Following is the Bank of Questions for GrB Selections (70% GDCE) of Mechanical Department for general guidance of prospective candidates. The List of Questions is not exhaustive, but is intended to serve as a guide only. The List includes broadly all aspects of working of a Junior Scale Officer and should help a candidate prepare for 70% GDCE Selections in Mechanical Department. The Questions given here are not necessarily in the same weightage as would appear in a question paper, but these Questions are only for guide-lines, The List has been divided into 5 Parts; as given below-

A. **General/Common**: Which includes subjects of Accounts, Personnel, Stores Departments & common to all stream of Mechanical.

B. **Rajbhasha**: 

C. **Workshop**: Which includes subjects of workshop of NCR.

D. **Carriage & Wagon**: Which includes subjects of Carriage & Wagon of NCR.

E. **Diesel Locomotive**: Which includes subjects of Diesel Locomotive of NCR.
Part ‘A’ General/Commam

1. Define Stock items non Stock items. Narrate the procedure of making a new item as a Stock item.

2. Briefly describe Hours of Employment Regulation (HOER) and what are the different categories of Staff as per HOER? Explain how the overtime is calculated for Running Staff.

3. Enumerate Minor and Major penalties as per DAR, 1968. Describe the procedure for imposing minor penalty.

4. Describe the duties of welfare department in Indian Railways? What are the different measures of welfare for employee given by Railway administration?

5. What system of disaster management is adopted in Indian Railways? What drawback of disaster management is criticized by public? Give your suggestions to improve the system.

6. What is budget grant for different types of head under Mechanical Department expenditure? What steps you have been taken to minimise the expenditure.

7. What will be action plan in your unit to control corruption?

8. What is Tender? How will you classify the tender, Describe in brief?
What is disaster Management? What do you understand about Golden Hour? What are the Primary requirements of disaster management during Golden Hour? Give suggestions to make more effective of Golden Hour in disaster Management.

What types of PPE used at workshop/Shed/Depot? What types of occupational Hazard is in workshop/Shed/Depot?

What do you understand by a charge-sheet? What factor should be considered while drafting a charge-sheet?

What do you understand by “The Railway Servants (pass) Rules 1968? What are the features of the rules? List various passes applicable to Railway employees?

What are the various allowance and advances are admissible to Railway Employee?

What do you understand by Inventory Control? What is the purpose of Inventory Management? Explain techniques of Inventory control Management?

Write down short notes on any four of the following.

| 1 | pvlukvjk | HOER |
| 2 | dj[kukvflku | Factory Act |
| 3 | dj懈k | Workmen’s Compensation Act |
| 4 | ik fu | Pass Rule |
| 5 | dezkhY; kktufk | Staff Welfare fund |
| 6 | Uure asv vf/ku | Minimum Wages Act |
| 7 | NqVhdktu | Leave Rule |
| 8 | fuyEu | Suspension |
| 9 | asv Hqriku vf/ku | Payment Wages Act |
| 10 | baxhVd;v vQVLV| Stock Control of Store |
| 11 | ,e,.MiH | M&P |
| 12 | LkVrRkulkvflVhvlbVe | Stock & Non Stock item |
| 13 | vVJih | RSP |
| 14 | ify'd, dkmV des'h | Public Account Committee |
| 15 | dSu vQYQkuh; y ikeVZ | Canon of Financial Property |
| 16 | ct Vl kfly | Budget cycle |
| 17 | LVW/HlQDsk | Stock verification |
| 18 | ihu,e | P.N.M |
| 19 | fjVkJ e$ c$QM~ | Retirement benefits |
| 20 | dHMBV       | Contract           |

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**Part ‘C’ Workshop**

1. **What work is done by wheel press? Write down the working principle & maintenance Schedule of wheel press.**

2. **What is the difference between CNC and Conventional Machine? How will you do the maintainance of CNC machine?**

3. **What do you understand by Codal life of Machine? Write down the process of replacement of the Machine, which have completed codal life.**

4. **Why profiling of Wheel is necessary? How the profile of wheel is carried out.**

5. **What types of bearings are used in freight stock? What is the difference between cylindrical Roller Bearing and Cartridge Taper Roller Bearing? Explain the advantage & disadvantage of both?**

