

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

RBE No.: 88 /2012

No.E(GP)2008/2/6

New Delhi, dt: 09 .08.2012

The General Managers,
All Indian Railways and Production Units.

Sub.: Syllabus for professional papers for 30% LDCE for promotion to Group 'B' post of AEN in Civil Engineering Department of Railways/Production Units.

Ref.: Railway Board's letter No. E(GP)79/2/30/1 dated 19.09.1979

A revised syllabus for professional papers for Limited Departmental Competitive Examination (LDCE) for promotion from Group 'C' to Group 'B' posts in Civil Engineering Department of Railways/Production Units is enclosed for guidance. This may be given wide publicity and circulated amongst the eligible candidates.

2. The revised syllabus will be effective from the date of issue of this letter. However, LDCEs for which written examinations have already been held or which are at an advanced stage, need not be disturbed.

3. Please acknowledge receipt.

Encl: As above


(SUMAN SHARMA)
DIRECTOR, ESTT. (GP)
RAILWAY BOARD

No.E(GP)2008/2/6

New Delhi, dt: 09.08.2012

Copy for information and necessary action to

- (1) The Director General, R.D.S.O., Lucknow.
- (2) The CAO, DCW, Patiala
- (3) The CAO, MTP (Rlys.), Mumbai and Chennai
- (4) The Chairman, Railway Recruitment Board:
Allahabad/Ahmedabad/Ajmer/Bangalore/Bhopal/Bhubaneshwar/Kolkata/
Chandigarh/Chennai/Gorakhpur/Guwahati/Jammu&Srinagar/Malda/
Mumbai/Muzaffarpur/Patna/Ranchi/Secunderabad/Trivendrum.
- (5) The Director General, Railway Staff College, Vadodara.
- (6) The Director IRISSET, Secunderabad/IRIMEE.
Jamalpur/IRIEE, Nasik,/IRICEN, Pune/IRCAMTECH, Gwalior.
- (7) The Railway Liaison Officer, Jeevan Tara Building, Parliament Street, New Delhi.
- (8) The General Secretary, IRCA, New Delhi.
- (9) The C.A.O, COFMOW, Rly. Offices Complex, Tilak Bridge, New Delhi-110002.
- (10) The Secretary, Railway Rates Tribunal (Chennai), 50 MC.Nichola Road, Chetput, Chennai.
- (11) The Exec.Director, CRIS, Safdarjung Rly.Stn.Building, Chanakyapuri, New Delhi.
- (12) The Director (Movement), Railways 17 N.S.Road, Calcutta.
- (13) The Joint Director (Iron & Steel) 3 Koilaghat Street, Calcutta.


(SUMAN SHARMA)
DIRECTOR, ESTT.(GP)
RAILWAY BOARD

No.E(GP)2008/2/6

New Delhi, dt: 09.08.2012

Copy forwarded to:

1. The General Secretary, All Indian Railwaymen Federation, Room No. 253, Rail Bhavan, New Delhi (35 copies)
2. The General Secretary, National, Federation of Indian Railwaymen, Room No. 256-E, Rail Bhavan, New Delhi (35 copies)
3. All Members, Departmental Council and National Council and Secretary, Staff Side, National Council, 13-C, Ferozshah Road, New Delhi (90 spares)
4. The Secretary General, Federation of Railway Officers Association, Room No. 256-A, Rail Bhavan, New Delhi (5 spares)
5. The Secretary General, Indian Railway Promotee Officers Association, Room No. 268, Rail Bhavan, New Delhi (35 spares)
6. The General Secretary, All India RPF Association, Room No. 549, Rail Bhavan, New Delhi-110001.
7. Railway Board Secretariat Staff Association.


For Secretary/Railway Board

Copy to:

PSs to MR, MSR (N), MSR (V)

Sr.PPSs to CRB, FC, MS, MM, MT, ML, ME

PPSs to Secretary, DG/RHS, DG/RPF

PPSs to all Addl. Members.

Dy. C&AG(Railways), Room No. 222, Rail Bhawan.

