

NOTE: Safety precautions must be mentioned and should not be of a general nature. They should be dealt with specifically in the sections where they apply.

## PLUMBERS' THEORY N1

(One 3-hour paper)

1. Uses and care of the commoner hand tools and machines used by the plumber.
2. Brief descriptions of the uses and properties of the materials used in the trade, including pipes and fittings, solders and fluxes, sheet metals, jointing materials, washers, and packings.
3. Elementary sheet metalwork and pattern development required for gutters and downpipes of circular, square and rectangular cross section.  
Development of simple right conic and pyramidal sections.  
Common joints used in sheet metalwork, such as grooved, knocked-up, paned-down, lapped and Pittsburg lock joints.  
Allowances for jointing, notching and wire edges.
4. Water supply:
  - (a) Methods of jointing, bending and fixing the various kinds of piping used in the trade, and the fittings used.  
Fitting of pipes between fixed points.  
Making provision for expansion and contraction in pipe lay-outs.
  - (b) Protective coatings; depths of mains and service pipes in the ground;  
protection against frost.
  - (c) Water meters; purpose installation; readings.
  - (d) Details of the common types of taps, stopcocks, full-way valves, non-return valves and ball-valves, high-pressure and equilibrium types (large and small).
5. Hot water supply:
  - (a) Basic principles of hot water supply systems.
  - (b) Geyser installations, all types, simple working details.
  - (c) Boiler and cylinder systems including systems with simple secondary circulations.
  - (d) Precautions against air-locks and the rectifying of such defects.
  - (e) Use and installation of supply tanks and modern full-way pressure valves.
  - (f) Precautions to be observed in connection with hot water supply installations.
6. Roofwork: Flashings to pitched and flat roofs and around chimney stacks. Valley and box gutters.  
Various types of eaves gutters, downpipes and rain-water heads and methods of fixing.

- 7. Elementary principles of gas welding and brazing applicable to the trade.
- 8. Sanitary fitments: Waste traps; sinks; baths; water closets; showers; laundry troughs and urinals; installation and connection. Elementary treatment of soil, waste, antisiphonage and vent pipes.
- 9. By-laws applicable to the work covered by the syllabus.
- 10. Workshop calculations:

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Para. 10 Amend to read as follows:

10. Workshop Calculations:

- (a) Areas and volumes of square, rectangular, cylindrical and right conic sections.
- (b) Water pressure.
- (c) Elementary boiler rating calculations.

PLUMBERS' THEORY N2  
(One 3-hour paper)

NOTE: Reference should only be made to work of the previous grade where this is essential for a better understanding of the subject matter covered by this syllabus.

1. Water supply:
  - (a) Types of water and its action on pipes, tanks and cisterns.
  - (b) Water reticulation: gravity systems.
  - (c) Fire hydrants; sprinkler systems; booster pumps for use on multistoreyed buildings.
  - (d) Electrolytic action on pipes and fittings.
  - (e) Brief description and details of pumps in common use (reciprocating and centrifugal). Simple hydraulic rams.
2. Hot water systems:
  - (a) Installations for large buildings including interconnection of geysers.
  - (b) Indirect systems.
3. Sheet-metalwork:

Development and practical applications of:

  - (a) Simple objects such as long tapers and square to rounds by means of triangulation.
  - (b) Oblique conic and pyramidal sections.
  - (c) Tees, symmetrically positioned, at all angles for pipes of different diameters.

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4. Drainage:
- (a) Principles of drainage and the planning of simple drainage lay-outs and installations discharging into septic tanks and french drains.
  - (b) Determination of invert levels; use of boning rods and sight rails, dumpy level.
  - (c) Description and uses of the various types of drainage pipes and fittings.
  - (d) Jointing of drainage pipes and fittings, all types.
  - (e) Septic tanks and french drains, principles of operation, precautions, calculations.
  - (f) Drainage fitments such as universal gullies, grease traps, sand traps, stable gullies and petrol interceptors. Manholes, inspection eyes and access branch connections.
  - (g) Subsoil drainage of building sites.
  - (h) Use of standard abbreviations.
5. Sanitary pipework and fitments.
- (a) One and two-pipe systems.
  - (b) Ventilation and antisiphonage pipes.
  - (c) Details and descriptions of W.C. pans (siphonic and washdown types), squat pans and bidets; flushing valves; flushing cisterns, valve, siphonic and automatic types. Installation and servicing.
6. By-laws applicable to the work covered by the syllabus.
7. Calculations:
- (a) Pump deliveries and ~~power~~ power required.
  - (b) Discharge from pipes under a constant head.
  - (c) Number of branch pipes which may be tapped from a single main.

PLUMBERS' THEORY N3

(One 3-hour paper)

NOTE: Reference should only be made to work of the previous grade where this is essential for a better understanding of subject matter covered by this syllabus.

