

Engineering Paper-I For SDO/A.E (CIVIL)

PART-I

1. Geotechnical Engineering:

Type of soil, Classification of soil. Darcey's law, permeability, Tenzaghi's theory of one dimensioned consolidation Compaction of soil, field compaction. Earth pressure at rest, active and passive pressure, Rankine's theory. Immediate consolidation and secondary settlement, stability of slope.

Essential feature of foundation, type, choice of type of foundation, proportioning of footing, isolated and combine footing, raft, pile group. pile foundation, pile load test and settlement of piles.

2. Structural Engineering:

Design of reinforced concrete structure-working stress and limit stress method based on IS code. Design of RCC cantilever and counterfort retaining wall Design of steel structures, factor of safety and load factor, tension and compression member, beams and plate. Design of water tank-elevated and underground. Design of masonry retaining wall.

Knowledge of relevant IS codes.

3. Environmental Engineering:

General Knowledge on sewerage system, domestic and industrial waste, flow through sewers, treatment of sewage, General Knowledge on distribution system of water supply, plumbing in buildings, treatment of sewage-working principles, design of septic tank. Water-sources, purity and quality of good drinking water.

PART – II

1. Engineering Materials :

Physical properties of building materials - stones, bricks, tiles, timber, cement, damp proofing materials, paints and steels.

2. Strength of Materials:

General Knowledge on simple stress and strain, elastic constant, axially loaded compression member, shear force, bending moment, theory of simple bending, beams of uniform strength, deflection of beams, torsion, elastic stability of columns, unsymmetrical bending, moment of inertia, neutral axis, bending stresses.

3. Quality Control and Construction Engineering & Maintenance:

General knowledge on quality control of materials, tests-frequency of test required. Knowledge of relevant IS codes.

Estimating, costing, valuation, specifications, analysis of rates.

General Knowledge on construction tools, plants, machinery and equipments.

General Knowledge on maintenance of buildings - Day to day repairs, Annual repairs,

Special repairs, Additions & Alterations, Preventive maintenance, Register of buildings, Safety of buildings, survey and inspection.

Engineering Paper-II For SDO/A.E (CIVIL)

PART- I

(a) Survey:

Method, reconnaissance, ground survey, final location survey.

(b) Geometric Design:

Basic principles, design speed, sight distance, road land width, road way, carriage way, shoulders, camber, super elevation, horizontal and vertical alignment, curves and hairpin bends, passing places.

(c) Formation:

Trace cut, jungle clearance, earthwork in excavation, profile finishing, rock blasting methods, transportation and storage of explosives and accessories

(d) Drainage

Hydrological study, road side drains, catch water drains, pavement drainage, application of sub-surface drainage, causeway, culverts.

(e) Protective Works:

Design and methods, types-retaining wall, breast wall, toe wall, check walls, parapet, railing

(f) Slope Stability:

Landslide investigation, causes of landslide, corrective measures, erosion control, stability analysis, rock slope protection, rock bolting.

PART- II

(a) Pavement:

Types of pavement, factors governing design of pavement, traffic prediction, design life, capacity, soil parameters, design of pavement, strengthening of pavement, component layers of pavement, stages of constructions, compaction of sub-grade.

(b) Road construction Equipments & Machineries:

Necessity of using correct tools, machineries and equipments, output factors, optimum output.

(c) Quality Control:

Quality of materials, test, test checking, knowledge of IRC specifications.

(d) Bridge & Dam:

Factors effecting selection of site, economical selection of type of bridge, design and maintenance of bridge, selection of site for dams - gravity and earth dams, design of dams.

Syllabus for DEPARTMENTAL EXAMINATION
under PUBLIC WORKS DEPARTMENT, Govt. of Mizoram

(e) Maintenance & Safety:

Culverts, protection walls, side drains, pavement, side beams, 3E's - Engineering, Enforcement & Education, geometric deficiency and solution, road side amenities - aboriculture, information sign, traffic signs and markings.

(f) Estimating, analysis of rates and specification.

Engineering Paper-I For SDO/A.E (MECHANICAL)

1. General Study of Various Type of Machinery & Equipment used in Public Works Department.

- a) Engine Operation and design, its performance and testing,
- b) Lubrication
- c) Cooling system
- d) Fuel & Fuel system
- e) Ignition system
- f) Electrical system
- g) Transmission system
- h) Maintenance

2. Alternative to Petrol and Diesel Engine Detail Study About The Pros And Cons Of Such Alternative.

3. Construction Equipments.

- a) Basic Principles and Devices
- b) Prime Movers
- c) Earth Moving Equipments
- d) Conveying Equipments
- e) Hoisting Equipments
- f) Pumping and de-watering Equipments
- g) Aggregate and concrete production Equipments
- h) Piles and Pile driving Equipments
- i) Earth compaction and Bituminous carpeting Equipment.

Syllabus for DEPARTMENTAL EXAMINATION
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4. Planning and Application Construction Equipment.

- a) Planning and selection of construction equipments advantages and disadvantages of using machine.
- b) Output production estimate and output production equipment.

