

**NORTHERN RAILWAY**

No.-Dy. CME/HQ/Misc/2004

Dated:- 19/08/2004

**Sub:- Question bank of selection/LDCE's for promotion from group-  
'C' to group-'B'.**

Ref:- POM items no. 2 of CPO.

A set of model questions consisting of 47 pages for sections/LDCE's for promotion from group-'C' to group-'B' of Mechanical Department is sent herewith for perusal please.

**Dy CME/HQ.**

**Chief Personnel Officer/NR**

**SAMPLE QUESTIOS OF PAPER II OF LDC IN MECHANICAL ENGG**  
**DEPARTMENT**

Q-1. What do you understand by Bench marking? What steps are involved in this process? How would you conduct the bench marking of a coaching depot /Diesel shed. Discuss its advantages and limitations?

Q-2. Design a layout of Diesel shed homing 100 diesel locos OR a coaching depot for' 400 primary and 250 secondary coaches. Draw a rough sketch explain the various facilities provided in major coaching depot /Diesel shed.

Q-3. What are the important performance indices of mechanical department? Explain briefly the significance and method of compilation. List out the steps to be taken to achieve the target of these indices of Diesel shed/C&W/Workshop?

Q-4. Discuss the latest modification /Developments in the field of Diesel traction or Coaches and wagons to improve the reliability and safety.

Q-5. What do you understand by maintenance management? What are the various maintenance techniques? Describe in details their benefits and shortcomings. Explain the system of maintenance being followed in your unit. Give suggestions to make maintenance more effective.

Q-6. Enlist the weak areas of your unit? As an officer what steps will be taken at your level to remove the weakness of these areas? '

Q-7. What is corporate Safety plan. What are its main objectives? List down the main features of this plan of your department.

Q-8. What is an accident ? How are accidents classified according to accident manual ? What are various factors causing accidents. Explain the important defects of rolling stocks, which may cause accidents.

Q-9. What is the prevalent disaster management system in IR? What are its short comings calling for its public criticism .Give your suggestions to improve the system.

Q-10. What do you understand by Non Destructive Testing? Explain various techniques used for testing components in workshops/ sheds.

## DIESEL MAINTENANCE

Q-1. What purpose does the lube oil serve in a diesel engine? What are the various causes of failure of diesel loco on account of lube oil system? Make an action plan to prevent the failure of this system?

Q-2. What is water pressurization system? Discuss the various causes of failure of diesel loco on account of water-cooling system covering both electrical and mechanical items. What precautions will be taken during summer? Give your suggestion to improve the reliability of this system.

Q-3. what is load box test? Why it is required in diesel loco and how it is carried out? How many types of load boxes are there?

Q-4. what are the various problem associated with Traction motors? What attention would you pay in schedules?

Q-5. What is need of excitation system in diesel loco. Describe the E type of excitation control briefly with the help of block diagram?

Q-6. Describe the function generator circuit with necessary sketch?

Q-7. What do you mean by comer point suppression? Explain the utility of the same with necessary sketches.

Q-8. Why the transmission is necessary for a diesel engine what should be the duties of ideal transmission. Explain the working principal of electrical transmission.

Q-9. Explain the working of expresser in brief. What are common defects noticed in expresser unit. What remedial measures will you take to avoid such failures?

Q-10. What action would you take if loco has following problem to rectify the fault?

1. Power ground on every notch.
2. Load meter showing zero
3. MR air pressure not maintaining.
4. FOP not maintaining
- 5.' BAP not maintaining/Loco not hauling the load
6. Expresser needle valve not lifting.
7. Lube oil level increasing
8. OST assembly tripping repeatedly
9. Engine shutting down with low lube oil indication
10. Engine not responding to throttle
11. Throttle not responding to engine
12. GF not picking up
13. Transition not taking place.
14. Fuel dilution
15. Engine hunting

Q-11. Write short notes on

1. SFC and its control

2. Outage and its calculations
3. RTTM blower bearing failures
4. Orifice test
5. Failures of HP tubes
6. Water pressurization system
7. Surging
8. Monsoon precautions
9. Air Flow indicating device
10. AAR CLASSIFICATIONS
11. Relations between Tractive efforts, pull and power
12. Fuel efficient kit
13. Hydraulic transmission
14. ACCR
15. VCR
16. Difference between water and grid load box
17. Difference between CARD NO 188 and card no 253 18.PWM
19. Dribbling
20. Automatic switching ON of flasher light.