1. Water supply:
  - (a) Rapid gravity and pressure filters - principles, installation details and operation.
  - (b) Swimming pool purification and pressure filtration.
  - (c) Water softening-base exchange method for domestic installations.
2. Drainage:
  - (a) Vacuum and conservancy tanks; details and operation.
  - (b) Lay-out of soil and stormwater drainage systems.
  - (c) Modern methods of lifting sewage (treated very briefly); schematic lay-out.
  - (d) Testing of drains and sanitary installations.
3. Principles of central heating; diagrammatic lay-out of modern one-pipe system with accelerated circulation.
4. Principles of ventilation and air-conditioning. Schematic lay-outs of modern systems for halls, cinemas and public buildings.
5. Pattern development:
  - (a) Triangulation applied to non-symmetrical developments.
  - (b) Oblique cylindrical Y-pieces and connectors.
  - (c) Transition pieces.
6. Sanitary pipework and lay-outs:
  - (a) More involved one and two-pipe lay-outs.
  - (b) Correct grouping of fittings for open wall and duct installations.
  - (c) Hospital and laboratory fittings and special kitchen fittings such as dishwashers, potato peelers and refuse disintegrators. Mixing valves for hot water installations. Details, installation and servicing.
7. Practical consideration of by-laws relevant to the work covered by the syllabus.
8. Calculations:
  - (a) General calculations applicable to the trade
  - (b) Velocities and discharge rates of drains  
(Chezy formula)



## LOODGIETERSTEOEIE

Let Wel: Veiligheidsmaatreëls moet genoem word en moet nie van algemene aard wees nie. Hulle behoort spesifiek behandel te word in die afdelings waar dit van toepassing is.

### LOODGIETERSTEOEIE N1

(Een 3-uurvraestel)

1. Gebruike en versorging van die mees algemene gereedskap en masjiene wat deur die loodgieter gebruik word.
2. Kort beskrywings van die gebruike en eienskappe van die materiale wat in die ambag gebruik word, met inbegrip van pype en toebehores, soldeersels en vloeimiddels, plaatmetaalsoorte, materiale vir laswerk, wasters en pakkings.
3. Elementêre plaatmetaalwerk en patroonsontwikkeling wat vir geute en geutpype van ronde, vierkantige en reghoekige dwarsnit benodig word.  
  
Ontwikkeling van eenvoudige regte koniese en piramiedvormige seksies.  
  
Die meer algemene lasse wat by plaatmetaalwerk gebruik word soos groeflas, omgeklopte penlas, plat penlas, oorslag- en Pittsburg-slotlasse.  
  
Toelatings vir lasse, inkeping en draadrande.
4. Watervoorsiening:
  - (a) Metodes vir die las, buig en bevestiging van pype en die toebehores wat by die ambag gebruik word.  
Die installeer van pype tussen vaste punte.  
Voorsiening vir uitsetting en inkrimping in pypinstallasies.
  - (b) Beskermlae; dieptes van hoofleidings en diensleidings onder die grond; beskerming teen bevriësing.
  - (c) Watermeters; doel; installasie; lesings.
  - (d) Besonderhede van die mees algemene soorte krane, afsluitkrane, volgangkleppe, terugslagkleppe en vlotterkleppe, hoëdruk- en ewewigstipes (groot en klein).
5. Warmwatervoorsiening:
  - (a) Basiese beginsels van warmwatertoeverstelsels.
  - (b) Gieserinstallasies, alle tipes, eenvoudige werkingsbesonderhede.
  - (c) Ketel- en silinderstelsels met inbegrip van stelsels met eenvoudige sekondêre sirkulasies.
  - (d) Voorsorgmaatreëls teen lugslotte en die herstel van sulke defekte.
  - (e) Die gebruik en installasie van toevoertens en moderne volgangdrukkleppe.
  - (f) Voorsorgmaatreëls wat nagekom moet word by die installasie van warmwatertoeverinstallasies.

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6. Dakwerk: Voegdekkings aan staan- en platdakke en om skoorstene. Kiel- en bakgeute.  
Verskillende soorte dakrandgeute, geutpype en geutpypkoppe en metodes vir die bevestiging daarvan.
  7. Elementêre beginsels van gassweiswerk en sweissoldeerwerk van toepassing op die ambag.
  8. Sanitêre toebehore: Vuilwatersperders; opwasbakke; baddens; spoelklosette; storte; wastrogge en urinale; installasies en verbinding.  
Elementêre behandeling van vuil-~~vuilwater~~-, sluk- en ventilasiepype.
  9. Verordeninge van toepassing op die werk wat deur die leerplan gedek word.
  10. Werkplaasberekeninge:
    - (a) <sup>Area</sup> ~~Oppervlakte~~ en volumes van vierkantige, reghoekige, silinder-  
vormige en regte, koniese voorwerpe.
    - (b) Waterdruk.
    - (c) ~~Herleiding van grade C. na grade F. en omgekeerd.~~
    - (d) Elementêre ~~Bev~~-berekeninge. *Katelseenheid* berekening
    - (e) ~~Ben~~voudige probleme betreffende die omsetting van Britse mate  
en gewigte in *Metric* eenhede



## LOODGIETERSTEORIE N2

(Een 3-uurvræestel)

LET WEL: Daar moet slegs na werk van die vorige graad verwys word waar soiets noodsaaklik is vir n beter begrip van die vakinhoud wat deur hierdie sillabus gedek word.