PSs to AM(Staff), Adv.(Vig.), , EDE, EDA, EDE(N), EDE(Res), JS, JS(E), JS(G), ED(E&R), EDE(GC), EDV(E), ED(Signal), EDV(S), EDF(E), ED(T&MPP), EDE(RRB), EDPC-I, DV(P), DE(L), DE(Res), DE(G), D(IH), JD(MPP), JDE(R)I&II, JDE(Rep)I&II, JDE(D&A), JDE(P&A), DPCI&II, JDE(L), JDE(N), JDE(N)II, JDE(N)III, DDF(E)I, DDF(E)VI, DDV(A&P), E(NG)I, E(O)III, DDRS(G), DDE(LR)I, Sec(E), PC-III, IV & V, E&R, E(Trg.), E(MPP), V(SS), E(SCT)I&II.

भारत सरकार
रेल मंत्रालय (रेलवे बोर्ड)

आरबीई सं: ४४ /2012

सं.ई (जीपी) 2008/2/6

नई दिल्ली, ०९.08.2012

महाप्रबंधक,

सभी भारतीय रेलों और उत्पादन इकाइयां

विषय: रेलों/उत्पादन इकाइयों के सिविल इंजीनियरिंग विभाग में एईएन के ग्रुप 'बी' पद पर पदोन्नति के लिए 30% सीमित विभागीय प्रतियोगी परीक्षा (एलडीसीई) के लिए प्रोफेशनल प्रश्न पत्रों के लिए पाठ्यक्रम।

संदर्भ: रेलवे बोर्ड का दिनांक 19.09.1979 का पत्र सं.ई (जीपी) 79/2/30/1

रेलों/उत्पादन इकाइयों के सिविल इंजीनियरी विभाग में ग्रुप 'सी' से ग्रुप 'बी' पदों पर पदोन्नति के लिए सीमित विभागीय प्रतियोगी परीक्षा (एलडीसीई) के लिए प्रोफेशनल प्रश्न पत्रों हेतु संशोधित विषय-सामग्री मार्गदर्शन के लिए संलग्न है। इसका व्यापक प्रचार किया जाए और इसे पात्र उम्मीदवारों में परिपत्रित किया जाए।

2. संशोधित पाठ्यक्रम इस पत्र के जारी होने की तारीख से प्रभावी होगा। बहरहाल, सीमित विभागीय प्रतियोगी परीक्षाओं, जिनके लिए पहले ही लिखित परीक्षाएं आयोजित हो चुकी हैं अथवा अंतिम चरण पर हैं, में कोई परिवर्तन करने की आवश्यकता नहीं है।

3. कृपया पावती दें।

संलग्नक: यथोक्त

सुमन शर्मा

(सुमन शर्मा)

निदेशक, स्थापना (जीपी)

रेलवे बोर्ड

Notes for Guidance of Paper Setter for Professional Subject.

(Not to form part of published syllabus).

- (1) Syllabus for Part –II of Paper I - Civil Engineering (General) has been framed to test the knowledge of theory of the candidate.
- (2) Syllabus for Part –II of Paper-II - Civil Engineering (Railways) has been framed to test the knowledge of the candidate on day-to-day practical aspects of Railway working and is based generally on Indian Railways Way & Works Manual and Engineering Code.
- (3) It is recommended for the guidance of the Question Paper Setter that:-
 - (a) Both the papers I and II in respect of Civil Engineering will carry 100 marks each and each paper will consist of two parts of 50 marks each.
 - (b) The first part of each paper having 50 marks will be compulsory and will consist of 3 questions having equal marks with the object of testing the precise knowledge of the candidate.
 - (c) The second part of the paper having 50 marks will consist of 6 questions, with option to answer any 3 questions; each question carrying equal marks. Out of these six questions, 2 questions each will be on Way, Works and Bridges.