Q-12. Explain with the systematic diagram the fuel oil system of diesel loco Discuss the various causes of failures that may arise from this system. Explain the steps to be taken to prevent the failures of this system.

Q-13. What is super charging? Explain the working principle of TSC with a simple line diagram labelling all the key parts What is air cushion and why it is provided? What are the causes of surging.

Q-14. Explain import maintenance requirements of thrust bearing and intermediate casing What are the causes of premature failure of TSC and how can be it prevented? What are the causes of TSC failures to build the required booster pressure?

Q-15. a- What is the role of safety device? What does happen if lube oil pressure of diesel engine falls below the preset value?

Q-15. b- Which device senses the cooling water level Explain its working what does it do in such occurrence?

Q-15. c- How do wheel, slip relay senses the traction motor faults what happens in this situations?

Q-15. d-How does the over speed safety device shuts down the engine in WDP3A Loco

Q-16. Explain the significance of failure investigation. What is the procedure of failure investigation. How can we get best results from the failure investigation?

Q-17. What are the common causes loco failure on crew account? Make an action plan to minimize the cases of loco failures on crew account?

Q 18: A spate of failures have taken place in Northern railway on account of crankshaft and main bearing. What are the factors affecting the performance of the crankshaft/main bearing and what are the various maintenance aspects to be followed to avoid these failures?

Q 19: What are the various factors affecting the performance of air and exhaust valves? Explain in detail. What are the important maintenance practices for valve, valve guides and valve seat inserts.

## **DIESEL (POWER)**

Q-1. What is track train dynamics? How safety can be achieved through it?

Q-2 (a). What is zero based review? How crew requirement is calculated in this review?

Q-2(b). What is the procedure of starting the PASS/Goods train from Non TXR station?

Q-3(a). What is TFC? How trains are run on D/L and S/L during TFC?

Q-3(b) On double line section one line is blocked due to accident? Explain the procedure for running of trains from the other line.

Q-4. What are the main reasons for train parting? What action is taken in case of train parting by the driver, guard, &ASM?

Q-5. Recently a committee has been formed to review the General Rules. What are your suggestions to the committee to make GR more useful?

Q-6. Fatigue among the drivers is the major cause of the accidents? What are the important recommendations of RRC to ensure that drivers take proper rest in running room to avoid the fatigues?

Q-7. What is Foggy Weather? How trains are run in this weather? Explain the precautions to be taken to ensure safe working of the trains?

Q-8. What do you understand by System of working? How many types of systems are there in IR. Explain Automatic block system and how it takes an edge over Absolute block working system?

Q-9. How the Quality of drivers is graded? What are the salient features and shortcomings of the existing grading system? Give your suggestion to remove the shortcomings of the existing system.

Q-10. Write short notes on

1. Power balancing
2. Crew balancing
3. Link disturbance and its implications on System
4. ST & NST failures
5. LEARNING road
6. PME
7. Rest provisions for running staff
8. Axle blocking
9. Crew lobby inspection
10. Simulator and its contributions to improve the performance of CREW
11. Difference between ART &ARME
12. Duties of driver during derailment on main line

Q-11. How are the ART classified. Keeping in view of latest advancements what up gradations would you suggest in order to ensure prompt relief and restorations work.

QN-12. What it is load factor? In Indian conditions what load factor is permitted? Explain the method of calculating of load factors for diesel locos

QN-13. As a first officer to reach on accident site, briefly list out your duties at site. What measures would you jointly take with official to the other department to establish the cause of accidents?

## CARRIAGE & WAGON

Q-1. Water availability in coaches is one of the essential requirements for traveling public. Water shortage in train had led to numerous public complaints. What are the various reasons for water shortage in trains? What are the major recommendations of watering committee for ensuring water availability? What step would be taken during maintenance to ensure water availability?