6. **What is train Parting? What are the main reason of train parting? Explain the measures to be taken to reduce train parting during POH in workshop.**

7. **Explain the construction of Tank Wagon, Barrel Fitting & Master Valve components. Write down the steam Cleaning process of Tank Wagon.**

8. **What are the welding defects? Explain the internal & external welding defects and remedial action to remove these defects.**

9. **What do you understand by down hand welding? Write down the advantage and disadvantage of down hand welding. What are the measures to facilitate down hand welding?**
10. What is the difference between BLC and BFKI? Explain the process of POH of BLC wagon in details.

11. What is the difference between BOXN & BOXN ‘R’? Explain the process for conversion of BOXN to BOXN ‘R’.

12. Write down the maintenance Schedule of E.O.T Crane? What measures you will take to reduce the brake down of E.O.T. Crane.

13. What are the different type of wheel defects. Explain each defect with the help of wheel defect guage.

14. Explain the machining process of Wheel disc & axle and also explain the wheel pressing process in details.

15. What is CNC machine? How it differ from conventional machine, which machine will be used for high quality and precision work.

16. Write down the salient features of CLW incentive scheme. How it differ from group incentive Scheme? Explain the merits & demerits of both.

17. What is distortion? Write down the reason of distortion. Write down the methods to eliminate distortion?

18. What is BOXN ‘R’ wagon? Write down the welding process of stainless steel.

19. What qualities a supervisor should have to become a good and successful supervisor. Explain in detail.

20. How the selection of electrode for welding is done? Explain different type of electrode used in workshop.
What is P.C.O in workshops? What are the different works of it. In your opinion upto which limit all parts of P.C.O are effective? What suggestion you will give to improve the effective working PCO?

Do you understand that the incentive Scheme is full filling the object for which it was introduced? What suggestion you will give to improve the effectiveness of this scheme.

There was an accident in workshop, in which one employee dead, you are the first officer reaching at the accident site in this situation, what will you work.

What parameters are considered for the performance of workshop? What step you will take to improve the performance of workshop.

Answer any four of the following.

de½ Why walking beam furnace is necessary for heating the bar for Coiling?

[k½ Why Shot peaning process is adopted for manufacturing of coil spring?

x½ Why manganese steel is not considered suitable for manufacturing of ICF Bogie spring. However it is considered suitable for Casnub Bogie?

/k½ What is the significance of bar peeling for manufacturing of coil spring?

Why pairing of coil spring is not considered suitable after losing its camber?

Make Layout of an ideal workshop having P.O.H capacity of 20 wagons per day. Please made out and list of required infrastructure.
27. What do you understand by Single wagon test ring? Write down the testing procedure on RDSO performa?

28. Write down the manufacturing and inspection procedure of BOXN helical spring.

29. Explain the working principle of single pipe Air Brake System with the help of schematic diagram.

30. What is 90 days sick marking of wagon? Suggest the measures to reduce the 90 days sick marking.

31. What action you will take in case of fire in tank wagon shop. What precaution/remedial action you will take to avoid such type of incidents in future.

32. What are the different types of welding defects? Write down the reason and remedial action of each defect?
What is NDT? What are the non destructive testing for testing of spring bar. Explain the magnetic partical testing method of Coil spring.

What is brake binding? Explain the reasons of brake binding and remedial action to over come this problem.

Explain the process of POH of BOXN Wagon. What step would you take during POH to reduce the 90 days sick marking.

What is corrosion? What are its reasons, Explain in detail to reduce/stop the corrosion.

Write down the complete manufacturing process of Spring from spring steel bar. Explain all parameters to be considered during this process.

How material is selected for manufacturing of spring? What material is used for manufacturing of ICF bolster spring? Explain the spring manufacturing process in detail.

Explain any two modern welding technologies, What precaution should be taken to avoid welding defects during welding. Explain in detail.

What are the demerits of existing incentive scheme in workshop, suggest your views to remove these demerits. Ensuring that there should be no reduction of earning of the employee.

