APPENDIX 1.01

(See paragraph 1.008)

FUNCTIONS AND POWERS OF CHHATTISGARH IRRIGATION PROJECTS BOARD

The following functions and powers have been assigned by the " Constitution of Chhattisgarh Irrigation Projects Board " vide Chhattisgarh Government No 2821 /29/VIP /WRD /TS/2000 Raipur dated 21/08/2001.

1. (i) The Government of Chhattisgarh, keeping in view the need for expeditious execution of Irrigation and Multipurpose Projects have decided to constitute Chhattisgarh Irrigation Projects Board (CIPB).

(ii) The Board will be the over all in charge of investigation, and preparation of project reports, preparation of river basin-Master Plans and construction of Major, medium Irrigation and Multipurpose Projects including their financial forecasts.

2. The composition of Chhattisgarh Irrigation Projects Board would be as given below:

(i)	Chief Minister of C.G.	Chairman
(ii)	Ministers for Water Resources Department, C.G.	Member
(iii)	Minister for Finance, C.G.	Member
(iv)	Minister for Public works Deptt., C.G.	Member
(v)	Minister for Public Health Engineering Department, C.G.	Member
(vi)	Minister for Agriculture, C.G.	Member
(vii)	Chief Secretary, C.G.	Member
(viii)	Secretary, Finance Department, C.G.	Member
(ix)	Secretary, Water Resources, Deptt. C.G.	Member
(x)	Secretary, Public Works Department, C.G.	Member
(xi)	Secretary, Public Health Engineering Department, C.G.	Member
(xii)	Chairman, Chhattisgarh State Electricity Board	Member
(xiii)	Representative of Central Water Commission	Member
(xiv)	Representative of Central Electricity Authority	Member
(xv)	Engineer-in-Chief, Water Resources Deptt. C.G.	Member
(xvi)	Engineer-in-Chief, Public Health Engineer Department, C.G.	Member
(xvii)	All Chief Engineer, Water Resources Deptt. C.G.	Member

3. (i) The Board shall be assisted by a Secretary who shall be Ex-officio Deputy Secretary to Government of W.R.D., a financial advisor, and such other staff as may be necessary.

(ii) The Board shall have its headquarters at Raipur. The Board shall have the powers to invite in its meetings such other officers as it may consider necessary.

4. The Board shall be assisted by the "EXECUTIVE COMMITTEE" and "TECHNICAL ADVISORY COMMITTEE" which shall be formed as below:

EXECUTIVE COMMITTEE

(i)	Chief Secretary, C.G.	Chairman
(ii)	Secretary, Finance Department, C.G.	Member
(iii)	Secretary, Water Resources, Deptt. C.G.	Member
(iv)	Secretary, PHE Deptt.	Member
(v)	Chairman, Chhattisgarh State Electricity Board, C.G.	Member
(vi)	Engineer-in-Chief, Water Resources Deptt., C.G.	Member
(vii)	All Chief Engineer, W.R.D., C.G.	Member
(viii)	Financial Advisor	Member
(ix)	Secretary, Chhattisgarh Irrigation Projects Board	Member Secretary

TECHNICAL ADVISORY COMMITTEE

(i)	Engineer-in-Chief, Water Resources Deptt., C.G.	Chairman
(ii)	Engineer-in-Chief, Public Works Deptt., C.G.	Member
(iii)	All Chief Engineer, W.R.D., C.G.	Member
(iv)	Chief Engineer (Civil) (C.S.E.B.)	Member
(v)	Secretary, Chhattisgarh Irrigation Projects Board	Member Secretary

5. In particular and without prejudice to the generality of the provisions of the paras above the Board shall-

(i) Supervise the survey, investigation and preparation of project reports and execution of Major and Medium Irrigation, and Multipurpose projects of the State selected by the State Government.

(ii) Examine and decide all proposals for preparation and designs and for obtaining expert advice.

(iii) Examine and approve from time to time under delegation of such powers to the Chief Engineers and other officers concerned with the execution of the Major and

Medium Projects both technical and financial as may be necessary, for the efficient execution of the projects.

(iv) Examine and wherever necessary, lay down specification and schedule of rates for various classes of works with a view to sound and efficient execution of the project.

(v) Approve all the estimates and contracts of the Major and Medium Projects, whose cost exceed the powers of sanction of the State Government in Water Resources Department.

(vi) Approval of all proposals for creation of posts and establishments required, provided that budget provision has been made.

(vii) Approve all proposals for award of work of supplies on contract, other than those based on public tenders and on detailed quantities estimates and works allotted on work order basis or on scheduled rates.

Note 1: Where total financial liability under a contract is definitely ascertainable at the time of placing contract itself as the result of a public or limited call for tenders, prior submission of the proposals to the Board will not be necessary so long as the contract is otherwise, within the powers of sanction of the State Govt. Water Resources Department.

Note 2: This will not affect the powers delegated from time to time to the Engineer-in-Chief and his subordinate officers.

(viii) Frame rules for delegation of powers and procedure for the purpose of carrying out its business.

(ix) Plan the programme of construction of different parts of the project. Keeping in view the funds available, the viability of the project and the desirability of obtaining quick results.

(x) Review the progress of land acquisition and rehabilitation of displaced persons.

(xi) Receive such progress report as it may be prescribed both as to work and expenditure in the prescribed form, from the Chief Engineer and other officers to review the progress of different units of the Major and Medium Projects and lay down steps to be taken to expedite the work.

(xii) Any such work whom the Board considers necessary to do.

(xiii) Any other function that may be agreed upon between the Central Government and Government of Chhattisgarh.

6. The rules of business of Chhattisgarh Irrigation Projects Board.

The rules of business of Chhattisgarh Irrigation Projects Board (C.I.P.B) are given in Annexure-I. The Board shall have full powers to amend the rules indicated in Annexure-I, as and when required.

RULES OF BUSINESS OF CHHATTISGARH IRRIGATION PROJECTS BOARD

1. The meeting of the Board shall be held at least once in two months.

2. The meeting shall be fixed and the agenda shall be finalized by the Secretary of the Board under the orders of the Chairman.

3. Notes on the items included in the agenda of a meeting shall be circulated by the Secretary of the Board at least seven days prior to the date of meeting.

4. All reference to the Board should ordinarily be made in the form of self contained notes.The Chief Engineer and other members should send their proposals to the Secretary of the Board, requiring consideration by the Board.