प्रोफेशनल विषय के लिए पेपर सेंटर के मार्गदर्शन के लिए नोट

(प्रकाशित पाठ्यक्रम के भाग के रूप में नहीं)

(1) सिविल इंजीनियरिंग (सामान्य) के प्रश्नपत्र-I के भाग-II का पाठ्यक्रम उम्मीदवार के सैद्धांतिक ज्ञान परीक्षण के लिए तैयार किया गया है।

(2) सिविल इंजीनियरिंग (रेलवे) के प्रश्नपत्र-II के भाग-II का पाठ्यक्रम उम्मीदवार के रेलों की कार्यप्रणाली के दिन-प्रतिदिन के प्रैक्टिकल पहलुओं के ज्ञान परीक्षण के लिए तैयार किया गया है और यह साधारणतया भारतीय रेलों के रेलपथ एवं निर्माण नियमावली तथा इंजीनियरी संहिता पर आधारित है।

(3) प्रश्नपत्र सैट करने वाले के मार्गदर्शन के लिए सिफारिश की जाती है कि:-

(क) सिविल इंजीनियरिंग के संदर्भ में दोनों प्रश्नपत्र I और II 100-100 अंक के होंगे और प्रत्येक प्रश्नपत्र में 50-50 अंक के दो भाग होंगे।

(ख) 50 अंक वाले प्रत्येक प्रश्नपत्र का प्रथम भाग अनिवार्य होगा और इसमें उम्मीदवार के सुस्पष्ट ज्ञान की जांच करने के लिए समान अंकों वाले 3 प्रश्न होंगे।

(ग) 50 अंक वाले प्रश्नपत्र के दूसरे भाग में 6 प्रश्न होंगे जिसमें किसी भी 3 प्रश्नों का उत्तर देने का विकल्प होगा; प्रत्येक प्रश्न के लिए समान अंक होंगे। इन छः प्रश्नों में से प्रत्येक में दो-दो प्रश्न रेलपथ, निर्माण और पुल से संबंधित होंगे।

Syllabus for professional papers(Revised) for 30% LDCE for Promotion to Gr. B post of AEN in Civil Engineering Department

Paper-1

Maximum Marks: 150	Qualifying Marks:90
General	Part-I
I. General Knowledge	50 Marks
II. Official language.	
	<u>Part-II</u>
Professional Subject	100 Marks

Civil Engineering (General)

1. Surveying.

(a) Types.

i) Chain and Compass survey —

Basic principles; base lines; check lines; tick lines; perpendicular and oblique offsets; conventional signs; plotting of survey; true and magnetic bearings; open and closed traverses; recording plotting of traverse, closing errors.

ii) Plane Table Survey-

Techniques of using Distomat and total stations. Method of setting layouts & curves using these equipments.

iii) Levelling-

Level Lines – datum, bench marks, simple levelling, fly levelling; recording the levels in field book; method of reducing levels; arithmetical check; longitudinal and cross-section contouring.

iv) **Theodolite Survey-**

Types of theodolites; measurement of horizontal angles, vertical angles, magnetic bearings and deflection angles; prolonging a straight line; traversing by method of included angles; balancing the survey- closing errors; calculations of latitude and departure; use of theodolite as a tachometer.

v) **Curves-**

Elements of simple circular curves; setting out simple circular curves; different methods.

vi) **Set out works-**

Setting out buildings, culverts, Central line of Railway alignment. Usage of GPS technology in setting out Centre line of Railway alignments.

(b) **Care & Custody of Survey Instruments-**

Handling of instruments- Transport and protection; permanent adjustments; repairs and periodical overhaul.

2. **Strength of Materials, Structural Designs & Drawings**

(a) **Strength of Materials-**

Stress, strain, Hooke's Law, working stress, factor of safety; bending moment and shear force in simply supported beams and cantilevers; simple theory of bending; moving loads on simply supported beams; influence lines for bending moment and shear force in statically determinate beams; short columns, long columns- empirical formulae.

(b) **Structural Design & Drawings**

i) **Steel Structures-**

Riveted and welded joints; tension and compression members; plate girders; connections; IRS Code of Practice for Steel Structures; Sketching of connection details.

ii) **RCC Structures-**

Slab- Single and 2-way reinforced; beams-rectangular, T and Doubly reinforced; Bending shear reinforcement; design of columns, footings, IRS Code of Practice for RCC structures; sketching of RCC details of simple structures. Use of computer aided softwares such as STAD, FEM etc. Basic requirements for usage of these computerized softwares.