What do you understand by unloadable of BOXN Wagon? What will you suggest to over come these problems?
What is your role at present in railways? What is your contribution to increase production and efficiency in your work? How you see the role of an Officer if you are selected which area you will improve?

What is Hot Box? What step you will initiate to reduce the hot box cases if you are an AME (C&W)/Diesel Shed/AM.

What is radiographic welding quality? Where this welding is used. Explain one or two with the help of example.

How scrap is generated in workshop? How it is sent to store explain the process of final disposal of condemn wagon?

Write down short notes on any four of the following.

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Part ‘D’ Carriage & Wagon

1. What modifications are carried out under Indo-German modification in ICF coaches? Explain in detail with diagram.

2. What is corrosion? In ICF coaches, what are the various locations of corrosion? Explain the reason there of and remedial action.

3. How classification of coaching sick line is done? Explain the required standard facilities for sick line having capacity of 100 coaches.

4. What do you understand by rolling IN and rolling OUT examination? What are the advantages of this examination? Describe in detail.


6. What is the main reason of bearing failure? Explain the measure to reduce the bearing failure.

7. What are the primary and secondary depot? What work is carried out in these Depot? Explain in detail.

8. What do you understand by passenger amenities and safety fittings? Explain each with example.

9. What do you understand by Riding index? What factors will you consider to maintain riding index of ICF coach?

10. What do you understand by suspension system? Write down the suspension system of ICF coach in detail.
11. Explain working of twin pipe air brake conventional system with the help of neat diagram indicating its components.

12. Explain layout & detail standard facilities required at primary depot for examination, washing and cleaning of 20 rakes.

13. Write down the classification of ART, Give the necessary tools list as per standard tool list of A class ART.

14. What parameters are to be recorded during joint check at the site of derailment explain with the help of format.

15. Write down the duties of AME at accident site. Explain in detail.

16. What do you understand by fire triangle? What preventive measures are taken during extinguishing the fire. Explain briefly.

17. What are the parameters to be recorded during movement in AC & DC traction area.

18. What do you mean by ODC? Explain all classes of ODC. What are the instructions for movement in AC & DC traction area.

19. How many types are of CASNUB trolley? Write salient features of CASNUB trolley and write down the difference in Mark I and Mark II trolley.

20. Explain working principal of air spring with the help of diagram. Write down its merits and demerits in detail.

21. What are the limitations during movement of Hybrid coach? What will you suggest to overcome these problems?
Explain salient features of BLC wagon. Explain ROH procedure of BLC wagon.

Explain salient features of BOXN(EL). What precaution are taken to make BOXN EL Wagon(25T).

Explain Bogie Mounted air Brake system in Casnub bogie with the help of diagram. How it differed from conventional air brake system of wagon.

What do you understand by Hybrid Coaches? How hybrid coaches are manufactured.

Explain the feature of hybrid coach.

What is the main reason of fire in train? What modifications are carried out to prevent fire in last few years by Indian Railway? What suggestions you will give to prevent expansion of fire.

How coaching stock reliability is measured? Describe anyone reliability measure. What actions should be taken to improve that parameter?

What were the main characteristics Railway board circular no 04 of revised maintenance pattern of coaching train?

What are the standard requirement of facilities in maintenance and operation of 24 coaches rakes in Depot?

Why brake system is required? what do you mean by brake rigging? How many types of brake system are in use in Indian railways? Describe Air brake system of coaches.
What are the wheel defects? Write down each defect and effect thereof. Explain the wheel defect with the help of wheel defect gauge.

Water is the basic requirement of passengers in coaches. There are chances of complaint in case of less/no supply of water. What are the reasons of non availability of water in train? What are the recommendations to ensure availability of water by water committee? What steps would you take to ensure availability of water?

What are the main defects found in axle guide assembly? What are the reason of it? Write down the remedial action of these defects.

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What are the latest instructions for designing lay out of coaching depot? Explain rough sketch of major coaching depot with various facilities.

What are the salient features of different bogies used in goods stock? Explain.

What is bogie mounted air brake system? Explain its advantage over conventional air brake system. Explain its design feature and working. What precautions are to be taken during maintenance?

What do you mean by brake binding in coaches? Explain its effect in Railway system. What factors are responsible for it. What are the suggestion to reduce brake binding?

