STAATSKOERANT
VAN DIE REPUBLIEK VAN SUID-AFRIKA

REPUBLIC OF SOUTH AFRICA
GOVERNMENT GAZETTE

REGULASIEKOERANT No. 3407 REGULATION GAZETTE No. 3407

PRYS (AVB ingesluit) 30c PRICE (GST included)

As 'n Nuusblad by die Poskantoor Geregistreer BUITELANDS 40c ABROAD *Registered at the Post Office as a Newspaper*

POSVRY · POST FREE

Vol. 202] PRETORIA, 2 APRIL 1982 [No. 8146

GOEWERMENTSKENNISGEWING

DEPARTEMENT VAN GESONDHEID EN WELSYN

No. R. 642 2 April 1982

SUID-AFRIKAANSE APTEKERSRAAD

REGULASIES BETREFFENDE DIE DIPLOMA IN FARMASIE

Die Minister van Gesondheid en Welsyn het kragtens artikel 49 (1) (j) en (k) van die Wet op Aptekers, 1974 (Wet 53 van 1974), op aanbeveling van die Suid-Afrikaanse Aptekersraad, die regulasies in die Bylae hiervan uitgevaardig:

BYLAE

WOORDOMSKRYWINGS

1. In hierdie regulasies beteken "die Wet" die Wet op Aptekers, 1974 (Wet 53 van 1974), en het enige uitdrukking waaraan 'n betekenis in die Wet toegeken is, daardie betekenis, en, tensy uit die samehang anders blyk, beteken—

"Aanhangsel" 'n aanhangsel by hierdie regulasies; en

"vorige regulasies" die regulasies uitgevaardig by Goewermentskennisgewing R. 378 van 3 Maart 1978, soos gewysig.

DUUR VAN KURSUS

2. Die studiekursus vir die Diploma in Farmasie strek oor vier jaar van voltydse studie wat deur die Suid-Afrikaanse Aptekersraad goedgekeur is: Met dien verstande dat 'n student hoogstens ses jaar vir die kursus ingeskryf mag wees: Voorts met dien verstande dat 'n student wat die vier jaar voltydse studie onderbreek of wat, na hy ses jaar vir die kursus ingeskryf is, nog nie die diploma behaal het nie, na goeddunke van die Raad, toegelaat kan word om weer vir die kursus in te skryf, behoudens sodanige voorwaardes as wat die Raad bepaal en na betaling van die voorgeskrewe gelde.

KWALIFISERING VIR DIPLOMA

3. 'n Kandidaat ontvang erkenning vir 'n vak deur in die eksamen in daardie vak ooreenkomstig hierdie regulasies te slaag. 'n Kandidaat kwalifiseer vir die diploma deur erkenning te verkry vir sodanige kwalifiserende kursusse as wat in hierdie regulasies bepaal word.

GOVERNMENT NOTICE

DEPARTMENT OF HEALTH AND WELFARE

No. R. 642 2 April 1982

SOUTH AFRICAN PHARMACY BOARD

REGULATIONS RELATING TO THE DIPLOMA IN PHARMACY

The Minister of Health and Welfare has, in terms of section 49 (1) (j) and (k) of the Pharmacy Act, 1974 (Act 53 of 1974), on the recommendation of the South African Pharmacy Board, promulgated the regulations as set out in the Schedule hereto:

SCHEDULE

DEFINITIONS

1. In these regulations "the Act" means the Pharmacy Act, 1974 (Act 53 of 1974), and any expression to which a meaning has been assigned in the Act shall bear the same meaning, and, unless the context otherwise indicates—

"Annexure" means an annexure to these regulations; and

"previous regulations" the regulations promulgated under Government Notice R. 378 of 3 March 1978, as amended.