3. **Construction materials**

Description, specification, properties and uses of building materials – Stones, sand, timber, bricks, cement, lime, building hardware, paints, varnishes, glasses, tiles.

4. **Foundation and constructions engineering**

(a) **Soil Mechanics-**

Elements of Soil Mechanics- Physical properties of soils, compaction, field methods of compaction; stabilization of soils; safe-bearing capacity of soils,; determination of safe-bearing capacity; earth pressure; plate loading test, specifications and construction of earthwork in embankments & cuttings.

(b) **Foundation Engineering-**

Functions of foundations; different types of foundations; settlement of foundations; methods of reducing differential settlements; pile foundations; well foundations for bridges.

(c) **Buildings-**

Brick and stone masonry; construction details–roofs, floors, staircases, joinery, scaffolding.

(d) **Reinforced & Prestressed Concrete**

Bending and placing of reinforcement; fine and coarse aggregates; concrete mixing, laying and compaction; finishing of RCC surfaces; formwork, curing, testing.

(e) **Steel Structures-**

Standard rolled sections; fabrication- templating, straightening, drilling, riveting, bolting and welding; matchmarking; trial erections, testing, site erections- equipment, methods.

(f) **Construction Machinery & Equipment-**

Drilling and blasting equipment for quarrying, tunnelling and excavation in rock, pile hammers and pile-driving equipment; pumps, concrete mixers, vibrators, grouting equipment, air compressors, pneumatic tools and different types of cranes.

(g) Types of cracks in buildings. Causes and prevention techniques for avoiding cracks in the buildings.

5. **Hydraulics & Hydrology**

(a) **Hydraulics-**

Elements of hydraulics- Open Channel flow; flow in pipes, frictional loss, empirical formulae.

(b) **Hydrology-**

Rainfall and run-off; rainfall statistics; rain gauges, run-off calculations by empirical methods, flood discharge estimation; measurement of flood discharge-current meter.

(c) **Hydraulic Structures-**

Design of bridges- alignment, number of spans; economic spans; waterway calculations; scour depth afflux; clearance; depth of foundations; BOX and Pipe Culverts, river training works-spurs, groynes, aprons, levees.

6. **Public Health Engineering .**

a) **Water Supply-**

i) Quality of water- physical, chemical and bacteriological standards of water; water-borne diseases; water demand- methods of forecasting; sources of water; treatment of water- aeration, sedimentation, filtration(slow and rapid sand filters); disinfection, hardness- methods of removal.

ii) **Conveyance and Distribution:-**

Pumping equipment; rising mains; systems of distribution, residual pressures; different types of pipes and fittings; testing of pipes.

(iii) Planning & design of layouts for rain water drains. Principles of rain water harvesting, methods, estimation of capacity of rain water harvesting pits/salient etc.

(b) **Sewerage:**

Sewage; waste water-collection and carriage; design and sewers; house connections; stormwater drains; disposal of sewage- river pollution and control; sewage treatment; land irrigation, septic tanks, primary clarifiers, sludge and

scum removal, trickling filters, activated sludge process, sludge digesting, principles of anaerobic digestion, sludge gas, sludge drying and disposal.

Paper- II

Maximum Marks:150	Qualifying Marks 90
<u>Part-I</u>	
Establishment & Financial Rules	50 Marks
<u>Part-II</u>	
Professional Subject	100 Marks

Civil Engineering (Railways)

1. **Railway Surveys & Construction:-**

Classification of surveys; principles governing location; ruling gradients; compensation for curves; vertical curves; hill surveys; catch sidings; tunnels; preparation of drawings; design of large bridges; progress reports on surveys; project estimates; standards of construction; junction arrangements; project report; preliminary arrangement for construction of new lines; letting out contracts; programme work; critical path networks; execution of work and measurements progress reports; completion works.

2. **Railway Track:-**

Description, specifications and functions of the structure elements; Rails, sleepers, fastening ballast, formation and other sub-structures; points and crossings; geometry and design features Track lay-outs.