You have to inspect a coaching depot in capacity of Sr DME , What are the main items to be inspected during your inspection. Prepare lists of these items.
44. What are the arrangements for coupling of railway vehicles in Railways? What type of couplers is used in Indian Railway? Explain.

45. How many types are of Railway accidents? As per Rly Accident manual, what steps would you take if you are of reaching at first officer at accident site. Explain in brief.

46. Explain in brief to Design and development of freight stock in railways, its classification and designation system.

47. How many types are of freight train examination? How many man hours are required for each examination? What are the salient features of other joint procedure order for freight train examination?

48. What is the new rolling stock introduce in coaching and wagon in Indian Railway? Explain each of them in brief.

49. What do you mean by Rail wheel interaction? What parameters are to be recorded during joint inspection of a derailment? Explain.

50. Write down brief notes on any four of the following.

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<tr>
<th>No.</th>
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<tr>
<td>1</td>
<td>Rolling IN Rolling OUT Examination</td>
<td>Amenity &amp; Safety fitting</td>
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<td>Worn Wheel Profile</td>
<td>Rail Wheel Interaction</td>
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<td>Primary &amp; Secondary Depot.</td>
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<td>Corrosion</td>
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<td>Biodegradable/Green Toilet</td>
<td>SPART</td>
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<td>7</td>
<td>Bogie Mounted Brake System</td>
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<td>8</td>
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**Water Rising Apparatus**

**Mechanized External Cleaning**

### Part ‘E’ Diesel Locomotive

1. What are the different factors are considered during making a lay out of 100 locos in the diesel shed. Describe Required different type of facilities Machinery & Plant with other facilities?

2. What is the importance of firing order in multi cylinder engine. Describe firing order of WDM2 locomotive?

3. As a Head Quarter officer CME send you to inspect diesel shed. What are main item you will inspect. Prepare a list of all these items?

4. In Indian Railways what development are in progress in the field of diesel locomotive. Describe all of them?

5. Describe the main characteristics of GT46 MAC, GM Loco. ?

6. You are Sr. DME (O & F); you have to inspect crew booking point. During inspection what main items will you inspect? Prepare a list of all these items. ?

7. What do you understand by train control system? What is present system today and what are its limitations. What is the future design of new train control system how it will work?

8. What is PME, when it is due. If a person fails in PME what will you do ?

9. What are the provision of duties and rest of running staff? Describe in detail?
10. What factors will you consider during making link of driver and how will you find out requirement of drivers?

11. Why transmission is necessary in diesel engine. What are the features of ideal transmission? Describe briefly about the transmission system used in diesel locomotive.

12. Describe fuel oil system of Diesel Locomotive with the help of diagram. Describe repair & testing procedure of different components of fuel oil system?

13. What are the factors that influence the performance of crank shaft main bearing. What procedure you will adopt to remove these defects during maintenance?

14. What do you understand about valve timing diagram? Explain valve timing diagram of 2 stroke and 4 stroke engine?

15. What are the factors that influence the performance of carbon brushes? What type problems occurred in it and what remedial action you will take to remove these problems?
18

21. Explain water cooling system of diesel locomotive with the help of diagram. Explain about electrical and mechanical failures in the system. What precautions you will take before starting of summer season?

22. Which type of water is used, In water cooling system of locomotive, what are the harmful effects of natural water while used in water system? How water treatment is done.

23. Explain principle of resistive braking system. What do you understand about braking control system? How it is achieved in Diesel Electric Locomotive.

24. What are the modification carried out in WDM2 locomotive. What are the maintenance schedule after these modifications. What are the advantages in switching over 07 days schedule to 10 days schedule?

25. What are the safety items fitted in WDM2 locomotive. Describe in detail

26. What is the importance of lubrication in diesel locomotive. Explain lube oil system with the help of diagram WDM2  Diesel locomotive

27. What do you know about SFC. What steps will you take to save fuel.

28. What is load box Testing? Explain the testing procedure in detail?

29. What is IRAB1 and 28 LAV-1 brake system. What are the differences between them, explain?

30. What is Super Charging? Explain with the help of diagram, How many types of turbo super chargers are used in locomotive? Explain working principle of turbo super charger.
What is preventive maintenance? Explain preventive maintenance of diesel locomotive in detail.