Q-2(a). What do you understand from Passenger Amenities in coach? What are standard Passenger Amenities provided in AC coaches? What steps do you suggest to improve the Passenger Amenities?

Q-2(b). List down the salient features of JHB coaches.

Q-3. What are the common sources of fire on train? What modifications have been carried out by Railway in the coaches in last few years to avoid fire hazards? What else do you suggest for preventing propagation of fire?

Q-4- What is brake binding in coaches? What are its implications on Railway system? What steps would you take to avoid such cases?

Q-5. As an officer you are asked to inspect the coaching depot. List down the items to be covered during check.

Q-6. What is bogie mounted AIR brake system? How it is better than the conventional air brake system? List the salient features of bogie mounted AIR brake system. Discuss the problem associated with the bogie mounted AIR brake system. what the steps to be taken to reduce the cases.

Q-7. What are the salient features of BLC wagons. Discuss the advantages, limitations and problems of these wagons.

Q-8. What are the causes of and what remedial measures would be taken for following problems?

1. Leakage rate of rake is much higher than the permitted valve of 0.2 kg/cm<sup>2</sup>/min in BP line.
2. No hissing sound from PEA V specially on pulling the pressure rod of PEAS ED and does not show any brake pressure reduction effect.
3. Brake piston movement is not smooth.
4. Brake Cylinder air draining time is too long
5. Alarm chain system is not working even after chain pulling
6. Air is escaping from front cover joints during application of air pressure.

Q-9. Write short notes on

1. STR
2. PRO plates
3. RPC maintenance
4. Composition of brake blocks & difference between K & L type brake blocks
5. Causes and remedial measures of poor brake power.

6. Salient features of Anti Telescopic coach.
7. Common defects of slack adjuster
8. Coach detachments
9. Single car test
10. System of numbering of BG coaches on IR
11. Distributor valve
12. Primary and secondary maintenance
13. Suspensions and its type
14. Difference between Primary and secondary detachment

Q-10. Describe briefly about Rolling out, Rolling in and Intensive examinations.

Q-12. Draw systematic diagram of Twin brake system a Coaches? What are the various factors responsible for air brake failures in the coaching stock/Explain in details the reasons of failure associated with various air brake assemblies What actions would you take at avoid these failures

Q-13. What are various types of coaches used by Indian Railways? Discuss briefly about the structural details of ICF coach body. What are the salient features of ICF coach design? Explain briefly.

Q-14. How is coaching stock classified on Indian Railways? What are various transportation codes for different applications of coaching stock?

Q-15. What do you understand by a bogie? What are its important requirements? What is the purpose of a bogie? What are important design aspects of a bogie?

Q-16. What are different arrangements for draft and buffer gears on a coach? Describe briefly the design features of screw coupling. What are the limitations of screw coupling?

Q-17. Write a brief note about the design development of freight stock in India. How is freight stock classified? What is the system of designation of wagons?

Q-18. What inputs are required from mechanical side for running trains at a maximum speed of 120 kmph?

Q-19. Why was a need felt to change the existing pattern of coach maintenance? What are the main features of revised maintenance pattern for coaching trains as per Railway Board policy circular No.4 of Oct'2001? What are the approved mandatory conditions to be fulfilled prior to introduction of round trip primary pattern of maintenance on coaching trains?

Q-20. Why is maintenance of stock necessary? What are various systems of Maintenance? Which system is prevalent in Indian Railways? Explain briefly the preventive maintenance system being used in Railways for coac:.4.illg.and freight stock.

Q-21. What types of suspension systems are used in Indian Railways? Explain the factors to be considered in the design of suspension system.

## WORKSHOP

Q-1. What are the important performance factors for the bearings? What are the various causes for bearing damage? What are the causes for bearing damage? What counter measures would you take to reduce the failures?

Q-2. What is planing machine and its working principle? Differentiate between Shaper and Planer?

Q-3. What locations are more prone to corrossions in ICF integral coaches, box wagons and tank wagons? What measures would you take to counter the corrosion in coaches?