3. **Maintenance of Permanent Way:-**

a) **Duties:-**

Duties of Assistant Engineers; duties of Permanent Way Inspectors; duties of Works Inspectors; duties of Bridge Inspectors; duties of Mates, Keymen and Gangmen.

b) Maintenance of Permanent way:-

Methods of maintenance; Beater packing, Measured Shovel packing, Machine packing, Systems of maintenance; overhauling systematic through packing, picking up slacks, Directed Track Maintenance; Miscellaneous works; lifting and lowering of track, screening of ballast; Maintenance of drains, lubrication of rail joints; adjustment of creep, maintenance of level crossings, Maintenance of points and crossings;

c) Special Maintenance Works:

Maintenance of short welded rails, long welded and continuous welded rails; maintenance in electrified section; special precautions; maintenance of track circuited sections; special precautions.

d) Maintenance of curved track and realignment of curves: Curvature, transitions, super elevation of curves, safe speeds, cant deficiency, speed on curves with turnouts, Realignments of curves: method.

e) Testing of track with track recording car, frequency based on category, OMS frequency and category, interpretation of track recording charts; analysis of the charts to improve track parameters. The allowable limits of parameters category-wise, attention to track defects etc.

f) Heavy axle traffic and different types, precautions and checks to ensure safety of track and bridges.

g) Maintenance and working of various track machines.

h) Formation treatment works for Railway embankments- various methods, advantages and disadvantages of the methods.

4. Maintenance of Bridges:

Inspection of bridges:

Records of inspection; details of bridge inspections; works connected with maintenance of bridges; laying of bridge sleepers; replacing cracked bed blocks; painting of steelwork.

5. Inspection and Maintenance of Tunnels:

Inspection of Tunnels: Records of inspection; equipment for inspection; details of tunnel inspection; works connected with maintenance of tunnels.

6. **Inspection and maintenance of turntables and weigh-bridge pits:**

Condition for satisfactory working of turntables; adjustments and overhauling of turntables; inspection and maintenance; erection and dismantling of turntables; weighbridge pits and approaches – responsibility of engineering staff; drainage of weighbridge pits; construction of new weighbridges.

- a) **Inspection and maintenance of weigh bridge pits:-** Inspection and maintenance of weigh bridge pits, drainage on weigh bridge pits and construction of new weigh bridges etc.
- b) **Track Management System:-** salient features, pre-requisites for introducing TMS in division, advantage of TMS etc.
- c) **Mobility Index:-** Concept, principles, methods of evaluation etc.

7. **Inspection & maintenance of buildings and structures other than bridges:**

General instructions; additions and alterations to quarters; transfer of buildings; buildings registers; scale of accommodation and other facilities; vacant railway buildings; maintenance of buildings, inspection and repairs; petty repair books; periodical inspections; details of inspections; Maintenance aspects of cracked buildings and repairs to the existing cracks.

8. **Maintenance of sanitary and hygienic conditions in station yards and railway colonies; water supply, drainage and sewerage:**

a) **Sanitation:**

Formation of sanitation committees; inspection by sanitation committee; sanitary arrangements in stations and colonies drinking water wells - protection; Cleaning of wells; disinfection; prevention of infectious diseases; disinfection of quarters.

b) **Water Supply:**

Source of water supply; water sample analysis; open wells - sizes; pumping capacity, improving yield; shallow tube wells; deep tube wells; impounding reservoirs; storage capacity; flood discharge; record of water levels in wells; rainfall registers; high level storage tanks; precaution against pollution; pumps - types, selection, installation ; aqueducts and pipelines–types, selection, laying; estimating requirements of water; layout of distribution systems; water supply from outside sources; maintenance and operation of water supply installation – responsibilities of Engineering department and Mechanical department.

c) **Drainage and Sewerage:**

Drainage systems, waterborne sewerage; sizes of sewers; sewage treatment systems; sewage disposals; sewage purification systems; surface drainage - layout, size of drains; disposal of sullage effluent; drainage of latrines; maintenance of sewerage and drainage systems; maintenance of open sullage drains; storm water drains; house connections; conservancy and sanitary arrangements; responsibilities of engineering staff.