What are indices performance of a diesel shed? What measures are taken to improve this? Explain in detail about indices.

What is CO-CO and BO-BO boggies? Mention differences between them. Which bogie is better? Explain.

What is air drier? What are the advantages after fitting it? Describe about air drier with the help of diagram.

Which types of battery are used in locomotive? Explain charging and discharging of battery with the help of diagram.

What is transition? What transition is required in locomotive? Explain transition used in WDM3A locomotive.

What do you understand about dynamic braking. What are the changes during dynamic braking?

How many types of card are fitted in WDG3A excitation panel? Explain all in detail.

Why circuit breaker is used in locomotive. Write names & function of each used circuit breaker in WDM3A locomotive.

Describe briefly about working principle about GE governor?

Explain working principle about wood word governor in detail

Explain working principle of micro control based governor in detail.

How failure investigation of a component is done. What parameters are considered during failure investigation?
What maintenance is done during annual maintenance (M24) of WDM2 locomotive?

What factors are considered while preparing loco link and crew link. If goods and mail crew booking is operated from same crew booking office. How will you calculate the requirement of total nos. of crew?

What are the advantages of supercharging engine? Describe working principle of turbo charger in WDM2 with diagram

What is air cushioning? Why it is used. What is surging of turbo super charger and what are the reasons of surging?

Why spectrograph is required in diesel Shed. What is its working principle, what are factors affecting it? What is the process to collect sample for spectrograph. Analysis, How much wear metal concentration is recomended in ALCO Locomotive.

What are the main requirements to repair thrust and intermediate casing. What are the reasons of premature failure of turbocharger? How it can be eliminate?

Write down brief notes on any four of the following.

1. Traction generator
2. Fuel Pump Motor
3. Rediater Fan Contactor
4. Low water Switch
5. Safety auxiliary Relay
6. Over speed Trip Assembly
7. Importance of Over Lap period
8. Importance of SuperCharging
9. Importance of Transmission
10. Engine Block
11. Cylinder head repairing
12. Fuel Pump
13. MU2B valve
### Table of Components

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<td>C-2 Relay</td>
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<td>16</td>
<td>LAV-1 Brake System</td>
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<td>VCD</td>
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<td>18</td>
<td>HB-5 relay valve</td>
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<td>Traction Generator</td>
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<td>Fuel Pump Motor</td>
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A locomotive has following troubles; Write down the stepwise remedial action of any five.

1. **Engine is not picking the speed.**
   - *Remedial Action:* Check the speedometer and adjust if necessary.

2. **Battery is not charging.**
   - *Remedial Action:* Check the battery terminals and connections.

3. **Battery is over charged.**
   - *Remedial Action:* Reduce the charging rate or adapt a voltage-regulator.

4. **Locomotive is not starting.**
   - *Remedial Action:* Check the starting system and ensure it is functioning properly.

5. **Hauling power is poor.**
   - *Remedial Action:* Check the drive mechanism and adjust as needed.

6. **Locomotive is giving Jerk on first notch and load metre is showing excess current.**
   - *Remedial Action:* Check the load meter and adjust the settings.

7. **G F Contractor is not picking up.**
   - *Remedial Action:* Check the name plate and ensure the connection is secure.

8. **Fuel Pump rack is not opening immediately at the time of starting the engine.**
   - *Remedial Action:* Check the pump and ensure its opening mechanism is functioning correctly.

9. **Engine is hunting.**
   - *Remedial Action:* Check the governor and adjust as needed.

10. **Explosion door cover burst.**
    - *Remedial Action:* Check for any signs of damage and replace if necessary.

11. **Engine Booster pressure is reduce.**
    - *Remedial Action:* Check the booster system and adjust as needed.
18. yksM ehVj 'kw n'kkZ jgk gSA
    Load metre is showing Zero.
19. bZatu fcukfdl hi Wj pukdsca qst kkgA
    Engine is shut down without any indication.
20. i jk ikuhudy x; kga
    What is completely drained out?