Q-4. What do you understand by On cost? How would you classify on cost for better analysis? Explain briefly

Q-5. Write short notes on

1. Route card & job card
2. Salient features of CL W pattern of incentive schemes
3. Filler materials and flux
4. TIG & MIG welding
5. Classifications of electrodes
6. Submerged welding
7. MACHINABILITY
8. Cutting speed and feed
9. Capstan and turret lathes
10. Pit planer
11. Draw cut shaper
12. Universal milling machine
13. CNC machines
14. Resistance welding
15. Tumbling
16. Buffing
17. Honing
18. Lapping
19. Super finishing
20. Taper turning
21. Difference between route card and job card

Q-6. What maintenance practice do you suggest for helical spring s used in suspension of coaching stock to avoid its failures between POH to POH ..

Q-7. When was incentive bonus scheme introduced in IR workshop show is incentive bonus is calculated in workshops? What are shortcomings and main causes for malfunctioning of the CL W incentive scheme? What factors should be considered while introducing the incentive scheme in workshop?

Q-8. What do you understand by the weld joint? What are basic types of weld joints? Explain briefly

Q-9(b). Compare the advantages and disadvantages between gas welding and Arc Welding.

Q-10. What are the common welding defects. What corrective actions are taken to avoid these defects?

Q-11. How will you maintain axels journals and roller bearings in the workshops. Explain briefly along with condemnations limits for each assemblies? What are various rejectable defects in above areas?

Q-12. Why was the Group Incentive Scheme introduced at some of the production units? What are its salient features and shortcomings?

Q-13. How is ultrasonic testing of Railway axles done? Describe briefly.

Q-14. What do you understand by the terms Limit, Fit, Tolerance, Accuracy, Allowance, Precision and Clearance? Explain different types of fits?

Q-15. Define surface finishing and describe briefly various surface finishing operations.

## RAILWAY ESTABLISHMENT

Q: What are the major and minor penalties under D&AR? Describe briefly the main differences in dealing with cases under major & minor penalties.

Q: An employee injured at your workplace because of electric shock, you are officer incharge, explain what action will you take covering all aspects required by Law and Industrial Relation.

Q: Differentiate between: PNM/PREM, Dismissal/Removal, Selection/Non selection posts.

Q: What is PLB and what are its provisions concerning Rly. Employee

Q: What is your entitlement of LAP, LHAP, CL in a year and what are the limitations if any for crediting, accumulating and availing the same.

Q : What is meant by commuted leave and encashment of leave and how these benefit you.

Q: What are the powers of :-Assistant Officer, Sr subordinate in scale 7450-11500 and 6500-10500 under D&A rules.

Q: Describe the salient features of imposing the punishment of removal from service under D&AR as per a) Normal procedure b) while applying 14(ii)

Q: What are retirement benefits monetary and otherwise, how does Vth pay commission report affect these benefits?

Q: How is PLB calculated: Draw a diagram, what is the effect of this payment on Rly Productivity?

Q: What are the various tiers of PNM? What are its weakness and strength? Discuss reforms of PNM.

Q: How is money received in Central Staff Benefit fund? How is the money distributed? Give examples.

Q: Describe the procedure of Appeals & Review under DAR, How is Suspension regulated after DAR has been completed.

Q: Describe the detail of the settlement benefits available to the family of a Rly employee in the event of

- i) Death during service.
- ii) Gets retire on superannuating after 30 years service
- iii) Gets volunteer retire after 30 years of service
- iv) Also explain the scheme of CG appointment.

Q: Write short notes on the following:

- i) Workmen compensation act

- ii) CG appointment
- iii) Settlement benefits
- iv) HOER
- v) Bench Marking
- vi) Payment of wages act
- vii) Factory Act - when applicable & various obligations to be fulfilled by management
- viii) DAR
- ix) Role of WLI
- x) PNM
- xi). Leave entitlement of Rly employee
- xii) Disciplinary Authority
- xiii) Family Pension
- xiv) GIS
- xv) NBR
- xvi) Inter se seniority
- xvii) Canons of financial propriety xviii) Half Monthly wages
- xix) August review
- xx) PLB
- xxi) PME
- xxii) Stock verification xxiii) Audit Inspection
- xxiv) Time frame of various stages for holding enquiry for major penalty charge sheet
- xxv) Commutation of leave
- xxvi) %age increase in various grades of restructuring of cadre introduced in Rly in 2003
- xxvii) Protective clothing
- xxviii) Hurt on Duty
- xxix) Assumed attendance
- xxx) Subsistence allowance
- xxxii) Break down allowance
- xxxii) Proforma fixation