5. The Secretary, after due examination of the proposals in consultation with the Financial Advisor shall as soon as possible, prepare a note for the consideration of the Board. Where the Secretary/ F.A. disagree with C.E./Member, further views of the C.E./Member on the comments of the Secretary/F.A. should also be incorporated in the note of the Secretary.

6. The Secretary's note should particularly bring out the points on which the orders of the Board are required and should be sent to the Members of the Board. The original references shall be available in the office of the Board. This will enable the Members of the Board to see the original references, if they so desire.

7. Every estimate which exceeds the powers of the sanction of the Chief Engineer and requires the sanction of the Board shall be sent by the Chief Engineer to the Secretary of the Board in accordance with the rule 4 and 5 above, atleast, two weeks prior to the date of meeting of the board in which it is to be considered. This estimate and abstract of cost. Together with a detailed report which should also explain the position and availability of funds should be sent to the Secretary in duplicate.

8. (a) The Executive Committee and The Technical Advisory Committee shall meet at least once in a month to review the progress of Irrigation Projects.

(b) The Executive committee shall have final powers to accept tenders for construction of works and purchases for Major and Medium Irrigation and multipurpose Projects, whose cost is more than Rs. 7.50 Crores but not exceeding Rs.15.00 Crores for which budget provisions have been made. In respect of tenders for construction of works and purchases exceeding Rs.15.00 Crores, it shall submit its recommendation to the Board for final orders. The State Govt. in Water Resources Department shall have powers to accept the tenders, costing more than 7.50 Crores but less than Rs.10.00 Crores for major, medium project and full powers for minor projects .

(c) The survey estimates for new Major Irrigation and Multipurpose Projects shall be approved by Executive Committee. The administrative approval shall be accorded by the Govt. only after such approval.

(d) The Executive Committee shall have final powers to accord sanction for the creation of posts, for Major and Medium Irrigation and Multipurpose Projects provided that necessary budget provision has been made.

(e) The Executive shall be bound by the Govt. orders issued from time to time in regard to new items of expenditure.

(f) The Technical Advisory Committee shall advice on all matters referred to it by the Board/ Executive Committee. The Technical Advisory Committee can co-opt any other person/expert as member when required, for advice under the order of the Minister for Water Resources.

9. The decisions of the Board shall be recorded in the minutes of the proceedings after the approval of the minutes by the Chairman of the Board. The Secretary of the Board shall send a copy of the approved minutes to the members. If any member has to suggest any modification in the minutes as recorded, he may do so, with in seven days of the receipt of the minutes. If the proposed modification may affect the proceedings materially, the modification may be incorporated in the minutes by the Secretary after the approval of the Chairman. Whenever modification is made in the minutes, a revised copy should be forwarded to each member.

Part II –SPECIAL PROCEDURE FOR EMERGENCY SANCTION

10. In cases where the C.E./Member for reasons to be given in detail, require immediate orders of the Board/ Executive Committee in anticipation of the Board/ Executive Committee's approval, the Chief Engineer/Member concerned should send detailed proposals and ask for a decision under this part.

11. On receipt of this reference and comments, if any, of the financial advisor, the Secretary will prepare a note and put up the case to the Chairman of the Board/Executive Committee for orders. Chairman shall exercise full powers on behalf of the Board/ Executive Committee.

12. All orders passed by the Chairman of the Board/Executive Committee under this procedure will be placed before the Board/ Executive Committee for formal confirmation in its next meeting.

PART III - ISSUE OF SANCTIONS AND GENERAL CORRESPONDENCE

13. The resolution of the Board which do not have financial implications may be issued by the Secretary, on the receipt of the approved minutes.

14. Financial Committee or any of the Committees to whom powers to accord financial sanction may have been delegated by the Board in accordance with the delegation that may be given to the Board by the Finance Department, shall also be issued by the Secretary to the Board and such order shall be admitted in the audit, without its communication to the Accountant General through finance department.

15. The routine and general correspondence on behalf of the Board shall be carried out by the Secretary of the Board. Important correspondences on behalf of the Board shall be carried out by the Secretary of the Board under the orders of Minister of Water Resources Government of Chhattisgarh and under the guidance of the Secretary, Water Resources Department, Government of Chhattisgarh, who may also give such general or specific directions to the Secretary of the Board as may be necessary.

APPENDIX 1.02

(See paragraph 1.020)

SCALE OF STAFF ADMISSIBLE TO ENGINEER-IN-CHIEF'S OFFICE

DELETED

APPENDIX 1.03

(See paragraph 1.020)

SCALE OF STAFF ADMISSIBLE TO CHIEF ENGINEER'S OFFICE

DELETED

APPENDIX 1.04

(*See* paragraph 1.020)

Scale of Staff Admissible to Circle/Division/Sub-Division

DELETED

APPENDIX 1.05

(*See* paragraph 1.020)

Scale of Staff Admissible to Canal Deputy Collector's Office/Irrigation Tahsildar's Office/ Irrigation Inspector's Office

DELETED.

APPENDIX 1.06

(*See* paragraph 1.021)

NORMS OF WORK LOAD OF REVENUE ESTABLISHMENT

1.	Canal Deputy Collector	:	1 for 10 Irrigation Tehsildar.
2.	Irrigation Tehsildar	:	1 for every 5 Irrigation Inspectors.
3.	Irrigation Inspector	:	1 for every 10 Amins.
4.	Amins	:	1 Amin for every 1,000 ha. In non –agreemented area under Major/ Medium Project.
			Or
		:	2 Amin for every 1600 ha. In agreemented area for Major/ Medium Projects.
			Or
		:	1 Amin for every 800 ha. of designed potential for agreemented areas for minor schemes.
			Or
		:	1 Amin for every 600 ha. of designed potential in non-agreemented areas for minor schemes

APPENDIX 1.07

(*See* paragraph 1.022)

Gazetted Establishment of the Works Departments

Class-1

E.-in-C. (W.R.D., P.W.D. and P.H.E.D.)
C.E. (Civil, Electrical and Mechanical) (W.R.D., P.W.D. and P.H.E.D.)
Conservator of Forest (W.R.D.)
S.E. (W.R.D., P.W.D. and P.H.E.D.)
Joint Director of Publicity (W.R.D.)
E.E.(Civil. Electrical and Mechanical) (W.R.D., P.W.D. and P.H.E.D.)
Senior Geohydrologist (Executive Engineer posted in Ground Water Survey of W.R.D.)
Deputy Director of publicity (P.W.D. and P.H.E.D.)
Hydrogeologist , Class I (P.H.E.D.)
Biologist (P.H.E.D.)
Research Officer (W.R.D.)
Superintending Geologist (W.R.D.)
Senior Geologist (W.R.D.)
Geologist (W.R.D.)
Senior Geophysist (W.R.D.)
Senior Chemists (W.R.D.)
Land Acquisition Officer (W.R.D.)