DURATION OF COURSE

2. The course of study for the Diploma in Pharmacy extends over four years of full-time study which has been approved by the South African Pharmacy Board: Provided that a student may be enrolled for the course for a maximum of six years: Provided further that a student who interrupts the four years of full-time study or who, not having obtained the diploma after having been enrolled for the course for six years, may, in the discretion of the Board, be permitted to enrol again for the course, subject to such conditions as the Board may determine and after payment of the prescribed fees.

QUALIFYING FOR THE DIPLOMA

3. A candidate shall receive credit for a subject by passing the examination in that subject according to the regulations. A candidate qualifies for the diploma by obtaining credit for such qualifying courses as are determined in these regulations.

TOELATING

4. Geen persoon mag as 'n kandidaat vir die diploma toegelaat word nie, tensy—

(1) hy in besit is van die Matrikulasiesertifikaat van die Gemeenskaplike Matrikulasieraad of 'n sertifikaat van volle vrystelling van daardie eksamen, uitgereik deur genoemde Raad; en

(2) hy in die matrikulasie-eksamen in Wiskunde op die hoërgraad of Wiskunde op die standaardgraad met minstens 50 persent en in een van die volgende vakke op die standaardgraad geslaag het:

Biologie, Chemie, Dierkunde, Fisika, Fisiologie, Natuur- en Skeikunde of Plantkunde; of

(3) hy, voor die instelling van die standaard- en hoër graad in die matrikulasie-eksamen in 'n eksamen van matrikulasiestandaard in Wiskunde en in een van die volgende vakke geslaag het:

Biologie, Chemie, Dierkunde, Fisika, Fisiologie, Natuur- en Skeikunde of Plantkunde.

VERLOOP VAN KURSUS

5. (1) Die kursus bestaan uit die volgende:

(a) *Eerste jaar: Farmasie I:*

Biologie, Chemie, Fisika en Wiskunde: Met dien verstande dat 'n student wat ingevolge die vorige regulasies, by die inwerkingtreding van hierdie regulasies vir Wiskunde, Biologie, Fisika, Chemie I, Dierkunde en Plantkunde ingeskryf is, vir doeleindes van die vorige regulasie tot 31 Januarie 1983 geleentheid het om in genoemde vakke te slaag.

(b) *Tweede jaar: Farmasie II:*

Biochemie (halwe kursus), Farmaseutiese Chemie I, Farmaseutika I, Farmasie-administrasie A (halwe kursus) en Fisiologie: Met dien verstande dat 'n student wat ingevolge die vorige regulasies by die inwerkingtreding van hierdie regulasies vir Chemie II, Farmakognosie, Farmaseutika I en Fisiologie ingeskryf is, vir doeleindes van die vorige regulasies tot 31 Januarie 1983 geleentheid het om in genoemde vakke te slaag.

(c) *Derde jaar: Farmasie III:*

Farmakologie I, Farmaseutiese Chemie II, Farmaseutika II, Farmasie-administrasie B (halwe kursus) en Gesondheidskunde: Met dien verstande dat 'n student wat ingevolge die vorige regulasies by die inwerkingtreding van hierdie regulasies vir Farmakologie I, Farmaseutiese Chemie I, Farmaseutika II en Gesondheidsvoorligting (halwe kursus) ingeskryf is, vir doel-eindes van die vorige regulasies tot 31 Januarie 1984 geleentheid het om in genoemde vakke te slaag.

(d) *Vierde jaar: Farmasie IV:*

Farmakologie II (een en 'n halwe kursusse), Farmaseutiese Chemie III (halwe kursus), Farmaseutika III, Farmasiepraktyk (halwe kursus) en Geregtelike Farmasie (halwe kursus): Met dien verstande dat 'n student wat ingevolge die vorige regulasies by die inwerkingtreding van hierdie regulasies vir Farmakologie II, Farmaseutiese Chemie II, Farmaseutika III, Farmasie-administrasie en Geregtelike Farmasie ingeskryf is, vir doel-eindes van die vorige regulasies tot 31 Januarie 1985 geleentheid het om in genoemde vakke te slaag.

