehicle register **RS-15**
93. Train examiner diary coaching **RS-69**
94. Condemnation of rolling stock **RS-24**
95. Passenger coach fit POH periodicity is 12 months **Yes/No**
96. A 24 coach capacity pit lines length should be 600Mts, **Yes/No.**
97. Periodicity allowance for "C" schedule for coaches is **6 months + 15 days Yes/No.**
98. Instructions for operation of air braked main line passenger trains Dec'1994, C=9408. **Yes/No.**
99. Emergency windows are provided from door on either side, in compartment in coaches.

- a)2nd (b)**3rd** (c)6th (d)8th
100. ICF coaches are provided with bearings:
a) Tapered (b) cylindrical (c) **spherical** (d) Ball
101. Wheel discs are fitted on axles.
a) Loose fit (b)**shrunk fit** (c)thermo fit (d)fastening
102. Projection of buffer from head should be within:
a)700 to 715 (b)680 to 695 (c)**600 to 635** (d)1030kg.M.
103. ICF type buffer of BG main line coaches.
a)**1130kg.m** (b)3130Kg.m. (c)2850 Kg.m. (d)1030Kg.m.
104. Lateral play between axle box lug and horn check on UIC bogies when both are new:
a)22mm (b)25mm (c)30mm (d)**20mm**
105. CASNUB bogie of latest type:
a)22W (b)22W(M) (c)22 NL (d)22NZB (e)**22HS**
106. ROH" for BOXN wagon once in;
a)18months (b)**24 months** (c)36months(d)40months.
107. In balance vacuum test the piston travel should be ;
a)3" to 4" (b)5" to 6" (c)**1" to 1 1/2"** (d)2 to 3 1/2"
108. In vacuum brake the crank arm will come to normal position after release due to:
a)Hydraulic pressure(b) pneumatic pressure (c)**gravity**(d)magnetic.
109. "R" charger is meant for:
a)releasing (b)**Re-charging** (c) rectification(d)for crew.
110. ICF coaches are built at:
a)Chennai (b)**Perambur** (c)Calcutta (d)Coimbatoore
111. In BOX wagon SABs are with "A" dimension:
a)**70mm** (b)80mm(c)40mm (d)22mm
112. Limiting device is housed in:
a)SAB (b)Vac.cylinder (c)**DV** (d)CR
113. PEASD is provided with **8 mm** choke
114. In empty load BOX empty indication have colour

- a)**Black** (b)yellow (c)red (d)green
115. CASNUB 22W(M) wheel diameter:
a)**1000** (b)982 (c)845(d)940
116. BOXN Wagon pull rod have holes for brake adjustment
a)6 (b)5 (c)8 (d)7
117. How do you measure buffer height of a coach.
a) **Rail centre to buffer centre**(b)Rail center to side buffer
c)rail centre to plunger center.(d)drag link to rail centre.
118. Which is the most frequent reason for Train parting on AAR coupler?
a) Failure of Knuckles
b) CBC operating handle bracket falling down
c)Operating handle bent/missing
d) CBC drooping
119. Which one of the following is the function of check valve with choke provided in the air brake system.
a)To maintain the regular air flow in the feed pipe.
b)To permit flow of air from the FP to the AR but not in the reverse direction.
c). To control the air pressure so that graduated brakes can be applied.
d). To supply air to AR after removing the dirt and moisture from FP.
120. Which one of the following is not the function of isolating cock in air brake system.
a)To isolate the flow of air to both the cylinders.
b)To isolate the auxiliary reservoir.
c)To supply air at the required pressure to any component.
d). To isolate control reservoir.
121. In a brake cylinder the piston movement is sticky in both application and release which one of the following is the reason.
a. Piston return compression spring is weak.
b. Piston rubber packing is cut or worn-out
c. Hexagonal nuts not equally tightened.
d. Piston rubber packing is running dry
122. Which one of the following is the function of PEAV
a.Facilitate the passenger to stop the train as and when required
b.Facilitate the passenger to intimate the driver to stop the train by reducing air pressure.
c.Driver of the train to know the air pressure of brake pipe under each coach.