Class-II

Assistant Engineers (Civil, Electrical and Mechanical) (W.R.D., P.W.D. and P.H.E.D.)
Assistant Geohydrologist (W.R.D.)
Account Officer (W.R.D., P.W.D. and P.H.E.D.)
Statistical Officer (W.R.D., P.W.D. and P.H.E.D.)
Administrative Officer (W.R.D., P.W.D.)
Chief Chemist (P.H.E.D.)
Assistant Research Officer (W.R.D. and P.W.D.)
Assistant Geologist (W.R.D.)
Assistant Geophysist (W.R.D.)
Assistant Chemist (W.R.D.)
Canal Deputy Collector (W.R.D.)
Hydrogeologist (P.H.E.D.)

APPENDIX 1.08

(*See* paragraph 1.023)

NON-GAZETTED ESTABLISHMENT OF WORKS DEPARTMENT STATE WIDE AND NON- STATE WIDE CADRES

A-Technical Executive

S.No.	Name of the Post	Water Resources Department	Public Works Department	Public Health Engineering Department	Remarks
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1.	Sub- Engineer, Select Grade	State-wide	State-wide	State-wide	
2.	Sub- Engineer, Ordinary Grade.	do	do	do	The State-wide and non State wide cadre descriptions are as per relevant recruitment rules of the concerned departments
3.	Irrigation Inspector	do	..	..	
4.	Reader to Canal Dy. Collector	do	..	..	
5.	Amin	do	..	..	
6.	Geological Survey Assistant	do	..	..	
5.	Geological Assistant	do	..	..	
8.	Junior Geologist	do	..	..	
9.	Geophysical Assistant	do	..	do	
10.	Technical Assistant	do	..	do	
11.	Drilling Engineer	..	..	State-wide	
12.	Foreman	..	..	do	
13.	Rig Operator	..	..	do	
14.	Assistant Operator	..	..	do	
15.	Driller	..	..	do	
16.	Surveyor	..	..	do	
17.	Mechanic/Supervisor	..	..	Non-state-wide	
18.	Sanitary Inspector	..	..	Do	
19.	Mistry	..	..	Do	

(1)	(2)	(3)	(4)	(5)	(6)
20.	Shift Driver	..	..	Do	
21.	Pump Driver	..	..	Do	
22.	Plumber	..	..	Do	
23.	Meter Reader	..	..	Do	
24.	Motor Mistry	..	..	Non-State-wide	
25.	Pipe Fitter	..	..	Do	
26.	Shift Fitter	..	..	Do	
27.	Motor Driver/Vehicle Driver	..	..	E.-in-C.'s office and C.E.'s office	Other offices
28.	Truck Driver	..	..	State-wide	Non-State-wide
29.	Jeep Driver	..	..	Non-State-wide	
30.	Lorry Driver	..	..	Do	
31.	Motor Boat Driver	..	..	Do	
32.	Form Superintendent *Cum*-Chemist	..	..	Do	
33.	Air Compressor Operator	..	..	Do	
34.	Air Compressor Driver	..	..	do	
35.	Explosive Van Driver	..	..	do	
36.	Filter Attendant	..	..	do	
37.	Pump Attendant	..	..	do	
38.	Welder and Turner	..	..	do	
39.	Work Assistant/ Sub-Artificer	..	..	do	
40	Motor Inspector	..	..	do	
41	Sub-Inspector	..	..	do	
42.	Electrician/Wiremen	..	..	do	
43.	Fitter	..	..	do	
44.	Filter Inspector Cum-Chemist	..	..	do	

B-Technical Non - Executive

S. No.	Name of the Post	Water Resources Department	Public Works Department	Public Health Engineering Department	Remarks
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1.	Superintendent	State-wide	State-wide	State-wide	
2.	Head Draughtsman	do	do	do	
3.	Draughtsman	do	do	do	
4.	Assistant Draughtsman	do	do	do	
5.	Tracers	do	do	E.-in-C.'s office and C.E.'s office	Other offices
6.	Research Assistant	do	..	State wide	Non-State wide
7.	Chemist	do	do	Non-State wide	
8.	Assistant Chemist	do	do	do	
9.	Geochemical Assistant	do	do	do	
10.	Laboratory Assistant	do	..	do	
11.	Geochemical /Geophysical/Geological Assistant	do	do	do	
12.	Silt Analyst	do	do	do	
13.	Instrument Mechanic	do	..	..	
14.	Embankment Inspector	do	..	..	
15.	Technical Assistant	do	..	..	
16.	Litho Draftsman	do	..	..	
17.	Laboratory Technician	do	..	..	
18.	Computer operator	do	..	..	
19.	Computer Programmer	do	..	..	

C-Ministerial

S.No.	Name of the Post	Water Resources Department	Public Works Department	Public Health Engineering Department	Remarks
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1.	Superintendent (C.E.'s Office)	State-wide	State-wide	State-wide	
2.	Superintendent (Circle)	do	do	do	
3.	Assistants Grade-I	do	do	do	
4.	Assistants Grade-II	Non-State-wide	do	E.-in-C.'s Office and C.E.'s office State wide	Other offices Non-State-wide
5.	Auditor	..	do	do	
6.	Stenographer	State-wide	do	do	
7.	Assistants Grade-III	Non-State-wide	do	E.-in-C.'s and C.E.'s office State wide	Other offices Non-State-wide
8.	Assistants Grade-II	..	Non-State-wide	Non-State-wide	
9.	Assistants Grade-III	..	do	do	
10.	Account Officer	..	..	Non-State-wide	
11.	Statistical Assistant	State-wide	..	State-wide	
12.	Bill Clerk, Cashier	..	..	do	
13.	Steno typist	Non-State-wide	..	E.-in-C.'s office and C.E.'s office State-wide	Other offices

14.	Accountant	..	..	State-wide	Non-State-wide
15.	Steno Typist	..	..	E.-in-C.'s Office and C.E.'s office State-wide	Other offices
16	Photocopier			--Do—	--Do—

APPENDIX 1.09

(*See* paragraph 7.032)

Gradation List

Gradation List…….as on 1st April 20 -------

S. No.	Name	Date of Birth	Date of appointment in the service	Date of appointment to the post to which gradation list pertains
(1)	(2)	(3)	(4)	(5)

Date of confirmation and post in which confirmed		Office where working on above mentioned date	Remark
Date	post		
6(a)	6(b)	(7)	(8)

APPENDIX 1.10

(See paragraph 1.054)

RULES RELATING TO THE DEPARTMENTAL AND LANGUAGE EXAMINATION OF ASSISTANT ENGINEERS AND TECHNICAL OFFICERS OF WORKS DEPARTMENTS

Examination in Hindi

The candidate will be required :-

(a) To make a written translation from Hindi into English of a petition dealing with matters connected with the department.