(2) (a) 'n Student moet al vier vakke van Farmasie I slaag voordat hulle Farmaseutiese Chemie I, Farmaseutika I en Farmasie-administrasie mag neem. 'n Student wat hoogstens twee vakke in Farmasie I uitstaande het, mag Biochemie en Fisiologie gelyktydig met die uitstaande Farmasie I-vakke neem mits hy in Chemie en Biologie geslaag het en mits daar nie klas- of eksamenroosterbotsings is nie.

ADMISSION

4. No person may be admitted as a candidate for the diploma, unless—

(1) he is in possession of the Matriculation certificate of the Joint Matriculation Board or a certificate of full exemption from that examination, issued by the said Board; and

(2) he has passed Mathematics in the higher grade in the Matriculation examination or Mathematics in the standard grade with at least 50 per cent and has passed one of the following subjects in the standard grade:

Biology, Chemistry, Zoology, Physics, Physiology, Physical Science or Botany; or

(3) prior to the introduction of the standard and higher grades in the Matriculation examination, he passed Mathematics in an examination of Matriculation standard and one of the following subjects:

Biology, Chemistry, Physics, Physiology, Physical Science or Botany.

ORDER OF THE COURSE

5. (1) The course comprises the following:

(a) *First year: Pharmacy I:*

Biology, Chemistry, Physics and Mathematics: Provided that a student who, at the coming into effect of these regulations, was enrolled for Mathematics, Biology, Chemistry, Zoology, Physics and Botany in terms of the previous regulations will, for the purposes of the previous regulations, have until 31 January 1983 to pass those subjects.

(b) *Second year: Pharmacy II:*

Biochemistry (half course), Pharmaceutical Chemistry I, Pharmaceutics I, Pharmacy Administration A (half course) and Physiology: Provided that a student who, at the coming into effect of these regulations, was enrolled for Chemistry II, Pharmaceutics I, Pharmacognosy and Physiology in terms of the previous regulations will, for the purposes of the previous regulations, have until 31 January 1983 to pass those subjects.

(c) *Third year: Pharmacy III:*

Health Science, Pharmaceutical Chemistry II, Pharmaceutics II, Pharmacology I and Pharmacy Administration B (half course): Provided that a student who, at the coming into effect of these regulations, was enrolled for Health Education (half course), Pharmaceutical Chemistry I, Pharmaceutics II and Pharmacology I in terms of the previous regulations will, for the purposes of the previous regulations, have until 31 January 1984 to pass those subjects.

(d) *Fourth year: Pharmacy IV:*

Forensic Pharmacy (half course), Pharmaceutical Chemistry III (half course), Pharmaceutics III, Pharmacology II (one and a half courses) and Pharmacy Practice (half course): Provided that a student who, at the coming into effect of these regulations, was enrolled for Forensic Pharmacy, Pharmaceutical Chemistry II, Pharmaceutics III, Pharmacy Administration and Pharmacology II in terms of the previous regulations will, for the purposes of the previous regulations have until 31 January 1985 to pass those subjects.

(2) (a) A student shall pass in all four of the subjects for Pharmacy I before being admitted to the courses Pharmaceutical Chemistry I, Pharmaceutics I and Pharmacy Administration. A student who has no more than two subjects of Pharmacy I outstanding, may be admitted to the courses Biochemistry and Physiology concurrently with the outstanding subjects of Pharmacy I provided that he has passed Chemistry and Biology and provided that there are no class or examination time-table clashes.

(b) 'n Student mag nie vir enige van die kursusse van Farmasie III inskryf voordat hy in alle kursusse van Farmasie II geslaag het nie: Met dien verstande dat 'n student wat in Fisiologie geslaag het vir Gesondheidskunde mag inskryf en dat 'n student wat in Farmasie-administrasie A geslaag het vir Farmasie-administrasie B mag inskryf, mits daar nie klas- of eksamenroosterbotsings is nie.