- d. Guard of the train to know the air pressure of the brake pipe under each coach.
123. In C3W distributor valve which one of the following sub-assemblies help in manual release of brakes?
a). Quick service valve b) Cut off valve
c) Quick release valve d) **Double release valve.**
124. On G.T. express a miscreant closed front BP cut off angle cock of third coach in en-route. What will be the effect on the train?
a. No effect on the train b. Front portion will have brake binding
c. No brake power in the entire train d. Rear portion will have brake binding
125. Twin Pipe Braking Helps In
a. Reduces braking distance b. Reduces release time
c. Prevents run away trains on graded sections d. Prevents skidding in case of brake pipe is broken
126. In a wagon wheel likely to derail is likely to be under
a. Broken spring b. Under a heavier load c. One with skid marks.
d. One with non functional D.V.
127. In case of coaching stock accident where human loss is there the enquiry will be conducted by
a. GM b. Sr. DME c. DRM d. CME e. CRS
128. During release after full service application in air braked wagon the brake should release within ____ seconds.
a. 5 Seconds b. 20 Seconds c. 30 Seconds d. 60 Seconds
129. What is the differential pressure across the brake cylinder pressure when the driver drops the BP pressure by 1.6 Kg/cm² ?
a. 3.8 Kg/cm² b. 2.8 Kg/cm² c. 1.6 Kg/cm² d. 0.4 Kg/cm²
130. What is the maximum wheel diameter of BOXN wagon fitted with CASNUB 22W retrofitted bogie? **Ans: 956mm.**
131. What is the new and condemning diameter of wheels fitted on ICF WGACCW coach? **Ans. 915mm & 813 mm**
132. What is the condemning wheel diameter of BOX "N" Wagon? **Ans: 906mm.**

133. What is the Permissible variation in wheel diameter on the same trolley and on the same BOXN wagon? Ans. 13mm & 25mm
134. What is the permissible variation in wheel tread diameter on the same bogie and on the same coach on BG ICF design at the time of wheel changing? Ans. 5mm & 13mm
135. What is the lowest permissible wheel diameter for a coach turned out after POH from work shops? Ans: 837mm
136. What is the Permissible wheel gauge of wheels on an ICF coach as per revised IRCA part IV? Ans: 1600 +2/-1mm
137. What is the distance between journal center on CASNUB bogie? Ans. 2260mm
138. What is the permissible flat surfaces on wheel tread of BOX "N" wagons as per the latest instructions? Ans: 60mm
139. What is the root radius when new for wheel turned to worn wheel profile? Ans: 14mm
140. What is the Axle load of coach running on Rajadhani express? Ans. 16.25 tonnes
141. What is the Condemning flange thickness of wheels fitted on ICF coach running at 110 Kmph.? Ans: 22mm
142. What is the revised torque value for tightening end locking screws fitted on CTRB of BOXN wagon? Ans: 40 kg. Mt.
143. What is the maximum and minimum Buffer heights to be maintained on an ICF coach under tare condition? Ans. 1105mm to 1090mm.
144. What is indication for ensuring proper coupling of CBC during train examination? Ans. 19 mm clearance between toggle and coupler body
145. At what wheel diameter reduction Brake adjustment of CASNUB bogie is done. Ans:18mm
146. What is the drop in vacuum level while testing an alarm chain apparatus of a single coach.? Ans 18cm to 20cm.
147. Minimum vacuum level to be maintained in of goods brake van? Ans: 38 cms.
148. What are the total number of rubber fittings in vacuum cylinder? Ans: Eight
149. 80.In C3W distributor valve, through which sub assembly the control reservoir is charged ? Ans: Cut off valve

150. In KE distributor valve, through which sub assembly the auxiliary reservoir is charged? Ans: R-Charger
151. 82. Which defect in C3W Distributor Valve causes brake binding ?
Ans: Main valve check valve damaged.
152. Which defect in KE type of Distributor valve makes the cylinder In operative?
Ans: Main diaphragm perished or Quick release valve leaking
153. Working Piston stroke of Bogie mounted brake cylinder? Ans: 32mm
154. Maximum slack take up capacity of a Bogie mounted brake cylinder? Ans: 305mm
155. In bogie mounted brake system at what wheel diameter the brake gear connection should be shifted to next inner hole of connecting link?
Ans: 839mm
156. What is the Brake cylinder pressure release time from 3.8Kg/cm² to 0.4 Kg/cm² with single car test rig as per IRCA Part IV? Ans: 15 to 20 seconds.
157. What is the drop in brake pipe pressure during sensitivity test with SCTR?
Ans: 0.6 Kg/cm² in 6 Seconds
158. What is the validity of Brake power certificate of CC rake?
Ans: 7500 Km. or 35 days which ever is earlier.
159. Colour of vacuum brake BPC of goods train? Ans: Pink
160. Brake power certificate of Air brake Goods train? Ans: Green
161. Minimum percentage of effective brake cylinders on an intensively examined Air brake goods train? Ans: 90%
162. Brake power percentage of Air braked CC rake at originating station? Ans: 100%
163. Minimum BP pressure required in brake van of 58 BOXN wagons?
Ans: 4.7 Kg/cm²
164. Permissible leakage rate of air pressure in goods train as per G-97?
Ans: 0.25 kg/cm²/minute.
165. Condemning limit of composite brake block in goods train? Ans: 10mm
166. Piston stroke of a loaded BCN wagon? Ans: 130mm
167. Pull required to operate alarm chain apparatus? Ans: 8 to 10 Kg.
168. Condemning thickness of Composite brake blocks of a coach? Ans: 12mm