(b) To make a written translation from English into Hindi of a reply to a petition in (a). The translation must be free from errors of grammar, spelling and idioms. The hand-writing must be legible.

(c) To converse with fluency and grammatical accuracy not only on matters falling within the scope of his official duties but also on matters of general interest. The conversation test should not include technical expressions concerned with subjects outside the scope of the W.D.

Note.- An officer whose mother tongue is Hindi or who proves to the satisfaction of the Superintending Engineer that he possesses a thorough knowledge of that language will not be required to appear in this examinations. The fact of his having passed the examination or exemption therefrom will be entered in service book.

Professional Examination in Engineering

This examination will consist of one paper in Engineering for Assistant Engineers. The paper in Engineering will be designed to test the candidate's knowledge of methods of construction used in the State, of the materials found in the districts in which they have been employed and the methods of applying them, prescribed forms of agreements, rates of payment for items of work and the manner in which they are calculated, the management of workers and local orders and instructions regarding the preparation of projects and the design and construction of works of their respective department.

Questions will be asked from the syllabus prescribed separately for Assistant Engineers (Civil) working in W.R.D., P.W.D. and P.H.E.D. as mentioned in Appendices Nos. 1.11, 1.12 and 1.13 (Part I) respectively. Normally ten questions will be asked in

Engineering paper out of which six will have to be answered of which one will be compulsory. Only preliminary aspects of design of structure will be asked by the examiner.

A common syllabus is prescribed in Appendix 1.14 for the Assistant Engineers E/M of W.R.D. and P.W.D. and questions will be asked from this having regard to their functional responsibilities.

The Assistant Engineers (E/M) of P.H.E.D. shall be examined in topics mentioned in Appendix 1.13 (Part II).

Syllabuses for the examinations of other technical officers in their respective disciplines will be prescribed by the Engineer-in-Chief.

Examination in Accounts

The paper in accounts will confine to matters which should be known to an officer in charge of a Sub-Division. The syllabus for the accounts examination is given in Appendix 1.10-A. Normally eight questions will be asked in accounts paper out of which five will have to be answered.

Standard for passing

In all cases the pass standard is 50 percent of full marks assigned to each paper.

(i) No marks will be assigned for the conversation test in the language examination but the candidate will be declared to have passed or failed. If he fails he will have to appear again for the whole of the examination in Hindi.

(ii) In the event of failure in any part of the examination in Engineering and Accounts the candidate will be required to appear again only for the subject in which he has failed.

Penalties for not passing

An Assistant Engineer or other Class II technical officer will not draw third or subsequent increments until he has passed these examinations. On passing these examinations he will draw the rate of pay that he would have attained if his increments had not been stopped unless the Government directs otherwise.

Conduct of Examination

(a) The Hindi examination will be held in the office of the Collector in the months of April and October or on such dates as may be fixed by Government from time to time. It will be conducted under the control of the Collector by the Languages Examination Committee constituted by Government for the examination of civil officers.

The Collector will decide what time shall be allotted to each part of the examination. The assignment of marks and the publication of results will be dealt with as prescribed in the rules relating to the departmental examination for Deputy Collectors.

Note.- The Superintending Engineer will intimate the names of the officers who intend to appear at this examination to Collector concerned by the 25th march and 25th September each year.

(b) The Engineering and Accounts Examinations will be conducted by the committee constituted by the E.-in-C. consisting of one C.E. and two senior officers of the engineering establishment. It will be held in 2nd week of September each year at the places to be decided by the committee. The centres of the examination shall be declared by the committee in 2nd week of July each year. The question paper in Accounts will be set and answer books valued by an officer of the A.G.'s office nominated by the A.G. The C.E. appointed to the committee will be responsible for setting the question paper and valuing the answer books in Engineering. He will also arrange with the A.G. for setting the question papers and valuation of the answer books in Accounts. He will also decide what time shall be allotted to each part of the examination. He will forward to the E.-in-C. the question papers, answer books, a tabular statement of marks and recommendations of the committee. The E.-in-C. will decide which A.Es. and technical officers have passed and shall declare the results.

APPENDIX 1.10 A

(See paragraph 1.054)

SYLLABUS FOR ACCOUNTS

EXAMINATION OF ASSISTANT ENGINEERS

1. Works Accounts

(a) Muster roll, payments to laboures, arrears of wages; labour recruitment, advance to labour and their recoveries.

(b) Measurement books:- Use and maintenance of measurement books; standard measurement books.

(c) Bills, various types of bills and vouchers, preparation examination and payment. Hand receipt, deposits.

(d) Advances to the contractors.

(e) Issue of materials to contractors, adjustments, works abstract; register of works; contractor ledger, schedule of rates.

2. Cash

(a) Mode of obtaining cash from banks and treasuries and custody of cash.

(b) Payment of bills and vouchers; remittance in treasuries.

(c) Cash book, upkeep, balancing, rectification of errors, verification ; typical entries of advances, cheques and bills.

(d) Imprest, temporary advance, cheque books and receipt books.

(e) Chargeable heads of account.

3. Store

(a) Stock and Tools and Plants:- Procurement, storage; receipt, issues, returns; checking, physical verification, issue rates, survey report, suspense account.

(b) Material at site accounts, Omnibus Transfer Entry Orders, C.S.A.

4. Contractors

(a) Various Types of agreements, contractors' bills piece-work and contract work, aid and advances to contractors.

(b) Labour laws, Minimums Wages Act, Workmen's Compensation Act.

5. Accounts Returns

Compilation of accounts; monthly account, duties and functions of S.D.O.