9. **Acquisition, management and disposal of land:**

General Code rules:

Ownership of railway land; sanctioning authority for acquisition and relinquishment; principles for acquisition and relinquishment; procedure for acquisition and relinquishment plans and schedules; taking over and handing over demarcation of boundaries; land records- demarcation and verification of railway boundaries, maintenance of rights of way; religious structures; management of railway land – leasing of licensing lease or licence of land; merchants and vendors at stations, bulk oil installations, natural products and grazing ; construction of buildings near railway land; sale of natural products; felling of trees – within railway land; outside railway land; felling of trees near electric or telegraph wires;

10. **Large Scale Permanent Way renewals:**

Classification of routes and tracks; track renewal programmes, factors governing permanent way renewal; preparation for relaying; preliminary work; systematic operation for complete relaying; speed restrictions to be observed during relaying; post relaying work; classification and disposal of released materials.

11. **Rehabilitation of Bridges:**

Precautions when working on bridges; rebuilding or alterations to bridges – design and execution of bridge works; temporary arrangements ; false work for erection of girders; assembly and erection of girders; cranes for erection of girders; testing of girders; proposals for strengthening existing girder spans; methods of regirdering major bridges;

12. **Works affecting railway safety and opening new works:**

General - Reference to rules; works requiring sanction of the ACRS and notice thereof ; application to the ACRS - execution of works and Safety Certificates; documents to accompany application; submission of Safety Certificate; deviations from plans approved by ACRS; applications for running of

new types of locomotives and/or rolling stock and for increase in speed; notification to railway officials when opening works; works resulting from accidents; opening of new lines; infringement to Schedule of Dimensions - condonation; procedure thereof; movement of ODCs - types and procedure for sanction for movement, precautions during movements.

13. **Railway Operation:**

a) **General:**

Reference to G. & S.R.; types of signals and their significance; rules for working of trains; block working rules- types, introduction of temporary single line working.

b) **Engineering restrictions and indicators:**

General – Definitions: Responsibility of the Inspector incharge; works of short duration; protection of line in block section and procedure for passing trains; works of long duration; temporary engineering fixed signals; arrangements prior to commencement of work; protection in block section for speed restrictions; procedure for blocking lines for engineering purposes; works at times of poor visibility; temporary signals in emergency; periodical notices of engineering restrictions; permanent speed restriction indicators; review of permanent speed restrictions; indicators- General.

c) **Level Crossings:**

General - Classification, Standard Specifications; normal position of gates; level crossing equipment, traffic and engineering gates; siding gate lodges; appointment of gatemen; duties of gatemen; maintenance of level crossings; examination of gate equipment and gatemen in rules; level crossings register; road traffic census; manning/demanning of level crossings.

d) **Working of Trolleys:**

General instructions - rules for working; distinction between trollies, lorries and motor trollies; Certificate of competency; officials permitted to use trollies and lorries; responsibility for safe working; working at night or in bad weather; working on track circuited sections; conveyance of non-railway officials; trolley permits for private sidings; trolley refuges; protection; equipment on trollies and lorries; working of trollies and lorries; in block sections, in station limits.

e) Ballast and material trains:

General - Rules for working; Restrictions in running; ordering of ballast trains; issue of "fit to run" Certificate; equipment; testing of brake power; working in block sections; running on Ghat section; loading and unloading from hopper wagons; planning of ballast and material train movements; training out materials and daily reports of ballast train working; charges for ballast trains; register of engineering vehicles.

14. Accidents:

General- Observance of rules; intimation of accidents by station masters; duties and responsibilities of the engineering officials in the event of accident impairing through traffic action at site, reporting details of accident - provisions of Accident Manual; action in case of derailments; examination of site and preparation of sketches; recording track and rolling stock measurements - accident procedure; use of recorded data; restoration of through running; procurement and arrangement of labour and equipment; temporary arrangements at site of accident; transshipment; funds required during emergencies; attendance of police at accidents; driver's reports on defects in track; action on receipt of reports of defective track; abnormal occurrence attributable to oscillation of locomotives; accidents not impairing through traffic; records of accidents.