(c) 'n Student mag nie vir enige van die kursusse van Farmasie IV inskryf voordat hy in Farmakologie I, Farmaseutiese Chemie II en Farmaseutika II geslaag het nie.

(d) Geregtelike Farmasie mag net geneem word in die jaar waarin 'n student sy kursus kan voltooi.

HERTOELATING

6. 'n Student wat twee jaar agtereenvolgens sodanig druip dat hy nie Farmaseutiese Chemie I, Farmaseutika I en Farmasie-administrasie A kan neem nie, se inskrywing word nie weer aanvaar nie.

EKSAMENS

7. (1) *Getal en duur van vraestelle.*—Die getal teorievraestelle en die duur van die teorie-eksamens is soos volg:

(a) *Farmasie I:*

Biologie, Fisika en Wiskunde: Een vraestel van drie uur vir elke vak.

Chemie: Twee vraestelle van twee uur elk.

(b) *Farmasie II:*

Farmaseutiese Chemie I: Twee vraestelle van twee uur elk.

Farmaseutika I en Fisiologie: Een vraestel van drie uur vir elke vak.

Biochemie en Farmasie-administrasie A: Een vraestel van twee uur vir elke vak.

(c) *Farmasie III:*

Farmakologie I: Een vraestel van drie uur.

Farmaseutiese Chemie II en Farmaseutika II: Twee vraestelle van twee uur vir elke vak.

Farmasie-administrasie B: Een vraestel van twee uur.

Gesondheidskunde: Een vraestel van drie uur.

(d) *Farmasie IV:*

Farmakologie II: Een vraestel van drie uur en 'n mondelinge eksamen wat alle werk van Farmakologie I en II insluit.

Farmaseutika III: Twee vraestelle van twee uur elk.

Farmaseutiese Chemie III, Farmasiepraktyk en Geregtelike Farmasie: Een vraestel van twee uur vir elke vak.

(2) *Bestek van eksamens.*—Die bestek van die eksamens moet in ooreenstemming wees met die leerplanne wat in die Bylae van hierdie regulasies uiteengesit word.

(3) *Eksaminatore.*—Elke teorie-eksamen word afgeneem deur minstens twee eksaminatore wat deur die Raad aangestel is en van wie een nie deelgeneem het aan onderrig in die vak waarin die eksamen afgelê word nie: Met dien verstande dat, in die geval van Farmasie-administrasie, die Raad by elke technikon 'n interne eksaminator moet aanstel, wat aan die onderrig in hierdie vak deelgneem het en wat die vraestel vir kandidate aan sy eie technikon opstel, en 'n moderator wat die vraestel goedkeur en as eksterne eksaminator optree.

(4) *Tyd en plek van eksaminering.*—Die hoofeksamen word jaarliks aan die einde van die jaar by sentra wat die Raad bepaal, afgeneem en aanvullingseksamens kan, na goeddunke van die Raad, in Januarie of Februarie elke jaar afgeneem word.

(b) A student shall not enrol for any of the subjects for Pharmacy III before having passed all the courses for Pharmacy II: Provided that a student who has passed Physiology may enrol for Health Science, and that a student who has passed Pharmacy Administration A may enrol for Pharmacy Administration B, provided there are not class or examination time-table clashes.

(c) A student shall not enrol for any of the courses for Pharmacy IV before having passed Pharmaceutical Chemistry II, Pharmaceutics II and Pharmacology I.

(d) Forensic Pharmacy may be taken only in the year in which a student can complete his course.

RE-ADMISSION

6. The enrolment of a student who has failed for two successive years so that he is unable to enrol for Pharmaceutical Chemistry I, Pharmaceutics I and Pharmacy Administration A, will not be accepted again.