APPENDIX 1.11

(See paragraph 1.054)

SYLLABUS FOR THE PROFESSIONAL EXAMINATION IN ENGINEERING FOR THE ASSISTANT ENGINEER (CIVIL) OF WATER RESOURCES DEPARTMENT

1. Investigation and Planning of Projects

(a) River basins of C.G., Water resources of C.G., master plans of rivers. Topo–Sheet studies:- Identification of projects, project analysis, master plan of basin and sub-basin , investigation for projects, field surveys for head works and canals.

(b) Types of schemes :- Storage works, diversion works, lift irrigation schemes, hydro power projects, multipurpose projects, selection, criteria for different types of schemes, surface water and ground water development, conjunctive use of ground water and surface water.

(c) Hydrological analysis, yield, floods, hydrological measurement of stream flows, gauge discharge stations, rainfall observations.

(d) Soil and materials investigation, fixing borrow areas, quarries, laboratory and field tests, design parameters.

(e) Geological investigations for foundations including drilling, logging of bore holes, water loss tests.

(f) Land and property surveys in submergence area, fixing up reference points, environmental, socioeconomics surveys.

(g) Project Preparation-Various chapters to be included, stage-I estimate, tender provisions, cost benefit studies.

2. Designs

(a) Upstream reserve for projects, empirical formulae, unit hydrograph, flood disposal provision for storage works, diversion works.

(b) Command area details, existing crop pattern, proposed crop pattern, intensity of Irrigation, water requirements of crops, cut off statement for canals, distribution system.

(c) Fixing reservoir storage capacity, determination of F.R.L., M.D.D.L., flood routing, dead storage, free board, wave height,

(d) Type of headwork.- Earth dam, masonry dam, wiers and barrages, considerations for types of headworks.

(e) General design criteria for earth dam and its components.

(f) General design criteria for masonry/concrete dam and its component and model studies, design of spillways in dams.

(g) General Design criteria for diversion works.

(h) Design of head regulators and other canal structures.

(j) Design of canals, distributory system.

(k) Instrumentation for earth dams and masonry dams.

3. Construction

(a) Construction management–construction programme, CPM-PERT Techniques, Management of men, material, machinery, funds.

(b) Land acquisition and rehabilitation river diversion works, coffer dams, dewatering,.

(c) Excavation in soil and rock.

(d) Construction of earthen dam, specifications.

(e) Construction of masonry/concrete dams, specifications.

(f) Drilling and grouting.

(g) Construction of canals, lining works and canal structures.

(h) Safety requirement at project site, lay out of haul -roads, scaffolding and centering handling of various types of equipment and machinery required for construction.

(i) Quality control- field and laboratory tests.

(j) Maintenance of records-Project drawings, working drawings, completion drawings.

(4) Maintenance and Operation

(a) Maintenance of headworks.

(b) Maintenance of canals, head regulator and canal structures.

(c) Operation of canals, distribution of supplies at right time in right quantities.

(d) Annual inspection of works, annual and special repairs estimates.

(e) Irrigation Act, rules and executive instructions operation of the Act, supply of water, recovery of revenue, maintenance of record.

(f) Ayacut development, full utilisation of irrigation potential, operational efficiency, field water losses, evaluation of benefits from projects.

(5) Lift Irrigation

(a) Preliminary investigation for site, gauging discharges, collection of hydraulic data, analysis of water for suitability,.

(b) Lifting devices e.g. pumps (oil or electric), calculations for B.H.P., approximate cost of materials required for running and running cost.

(c) Crop planning- distribution of water.

(d) Design and construction of channels and water courses.

(e) Auxiliary structures Like engine house, pump well, delivery chamber etc., their design and construction.

(f) Measurement of supply- various devices. Maintenance of schemes.

(g) Determination of water rates.

(h) Maintenance of schemes.

APPENDIX 1.12

(See paragraph 1.054)

SYLLABUS FOR THE PROFESSIONAL EXAMINATION OF ASSISTANT ENGINEERS (CIVIL) OF PUBLIC WORKS DEPARTMENT

General:-

(1) Materials,

(a) Methods of manufacture, extraction etc.

(b) Specifications regarding quality, strength, uses in various applications of the building material viz stones, metal, sand, bricks, tiles, glass, limes, cements, timber, steel, asphalt etc.

(c) Soils-Classification and properties–Load bearing capacities, settlements, cracking etc.

(2) Construction- (A) Buildings

(a) Various Types of foundations, roofs etc.

(b) General principles of design of foundations super structure, roofs etc.

(c) Scaffolding, centering etc. types, methods of design execution, precautions to be observed.

(d) Flooring- Types, specifications.

(e) Doors and windows–Types, including steel windows and aluminium doors, standards.

(f) Stair cases-Types and design.

(g) Mortars- Types, proportions for different items of work, specifications-in construction and in plastering.

(h) Concrete-Types proportions, nominal mix, design mix, strength.

(i) Sanitary and water supply installations-Internal and external planning, design and construction.

(j) Fundamental of Electrical installations in buildings.

(B) Roads

(a) Classification :-

(1) NH, SH, MDR, ODR,

(2) Cement concrete, asphalted, water bound macadam, fair weather.

(b) Standard width for land, formation, crust for the various categories.

(c) General principles of alignment, road drainage, gradients.

(d) Culverts-Surveys, catchment areas, calculation of water way required, Types of culverts, sections of abutments, piers, decking etc.

(e) Curves- Types, layout, minimum radius prescribed for various types of roads and speeds.

(f) Specifications for (i) earth work (ii) road making materials (iii) compaction for moorum, metal and (iv) asphaltic surfaces.

(g) Kilometer stones, road signs, name boards, caution boards, IRC standards therefor.

(h) Road side arboriculture.

(i) Designs of road crusts, thickness, width, curves, grades etc. with respect to traffic intensity, soil conditions, nature of traffic etc.

(C) Bridges

(a) Categories:-

(1) Based on size-(i) Major (ii) Medium.

(2) Based on type-

(i) RCC slab

(ii) Arches

(iii) Prestressed decking.

(b) Selection of site- Criteria.

(c) Survey of catchment area- calculation of water way, spans, heights, standard loadings and their effects on the design of foundation, substructure and superstructure.

(d) Foundation :- Types (open well, pile, raft) designs, methods of execution, dewatering coffer dams–their construction, diversion of river course, methods of well sinking, calculation scour depth etc.

(e) Substructure:- Types (Stone masonry, PCC, RCC, Solid or celluler, for piers, abutments), wing walls-design and construction for various types, in stone, cement concrete –stability calculations.