Q: Objective Type questions:

- i) Circumstances under which a Rly employee can be put under suspension
- ii) If a person admits his guilt is it still necessary to issue a charge sheet before imposing a penalty?
- iii) In SF-5 if a person accepts the charges unconditionally is it still necessary to hold an enquiry?
- iv) Define factory under factory act.
- v) Is Charbagh shop a factory?
- vi) Is SRE loco shed a factory ?
- vii) Under the workmen compensation act what are the circumstances under which the employer is not liable to pay compensation in the case of a) total disablement; b) death.
- viii) What is full form of DCRG & SRPF.
- ix) How is DCRG calculated & what is the maximum limit.
- x) Present rate of interest under your PF scheme.
- xi) What pay is taken into account while calculating pension, DCRG, leave encashment.

- Q: i) Under factory act a factory having more than 1000 employees should pay wages ..... days in wage period (3,5,7,10 days.)
- ii) Who does coordination of M&P programme of N.Rly (F A&CAO (B&E) CRSE (F), CME/plg ,CAO(construction).
- iii) Cost of wheel lathe purchased on additional/misc account is booked in - (DRF, WMS capital, revenue.)
- iv) Who will sign the PAC of a new stock item cost Rs 75000 - Sr. Scale officer, (JAG, HOD, PHOD.)

- Q: a) What is minimum period that must elapse in case of successive promotion of supervisor & artisan staff? Can this requirement be relaxed?
- b) What are selection & non selection grades in Supervisor grade?
- c) Enlist the recruitment grades in Mech. Engg. Deptt.
- d) What is current %age distribution specified in Artisan category

## RAILWAY FINANCE

Q: Write Short notes on the following:

- I) Man Power Planning
- II) M&P programme
- III) August Review
- IV) Development Fund
- V) Sources of funds for IR
- VI) Direct & Overhead costs
- VII) Canons of Finance propriety
- VIII) Urgency certificate
- IX) Plan Head
- X) Convention Committee
- XI) Capital And Revenue expenditure
- XII) Zero based budget

Q: How is budgeting process is carried out in IR, explain the various stages with specific illustration from your field duty.

Q How is a cost budget prepared in RIy workshop and how is it administrated? Indicate how the under and over charges adjusted.

Q: How is it ensured by Parliament that expenditure incurred by GOI on IR is need based and well within the limit of budget. What role is played by Parliamentary committees in this respect?

Q: How does Parliament exercise control over Rly Budget?

Q: What are the indices of financial efficiency over IR?

## RAILWAY STORES

Q How would you ensure that repairs and maintenance expenditure conforms to the changing types of rolling stock?

Q: How are the material procured by Stores Department on railways? What is the role of various purchase agencies?

Q: Define Inventory, explain various technique of Inventory control? In what way financial benefits can occur through efficient inventory control

OR

Q: Why inventory control has assumed great importance in modern materials management on an organization?

Q: How is stock verification carried out in railways? What is the periodicity of stock verification?

Q: What are different methods of recoument and describe the method of disposal of scraps?

Q: Write Short notes on the following:

- I) Difference between stock and non stock items
- II) Difference between Maxima And Minima
- III) Difference between ordering cost and Inventory carrying cost
- IV) PAC tender
- V) Imprest store
- VI) Rate contract, Running contract And Service contract
- VII) Stock out cost
- VIII) Inventory turn over ratio
- IX) Emergency stores
- X) Surplus stores
- XI) EOQ
- XII) Earnest Money
- XIII) Security deposit
- XIV) Force mejeure
- XV) Risk purchase
- XVI) Variety reduction
- XVII) Movable surplus
- XVIII) Value analysis
- XIX) Standardisation
- XX) Over stocks