1. Watervoorsiening:
  - (a) Soorte water en die werking daarvan op pype, tenke en bakke.
  - (b) Waternet: valstelsels.
  - (c) Brandkrane; sprinkelblusstelsels; aanjapompe vir gebruik op meerverdiepinggeboue.
  - (d) Elektrolitiese werking op pype en toebehores.
  - (e) Kort beskrywings en besonderhede van pompe wat algemeen gebruik word (suier- en sentrifugale tipes). Eenvoudige hidrouliese ramme.
2. Warmwaterstelsels:
  - (a) Installasies vir groot geboue met inbegrip van tussenverbinding van geisers.
  - (b) Indirekte stelsels.
3. Plaatmetaalwerk: Ontwikkeling en praktiese toepassings van:
  - (a) Eenvoudige voorwerpe soos lang spitsstukke, vierkant-na-ronde oorgangstukke deur middel van triangulasie.
  - (b) Skuins koniese en piramiedvormige stukke.
  - (c) T-stukke, simmetries geplaas, teen alle hoeke vir pype van verskillende diameters.
4. Riolering:
  - (a) Beginsels van riolering en die beplanning van eenvoudige rioleringsaanlegte en installasies wat in septiese tenke en stapelriole ontlaas.
  - (b) Bepaling van bodemhoogtes; die gebruik van korrelstokke en korrelhoute; bukswaterpas.
  - (c) Beskrywing en gebruike van die verskillende soorte rioolpype en toebehores.
  - (d) Die las van rioolpype en toebehores, alle tipes.
  - (e) Septiese tenke en stapelriole, werkbeginsels, voorsorgmaatreëls, berekeninge.
  - (f) Rioleringstoebehores soos universele rioolputte, vetvangers, sandvangers, stalrioolputte en petrolonderskeppers. Mangate, inspeksie-oë en steekoë.
  - (g) Sugriolering vir bouerreine.
  - (h) Die gebruik van standaardafkortings.
5. Sanitêre pypwerk en toebehore.
  - (a) Een- en tweepypstelsels.
  - (b) Ventilasië- en slukpype.
  - (c) Besonderhede en beskrywings van sk-bakke (hewel- en spoel-tipes), kurkpanne en bidette. Spoelkleppe: Spoelbakke, klep-, hewel- en outomatiese tipes. Installasie en versiening.
6. Verordeninge van toepassing op die werk wat deur die sillabus gedek word.
7. Berekeninge:
  - (a) Pomplerings en <sup>drukwing</sup> ~~perdeking~~ wat benodig word.
  - (b) Afvoer vanuit pype onder konstante drukhoogte.

LET WEL: Daar moet slegs na werk van die vorige graad verwys word waar soiets noodsaaklik is vir 'n beter begrip van die vakinhoud wat deur hierdie sillabus gedek word.

1. Watervoorsiening:
  - (a) Vinnige val- en drukfilters - beginsels, installasiebesonderhede en werking.
  - (b) Swembadversuiwering en drukfiltrering.
  - (c) Waterversagting: basiese uitruilstelsel vir huishoudelike installasies.
  
2. Riolering:
  - (a) Vakuum- en riooltenke; besonderhede en werking.
  - (b) Die uitlê van riool- en stormwaterdreineerstelsels.
  - (c) Moderne metodes vir die pomp van rioolvuil (baie kortliks behandel); skematiese uitleg.
  - (d) Toetsing van riole en sanitêre installasies.
  
3. Beginsels van sentrale verwarming; diagrammatiese uitleg van moderne eenpypstelsel met versnelde sirkulasie.
  
4. Beginsels van ventilasie en lugversorging. Skematiese uitlegte van moderne stelsels vir sale, bioskope en openbare geboue.
  
5. Patroonontwikkeling:
  - (a) Triangulasie toegepas op nie-simmetriese ontwikkelings.
  - (b) Skuins, silindriese Y-stukke en verbindstukke.
  - (c) Oorgangstukke.
  
6. Sanitêre pypwerk en uitlegte:
  - (a) Meer ingewikkelde een- en tweepypuitlegte.
  - (b) Korrekte groepering van toebehore vir oopmuur- en skagininstallasies.
  - (c) Hospitaal- en laboratoriummeubelment en spesiale kombuismeubelment soos skottegoedwassers, aartappelskillers en vuillisdisintegreerders. Mengkleppe vir warmwaterinstallasies. Besonderhede, installasies en versiening.
  
7. Praktiese oorweging van die verordeninge met betrekking tot die werk wat deur dié leerplan gedek word.
  
8. Berekeninge:
  - (a) Algemene berekeninge van toepassing op die ambag.
  - (b) Snelhede en afvoertempo's van rioolpype (Chezy-formule).