(f) Superstructures:- Types (arch, PCC, prestressed etc. designs, precautions to be observed in execution.

(g) Bearings:- Types and uses.

(h) Railings:- Types.

(j) Approaches:- Geometrics, precautions to be observed in earth work etc.

General:- (1) Works Department Manual.

(2) Schedule of rates, analysis of rates, standard specifications.

(3) Management and organisation of scarcity works.

(4) PERT and CPM Techniques-

APPENDIX 1.13

(See paragraph 1.054)

Part I

SYLLABUS FOR THE PROFESSIONAL EXAMINATION

OF ASSISTANT ENGINEER (CIVIL) OF P.H.E.D.

(1) General:

(i) Survey for project preparation with special reference to chain survey, compass survey, levelling, contouring, G.T.S. bench marks, toposheet Recording of survey data in level books, field books etc.

(ii) Provisions made in the National Building Code published by the Indian Standards Institution.

(iii) Standard specifications, schedule of rates inforce in the Department and estimating procedure.

(iv) Design and construction of RCC /Steel/Masonry structures related to water supply and waste water disposal projects and other PHED projects.

(v) Quality standards and field/laboratory testing procedure for items like cement, sand, metal, bricks, cement concrete etc.

(vi) Designed and construction of tube well and its development in various Geological formation.

(vii) Theory, principal and practices of surface and surface water identifications, development and use.

(viii) P.E.R.T. and C.P.M. Techniques.

(2) Public Health Engineering:

(i) Topics in the current Manuals on water supply and Sanitation Engineering published by the Central Public Health Engineering and Environmental Organisation, Government of India.

(ii) P.H.E. Departmental Specifications and practices.

(iii) Water supply and sanitation conditions in C.G. with special reference to the C.G. Government policies about urban/rural water supply/sanitation programmes.

(iv) Special programmes in execution with the assistance of other nations and international organisations, World Bank etc.

(v) Several types of drilling rigs in the department. The types of hand pumps in use in rural areas and the procedure for their maintenance.

(vi) Government rules for maintenance of water works, practices in maintenance of water works and sewage works including distribution, metering, billing, revenue collection, quality control etc.

Part –II

SYLLABUS FOR PROFESSIONAL ENGINEERING EXAMINATION OF ASSISTANT ENGINEER (E/M) P.H.E.D.

(a) Syllabus for the candidates of W.R.D. & P.W.D. as given in Appendix 1.14.

(b) (i) General principles of water and sewage treatment, electrical and mechanical machineries and equipments used in water supply and sewage collection and treatment works, their specifications, installation, preventive maintenance and repairs.

(ii) Radial gates, silt extractors-installation, use, preventive of maintenance and repairs.

(iii) Air compressors and their uses in P.H.E. work like yield tests, drilling, dewatering, operating vibrators etc.

(iv) Various types of drilling rigs slow/fast, rotary/pneumatic, their working and maintenance.

(v) Various types of hand pumps, their installation, maintenance and repairs.

(vi) Workshops- its machineries and equipment, lay-out.

(vii) Tube well construction in various geological formations.

(viii) Supply of water in emergencies through tankers etc. Arrangement of water supply during fairs and congregations.

APPENDIX 1.14

(See paragraph 1.057)

SYLLABUS FOR PROFESSIONAL EXAMINATION OF ASSISTANT ENGINEERS (E/M) OF W.R.D. AND P.W.D.

Part I-Equipments and their Uses

1. Basic Principles and Devices:

Gears-Simple, Differential-transmission or change speed gearing- Synchromesh transmission-fluid couping-Torque converters-Clutches-Breakes-Transmission of power-Pneumatic tyres-Crawlers-Steel wire rope-Bearings.

2. Prime Movers:

Classification-Operation cycles-performance and rating of I.C. Engines-Construction of internal combustion engines-Auxillaty manifolds-Air-cleaner-Lubrication system-Cooling system-Fuels-Regulations of I.C. Engines-Types of Governors-I.C. Engines at high altitudes.

3. Earthmoving Equipment (for W.R.D. only):

Excavators-Basic-shovel-attachments-Dipper shovel-power shovel operation-Dragline-operation-Clamshell-Comparison of different shovel excavators-Hydraulically powered excavators versus wheeled tractors-Ratings of tractors-Tractor units-Construction-Ground drive-power take-off-Tractors in earth moving-Bulldozer Attachment of dozer-Tractors loader-Belt loader-Ripper-Scraper Scraper Construction-Scraper operation and application bowl operation of scrappers-Motor grader-Motor grader operation-Earth compactors.

4. Hauling Equipment:

Highway trucks-Truck construction-Trucks with 4 wheel drive-truck brakes-Air brakes in trucks-Air brakes in trailers-dump trucks-Rear dump trucks-Dumpers-Use of dump trucks as earth haulers-Trailers-Tractors for hauling work.

5. Hoisting Equipment:

Hoist winch-Fiber rope-Hoisting chains and hooks-slings-chain hoists-jacks-Hoist winches-Fork trucks-Cranes Mobile cranes-Tower-Cranes-Safety devices in cranes-Overhead on gantry cranes-Safety in crane operation.

6. Conveying Equipment: (For W.R.D. and P.W.D. only)

Screw conveyor-Bucket conveyor-bucket elevator-Band or belt conveyor-Types of belts, Rubber-belts-Damage to belt-angle of incline of conveyors-Belt speeds-Magnetic separation on belt conveyor-Elevator belts-Idlers-Spacing of, idlers-Drivers-Transmission of driving power-Tandem drive-Wear on pulleys and lagging-Loading hoppers and chutes-capacity of conveyor and horse power required-Crooked running of belts-Belt fastening-Pneumatic conveyors.

7. Pneumatic Equipment:

Air consumption of pneumatic tools-Pneumaticed air system-Air compressor-Reciprocating compressors performance-Selection of compressor-prime movers for compressors-Compressors regulation-Rotary compressor-Axial flow compressor –portable compressors-In take pipe and air filter-Intercoolers and after coolers Oil separator-Air discharge Pipe –Air receiver, Drying of compressed-Air Distribution system for compressed air, Centralized plants-Maintenance of proper air pressure in the system-Air operated tools jack hammer-Drill bits and steels-Diamond bits-Auger drills-Fitting of air tools-Precautions in use of pneumatic tools.