169. Maximum permissible clearance between pin and bush during renewal on Express train? Ans: 0.75mm
170. What is the dimension 'A' OF slack adjuster for coaches with 16.25 ton bogies?
Ans: 22mm
171. Slack adjuster "e" dimension of ICF coach? Ans: 375mm +/- 25mm
172. Longitudinal movement of bolster in ICF bogie is controlled by?
Ans: Anchor link
173. Angle to which split pins and cotters to be split? Ans: 45 degrees
174. What is the main criteria for taking a coach for IOH and C schedule?
Ans: Coaches earning more than 2.5 lakhs KMs. per annum are to be given IOH and other coaches are to be given 'C' Sch. attention.
175. Periodicity of ROH of BOXN? Ans: 18 months.
176. Periodicity of ROH of BCNA Wagon? Ans: 24 months.
177. Periodicity of POH of OCVs on mail & express trains? Ans: 12 months
178. Newly built ICF coach running on mail/express trains first IOH is done after months? Ans: 12 months
179. What is the permissible longitudinal clearance between side frame and adapter on 22NLB CASNUB bogies? Ans: 12 to 18mm
180. **Condemning height of EM pad?** Ans: 42mm
181. Condemning height of CC pad? Ans: 109mm
182. Man hours required for CC rake examination? Ans: 100 man hours.
183. How the center pivot of CASNUB bogies are lubricated as per revised wagon manual? Ans: Graphite flakes to IS-495
184. Codal life of steel bodied dining and pantry cars? Ans: 25 years
185. What is the codal life of light utilization categories of coaches? Ans: 40 yrs
186. *Codal life of BOXN wagon?* Ans: 30 yrs
187. Minimum air pressure in the under slung water tank of AC coach?
Ans: 0.35 Kg/Cm².
188. RS 69 is used as? Ans: Rake maintenance Dairy
189. 120. What is the minimum oil level to be maintained above the guide cap in dash pot of BG ICF coach as per latest coaching manual? Ans: 40mm
190. **Starting time for MRV during day for direct dispatch?** Ans: 15 min
191. What is the starting time for ART during night? Ans 45 min
192. In service "E" dimension of slack adjuster increases / decreases. Ans: Decreases
193. The clearance between wheel and brake block increases automatically in Bogie mounted brake cylinder? True/False Ans: False, remains constant

194. Wear on brake block does not disturb 'A' dimension of slack adjuster? True/False? Ans: True
195. If an accident takes place in an outstation but the mainline is clear what is the hooter code? Ans: 3 long
196. If a goods train is stabled for more than **24 hours** the BPC becomes invalid.
197. What is the maximum difference of camber in springs that is permissible in a trolley of BOX wagon? Ans: 13mm
198. Beyond which temperature is the axle box considered hot?
Ans: 80 degrees C
199. In an open line coaching depot for what defects do you look for when the bearing is opened for schedule?
Ans: Bearing should not be opened in open line *depots for schedules*
200. What is the full form of CORTON steel?
Ans: Corrosion Resistant steel
201. For Inspection carriages how often is POH carried out? Ans: 2 years.
202. Under whom does NTXR work? Ans: IRCA
203. Where is Rail Spring Karkhana located?
Ans: Sithouli Gwalior
204. What is a Air Flow indicator?
Ans. Indicates excess leakages of air pressure
205. What types of brakes are there in LHB coaches?
Ans. Disc brakes
206. Decode COFMOW?
Ans. Central Organization For Modernization Of Workshops
207. Decode LHB? Ans: LINKE HOFFMAN BOSCH
208. **PCV stands for?** Ans. Passenger coaching vehicle.
209. What is OCV? Ans. Other Coaching Vehicle
210. What is A dimension of slack adjuster fitted on BOX / BCX wagon?
Ans. 50mm
211. Periodicity of ROH of Four wheeler tank wagon is 14 Months months.
212. To procure non-stock item of value more than Rs.10,000/- S-1302-A form to be prepared.?
213. What is the Minimum brake power to be ensured on coaching trains in enroute? Ans: 90%
214. What type of bearing is fitted to ICF coach wheel sets?
Ans: Self aligning spherical roller bearing.
215. What is the wheel base of an ICF bogie? Ans: 2896mm.
216. What is the wheel base of CASNUB bogie? Ans: 2000mm

217. What is the dia of the choke provided in PEV? Ans: 8mm
218. What is the maintenance time required for maintaining 24 coach train?
Ans: 6 hours.
219. What is the Max. speed permitted to run a loaded BCX wagon with clamped broken spring by the train? Ans: 40 Kmph.
220. What is the minimum buffer height permitted on loaded coaching stock?
Ans: 1030mm
221. Safe to run examination of Mail/Exp.trains to be done after every 250 to 350 Kms of run?
222. Standard moving dimension of BG rolling stock at top centre is 4115mm?
223. What is the release time of a DV permitted on coaching stock?
Ans: 15 to 20 sec.
224. What is the droppage of BP pressure for full service brake application on coaching train? Ans: 1.0 to 1.5 Kg./Cm².