15. Rivers & Floods, pre-monsoon precautionary measures and patrolling of Railway line:

a) **Rivers and Floods;** General- behavior of rivers; watchmen at important bridges; pitching stone and boulder reserve; vigilance during floods; flood records; survey of the course of river; river protection works; types, design, repairs and maintenance records – rivers and floods.

b) **Pre-monsoon precautionary measures:**

Vulnerable sections; materials for anticipated emergencies; monsoon emergency rakes; equipment tools, rail clusters, temporary bridge spans; protective works; railway affecting tanks; inspection and vigilance over railway affecting tanks; pre-monsoon; during monsoon.

c) **Monsoon and emergency patrol:** Kinds of patrolling; keymen's daily patrol, gang patrol during abnormal rain; systematic night patrolling during monsoon; stationary watchmen at vulnerable points; review of patrolling systems and vulnerable locations; security patrolling during civil disorders; protection of line in emergency; duties of patrolmen and their equipment; reporting damage & obstruction on track to Station Masters; check over patrolling; inspection of equipment; surprise checking at night.

16. Preparation of plans and estimates:

Preparation of Plans-

General procedure; plan for other departments; sizes of drawings; titles and numbering of drawings; scale of drawings; details on drawings; symbols and colours of drawings; Railway Board drawings; plans issued by the Chief Engineer's office; plans in Divisional/Asstt. Engineer's/Inspector's offices; completion drawings; care and filing of tracings; preparations of estimates – Code rules; technical details, rates and quantities; schedule of rates and price - listing of stores; report - and justification; rent statement for staff quarters; special features of estimates; remodelling of station yards, track renewal works, deposit works; Urgency Certificate; Supplementary Estimates.

17. Contracts and Execution of works:

a) Contracts:

General - Code reference for contracts; lists of approved contractors and registration of applications; Schedule of Rates; Analysis, non-scheduled rates, special rates; tenders; procedure, tender documents, drawings and specifications, tender committees, acceptance of tenders, contracts; procedure, contract documents, General and special conditions of contract; loan of tools and plant to contractors; issue of departmental materials to contractors; lease or licence of railways quarries; measurements and measurement books - code reference; recording measurements; 'on account' measurements; standard measurements; responsibilities of Inspectors and Asstt. Engineers for measurements of works; ballast measurements; computation of quantities; preparation of abstracts in measurement books; submission of bills; checking of bills, bill registers; disputes with contractors.

b) Execution of works:

General instructions - Code rules; agencies for executing works; responsibilities of executive officers; deposit works; excess and savings on estimates; attention to public interests, prevention of accidents; religious edifices and archaeological remains; provision of lightening conductors; planning - critical path net works, PERT; departmental execution of work- record; progress reports, charges for stores and labour, execution of works in Engineering workshops; contracted works, issue of Work Orders; completion documents; works pertaining to other departments.

18. **Miscellaneous:**

a) **Engineering plant:**

General - code rules; engineering plant reserve, plant register; valuation of plant; maintenance, storage and repairs; requisitioning of plant, use of plant at site; maintenance of log books; hiring out of engineering plant; examination of boilers of the Engineering Department.

b) **Explosives:**

General - Issues of instructions on use of explosives; observance of rule carriage of explosives; commonly used explosives; selection of explosives; storage and conveyance to work site; blasting operation; boring holes; amount of charge ; preparation charge; electrical and safety fuses; precaution to be observed during blasting; misfires; protection to trains and railway property; destruction of explosives; detonating signals - care and custody; use of detonators and test.

c) **Management of Engineering Stores:**

General - Reference to Code Rules; procurement of stores - requisition, acknowledgement of receipt claims for short receipts, etc.; custody of stores - classification, handling and storage; Account heads of stores - operation, records and returns; disposal of released and surplus stores - return to Stores Depot, disposal by auction; verification of stocks and adjustment for shortages/excesses.

d) **Law and Order:**

Railway police; lodging complaints; co-operation with railway police; cognisable offences; non-cognisable offences; powers of arrests by railway staff; warrant against railway staff; action by railway staff in cases of attempted sabotage; answering of Court Summons; prevention of trespass; disposal of human bodies found run over; disposal of cattle found dead on the line.