8. Pumping and Dewatering Equipment:

Classification of pumps-Types of pumps-Characteristics of modern pumps-Reciprocating pumps-Advantages and disadvantages of reciprocating pumps-suction requirement of reciprocating pump-Installation of reciprocating pump-Centrifugal pumps-Construction of centrifugal pumps, Sealing-ring–Bearing- Stuffing box –Diffuser type-centrifugal pumps—Multiple motor-pumps-Specification of centrifugal pumps and their selection, shaft driven turbine bore hole pumps-submercible turbine pumps-sludge pumps-Centrifugal non-Clogging pumps-suction piping-Delivery piping Power required for a pumps-Dewatering plant-sump pumping.

9. Aggregate and Concrete Production Equipment :

Crusher-jaw-crusher-hammer mill, Roll crusher, Feeders and grizzlies-Screens –Revolving-Screens-shanking screen s-Vibrating Screens-washers-portable aggregate plant-Concrete mixers placer-Pneumatic vibrators for concrete.

10. Piles and Pile Driving Equipment :

Pile driving rigs-Types of driving rigs-skid mounted vertical rigs-skid mounted raking rigs-Transportable rigs-Types of piles-Driving hammers-Drop hammer lubrication-winches.

11. Production estimates and Sizing and Matching:

Cycle time-Corrections for cycle time-job and Management Factors-Production estimates for excavator-Soil properties affecting measurement, capacity ratings of equipment, Output of motor graders-Output of compactors –Output of aggregate processing plant-Output of concrete producing plant-production estimates for other equipment.

12. Planning and Selection of Construction Equipment:

Advantage of using machines-Disadvantage of using machines, advantage of using manual labour-Disadvantage of using manual labour.

13. Welding Equipment:

Selection of electrodes-Electrode rods-Types of cast iron low hydrogan hy electrodes-Effect of moisture and storage conditions-Welding T/1 and T/2 (Type-A) steel-Hard facing-general instruction for the welding of excavator parts.

14. Road Rollers (For P.W.D. only) :

Types, selection, deployment, operation, economics of operation, maintenance.

Part II-Maintenance

1. Preventive Maintenance and Repairs:

Preventive Maintenance-Availability of spare Parts-Interchangeability of spare parts-Inventory management, application of inventory model-stock planning through ABC analysis-Principles aspects and maintenance, Servicing and servicing facilities-Field repairs facilities-Inspection of equipment-tools and aides of maintenance , requirement of construction equipment-storage and handing of bubricant-Maintenance and Servicing of Important of components-Maintenance of engines-Power transition systems-tubes and tires crane excavator-workshop for major repairs-cost of preventive maintenance.

2. Tools and Maintenance :

Steam cleaning-handling tools, machine tools-requisition of spare parts-training of personnel, layout of shops.

3. Tyre Maintenance :

Function importance of correct tyre inflation-overloading-Bleeding-Effect of different types of road surfaces, mechanical faults-Maintenance tyre, Hours, Kilometer recording system, repairing and retreading.

4. Requirment and Service problem of pistons and piston rings:

Basic requirements-Abnormal combustion, Run in procedure Honing-Chromplated piston rings scoring-Maintenance steps-Detonation and preignition piston ring coating-Top grove wear-Corrosion control.

5. Fuel Injection Equipment :

Function and operation-Timing and lubrication Fuel Injection nozzles and maintenance, Operation and Maintenance of Governors Cummins "PT'' fuel system.

6. Batteries :

Types of storage batteries-Lead acid batteries-Construction-Maintenance and service-Trouble shooting-Care in winter.

7. Safety in works and in workshops.

8. Factory Act and workmen's compensation Act.

Part –III-Electrical Engineering

(1) Difference between A.C. and D.C. currents.

(2) Domestic and Industial wiring system.

(3) Transmition system H.T. and L.T.

(4) Single phase and three phase electric motor and Generator with Protection devices.

(5) Various Types of starters and their specification, application along with the essential electrical components.

(6) Electric cable and wires and their selection for various electrical works.

(7) Electrical maintenance system, precautions for elimination accidents and loses.

(8) General knowledge about electrical instruments and measurements.

Part IV –Gates (For W.R.D. only)

(1) Types of gates and their application.

(2) Maintenance, repairs and inspection of gates.

(3) Various types of sealing arrangements required in gate fabrication.

(4) Types of hoisting devices and their specifications.

(5) Erection and alignment of gates.

(6) General design of civil structures and the essential provision for easy maintenance of vertically lifting gates.

APPENDIX 1.15

(See paragraph 1.057)

RULES RELATING TO THE DEPARTMENTAL EXAMINATION FOR THE SUB-ENGINEERS AND TECHNICAL EXECUTIVE SUBORDINATES OF WORKS DEPARTMENT

Professional Examination in Engineering

This will consists of one paper in Engineering for Sub-Engineers.

The paper in Engineering will be designed to test the candidates' knowledge of methods of construction used in the State and of the materials found in the districts in which they have been employed and the methods of applying them, prescribed forms of agreement, rates of payment for items of work and the manner in which they are calculated, the management of work people and local orders and instructions regarding the preparation of projects and the design and construction of works of their concerned department.

Questions will be asked from the syllabus prescribed for Sub-Engineer (Civil) working in W.R.D., P.W.D. and P.H.E.D. in Appendices 1.16 , 1.17 and 1.18, (A) respectively. Normally ten questions will be asked in Engineering paper out of which six will have to be answered of which one will be compulsory . Only preliminary aspects of design of structure will be asked.

A common syllabus is prescribed in Appendix 1.19 for the Sub-Engineers E/M of W.R.D. and P.W.D. and questions will have regard to their functional responsibilities. The Sub-Engineers E/M of P.H.E.D. shall be examined in topics mentioned in Appendix 1.18 (B).

Syllabus for the examinations of other technical subordinates in their respective cadre will be prescribed separately.

Examination in Accounts

The paper in account will be confined to matters which should be known to a Sub-Engineer incharge of department works. This will be common to all officers of the works departments. The syllabus for the account examination is given in Appendix 1.19-A Normally eight questions will be asked in accounts paper out of which five have to be answered.

Conduct of the Examination

The Engineering and Account Examinations will be conducted by the committee constituted by the Engineer-in-Chief consisting of one Chief Engineer and two senior officers of the Engineering Establishment. It will be held at places to be decided by the Engineer-in-Chief in 2nd week of September each year. The question paper in Account will be set and answer books valued by an office of the Accountant General's office nominated by the Accountant General. The Chief Engineer appointed to the committee will be responsible for setting the question paper and valuing the answer books in Engineering. He will also arrange with the accounted General for setting the question papers and valuation of the answer books in Accounts. He will also decide what time shall be allotted to each part of the examination. He will forward to the Engineer-in-Chief question paper, answer books, a tabular statement of marks and recommendations of the committee. The Engineer-in-Chief will decide which Sub-Engineers and Technical subordinate have passed and shall declare the results.