5. Economic of Construction Equipments.

- a) Principles of Engineering and Economics.
- b) Depreciation and calculation of depreciated cost.
- c) Working life of construction equipments.
- d) Procedure for calculation of number of equipments required for a particular work.
- e) Calculation of Units cost for a particular work using construction equipments.

6. Preventive Maintenance of Repair

- a) Inter-changeability of spare part.
- b) Inventory management principles aspects and method of maintenance.
- c) Servicing and servicing facilities.
- d) Field repair facilities.
- e) Inspection of equipments.
- f) Workshop for major repairs.

7. Hire Charges of Construction Equipment.

- a) Different component of hire charges.
- b) Calculation of different compound hire charges.
- c) Procedure of accounting and crediting for different component of hire charges.

8. Any other topics concerning Mechanical Engineering Works.

Engineering Paper-II For SDO/A.E (MECHANICAL)

1. Welding and Related Processes

- a) Different types of Welding and its importance in fabrication in Modern Industries
- b) Oxygen cutting, Brazing & Soldering and its application.

2. Measurement and Inspection

- a) Standard of Measurements and measuring tools used in machine shops.
- b) Linear Measurement, Angular Measurement, Taper Measurement, Surface Measurement.
- c) Comparator and Ganges.

Syllabus for DEPARTMENTAL EXAMINATION
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3. **General Study of the following Machine Tools and its Application**
 - a) Lathe Machine.
 - b) Milling Machine.
 - c) Drilling and Boring Machine.
 - d) Grinding Machine
 - e) Strapping and planning Machine.
4. **Study salient features of diesel generating set and its maintenance.**
5. **General study of different types of internal electrification of building.**
6. **Procedure followed to condemnation of old and unserviceable machinery and equipment.**
7. **General principle construction and application of refrigeration and equipment.**
8. **Any other topics concerning mechanical engineering works.**

Accounts Paper-I For SDO/A.E

The examination is mainly to test whether the officers have thorough knowledge of accounting procedure including writing up to various accounts. Such as Cash Books, Contractor Ledger, Materials at site accounts, Stock Returns, Register of Works, Preparation of Contractor Bills.

Accounts Paper-II For SDO/A.E

The examination is mainly intended to test the knowledge of the officials with the Rules and Regulations contained in CPWD Manuals, CCS (Conduct) Rules, 1964 General Financial Rules, (System of Financial Management and Control) G.P.F. (Central Service) Rules, 1960 and Fixation of Pay under the Mizoram (Revision of Pay) Rules, 2010.

Engineering Paper-I For ASSISTANT ARCHITECT

Planning and Designing

Basic Planning, Basic and standard dimensions for buildings, residential, public buildings, and official buildings.

Solar architecture, passive and active solar architecture. Sun angles and orientation.

Landscaping, hard landscape paving designs, and soft landscape. Site drainage, Plants and planting. Pools and fountains. Parking and recreation facilities including sports facilities, outdoor lighting.

Design for handicapped, basic and standard dimension and type of access required.

Town planning, complex planning and satellite town planning, relevant code of practice. Transport and circulation analysis of planning. Hierarchy of access and Pedestrian circulation, vehicular circulation and road system regarding urban and town planning.

Building byelaws or regulation, and development rules. National building code for safety and services provisions and incorporation of NBC on relevant norms.

Practice and guide lines as per the architect act 1972.

Engineering Paper-II For ASSISTANT ARCHITECT

Construction and Building Services.

Building materials stone, wood, plastic, boards and modern materials, conventional traditional material and method of construction, Specific materials for flooring, wall ceiling and roofing and roof treatment

Brick bond, Flemish bond, English bond for different thickness.

Stone masonry, random rubble, coarse rubble, ashlar work, and stone cladding works.

Wood working carpentry joints and mouldings, For different component of buildings.

Specification of building materials and process of construction. Detailing of section and building components Estimates by Quantity take off method.

Reinforce cement concrete and plain cement concrete works. System of structure, Load bearing and frame structure and theory of structures. Basic design of steel and RCC structure, effect of wind and earthquake load.

Anti-termite treatment. Method of application and common chemicals and modern new and available chemicals

System of curtain wall, construction of different wall system with modular and prefabricated system of construction

Building services, Water supply system pipe payout and for small and multistoried buildings. Soil, waste water disposal and vent pipe systems. Electrical system of building and illumination system and layout. Acoustic HVAC aspect of building construction.

Modern fitting equipment for hard wares, toilet illuminations and any other building fittings.

Paintings, surface preparation for paints for different materials, colour scheme, combination, type of paints and their different grades of quality and application.

Accounts Paper For ASSISTANT ARCHITECT

1. P.W.ACCOUNTS:

CPWD Manual Vol. II, Section-2 (Stages for Execution of Works)

2. GENERAL FINANCIAL RULES:

Chapter-2 (General System of Financial Management and Control)

3. G.P.F(Central Services) Rules, 1960.

4. C.C.SLEAVERULES, 1972

Rule 26, 27, 28, 29, 30, 32, 40, 41, 42.

5. C.C.S(Conduct Rules) 1964

Rule - 18 - Moveable, Immoveable and Valuable Property.