Standards for Passing

In all cases the pass standard is 50 percent of full marks assigned to each paper.

APPENDIX 1.16

(See paragraph 1.057)

SYLLABUS FOR PROFESSIONAL EXAMINATION IN ENGINEERING FOR THE SUB-ENGINEERS (CIVIL) OF W.R.D.

1. Investigation and planning of projects:-

(a) River basin of C.G.:-

Topo-sheet studies, identification of projects, investigation for projects, field surveys for head works and canals.

(b) Types of schemes:- Storage works, diversion works, lift irrigation schemes, multipurpose projects, surface water and ground water development.

(c) Hydrological analysis, yield, floods, flows, gauge discharge stations, rainfall observations.

(d) Soil and materials investigation, fixing borrow areas, quarries.

(e) Geological investigation for foundations including drilling, logging of base holes water loss tests.

(f) Land and property surveys in submergence area, fixing up reference points.

(g) Project preparation :- Various Chapter to be included, Stage, I estimates, standard provision, cost benefit studies.

(h) P.E.R.T. and C.P.M. Technique.

2. Designs.

(a) Rainfall run-off studies, estimation of yield, upstream reserve for projects, estimation of floods, empirical formulae, unit hydrograph their application to storage work, diversion work.

(b) Command area details, existing crop pattern, proposed crop pattern, intensity of irrigation water requirement of crops, cut off statement for canals, distribution system.

(c) Fixing reservoir storage capacity, determination of FRL, MDDL, dead storage, free board.

(d) Type of headworks- earth dam, masonry dam, weirs and barrages, considerations for types of headwords.

(e) Design of head regulators and canal structures.

(f) Designs of canals, distributary system.

3. Construction

(a) Construction management-construction programme, management of men, material .

(b) Land acquisition and rehabilitation.

(c) Construction of earthen dam, specifications of items of construction.

(d) Construction of masonry /concrete dams, specifications of items of construction.

(e) Drilling and grouting.

(f) Construction of canals, lining works and canal structures.

(g) Safety requirement of project site Lay out of haulroads, scaffolding and centering.

(h) Quality control-field and laboratory tests.

(j) Maintenance of records- project drawings, working drawings, completion drawings.

4. Maintenance and Operation

(a) Maintenance of headworks.

(b) Maintenance of canal, head regulator and canal structures.

(c) Operation of canals, distribution of supplies at right time in right quantities.

(d) Irrigation Act, rules and execution instructions, Operation of the Act, supply of water for irrigation-recovery of revenue-maintenance of record.

(e) Ayacut development, full utilisation of irrigation potential.

5. Lift irrigation

(a) Preliminary investigation for site, gauging discharge, collection of hydraulic data. Analysis of water for suitability.

(b) Crop Planning- distribution of water, water courses.

(c) Measurement of supply-Various devices.

(d) Maintenance of Schemes

APPENDIX 1.17

(See paragraph 1.057)

SYLLABUS FOR PROFESSIONAL EXAMINATION IN ENGINEERING FOR THE SUB-ENGINEERS (CIVIL) OF PUBLIC WORKS DEPARTMENT

(1) Material of Construction.

(a) Methods of manufacture of materials of construction.

(b) Specifications regarding quality. Strength, metal, sand, bricks, tiles, glass, lime, cements, moorum, asphalt, steel etc.

(2) Buildings.

(a) General idea of principle of design of foundations, soils and their behavior, superstructure and roofing etc.

(b) Types of foundations, roofs and their applications.

(c) Scaffolding, centering, methods of errection, precautions to be observed.

(d) Types of Flooring, specifications and their application.

(e) Doors, windows, standard types including steel windows, aluminium doors.

(f) Stair cases-types and design.

(g) Mortars and their uses, specifications for mortar required for construction and plastering.

(h) Concrete –proportions, methods of mixing, laying etc. nominal mix and design mix.

(i) Sanitary and water supply installations, internal and external, construction and maintenance.

(j) Fundamentals of electrical installation in buildings.

(3) Roads.

(a) Classification –NH, SH, MDR, ODR.

(b) Cement concrete, asphalted, water bound macadam, fair weather roads, standard widths, formation widths, crust width and thickness of crust for various soils /traffic intensities etc.

(c) General principles of alignment, road drainage, camber, gradient etc.

(d) Curves- Types layouts, standard radius for various types of roads and traffic intensities.

(e) Specification for earth work, road making materials, compaction of moorum, water bound macadam surfaces, various types of asphaltic surfaces and pavements.

(f) Kilometer stones, road signs, name boards caution boards-I.R.C. standards therefor .

(g) Road side arboriculture.

(4) Bridges.

(a) Categories

(1) Based on size –(i) Major, (ii) Medium.

(2) Based on type-(i) R.C.C. slab, (ii) Arches, (iii) Prestressed decking.

(b) Site selection-general considerations.

(c) Catchments area, water way calculation.

(d) Foundations-open, pile, raft and their methods of constructions, systems of dewatering, cofferdam, diversion of streams.

(e) Substructure-types –stone masonry, P.C.C., R.C.C. –solid or-cellular-methods of construction.

(f) Superstructure –General idea about types-arch. R.C.C. slab or prestressed bridges-systems of execution and precautions to be observed.

(g) Bearing-Types.

(h) Railing-Types.

(i) Approaches-Precautions to be observed in compaction etc-geometrics.

(5) General.

(a) Working knowledge of the Works Department Manual.

(b) Analysis of rates, schedule of rates, specifications.

(c) Management of scarcity works.

(d) P.E.R.T and C.P.M. Technique.

APPENDIX 1.18

(See paragraph 1.057)

SYLLABUS FOR PROFESSIONAL EXAMINATION IN ENGINEERING FOR THE SUB-ENGINEERS OF P.H.E.D.

(A) Civil Engineering

The syllabus shall be same as appendix 1.13 applicable to Assistant Engineers (Civil) except the following topics:-

(1) (iv) Design of R.C.C. /Steel/Masonry structure.

(B) Electrical & Mechanical Engineering

The topics shall be as mentioned in Appendix 1.19 and Appendix 1.13. Part II (b).