EXAMINATIONS

7. (1) *Number and duration of papers.*—The number of theory question papers and the duration of the theory examinations shall be as follows:

(a) *Pharmacy I:*

Biology, Mathematics and Physics: One three-hour paper for each subject.

Chemistry: Two two-hour papers.

(b) *Pharmacy II:*

Pharmaceutical Chemistry I: Two two-hour papers.

Pharmaceutics and Physiology: One three-hour paper for each subject.

Biochemistry and Pharmacy Administration A: One two-hour paper for each subject.

(c) *Pharmacy III:*

Pharmacology I: One three-hour paper.

Pharmaceutical Chemistry II and Pharmaceutics II: Two two-hour papers.

Pharmacy Administration B: One two-hour paper.

Health Science: One two-hour paper.

Health Science: One three-hour paper.

(d) *Pharmacy IV:*

Pharmacology II: One three-hour paper and an oral examination which covers all the work done in Pharmacology I and II.

Pharmaceutics III: Two two-hour papers.

Pharmaceutical Chemistry III, Pharmacy Practice and Forensic Pharmacy: One two-hour paper for each subject.

(2) *Compass of the examinations.*—The compass of the examinations shall be in accordance with the syllabi set out in the Annexure to these regulations.

(3) *Examiners.*—Each theory examination shall be conducted by not fewer than two examiners appointed by the Board, one of whom shall not have taken part in the teaching of the subject under examination: Provided that in the case of Pharmacy Administration, the Board shall appoint at each technikon an internal examiner who has taken part in the teaching of this subject and who shall set the question papers for candidates in his own technikon, and a moderator, who shall approve the question papers and act as external examiner.

(4) *Time and place of examining.*—The main examination shall be held annually at the end of the year at centres determined by the Board and, in the discretion of the Board, supplementary examinations may be held in January or February of each year.

(5) *Interne teorie-eksamens*.—Interne teorie-eksamens word twee keer elke jaar aan die technikon waar die kandidaat sy studiekursus volg deur interne eksaminatore wat die Raad aanstel, afgeneem.

(6) *Interne praktiese eksamens*.—Praktiese eksamens word aan die technikon waar die kandidaat sy studiekursus volg, deur interne eksaminatore wat die Raad aanstel, afgeneem. Die Raad moet 'n eksterne moderator aanstel vir elke praktiese vak aan elke inrigting, welke moderator die vraestelle van die praktiese eksamen moet goedkeur, minstens een van die praktiese eksamens inspekteer en die werk wat deur die kandidate gedoen is, ondersoek en daaroor aan die Raad verslag doen. Die aard van en die getal praktiese eksamens wat gedurende die jaar in elke vak afgeneem moet word, word deur die Raad bepaal.

(7) *Toelating tot eksamen*.—(a) Geen kandidaat mag tot 'n eksamen toegelaat word nie, tensy hy die voorgeskrewe eksameninskrywingsgeld betaal het wat saam met die eksameninskrywingsvorm ingedien moet word.

(b) Geen kandidaat mag tot 'n eksamen toegelaat word nie, tensy hy in besit is van 'n sertifikaat, uitgereik deur die technikon waar hy sy studiekursus volg, ten effekte dat hy minstens 75 persent van die klasse van die voorgeskrewe studie-kursus in die eksamenvak bevredigend bygewoon het en 'n jaarpunt van minstens 35 persent in die vak behaal het: Met dien verstande dat 'n kandidaat wat erkenning ontvang het vir al die kursusse, uitgesonderd een kursus, wat voorgeskryf is vir Farmasie I, Farmasie II, Farmasie III of Farmasie IV, toegelaat mag word om hom vir eksamen in daardie kursus of halwe kursus by die volgende gewone eksamen aan te meld sonder dat daar van hom verwag word om bedoelde sertifikaat te verkry.

(8) *Egrotat- en spesiale eksamens*.—(a) Die Raad kan 'n kandidaat toelaat om hom vir 'n egrotat- of spesiale eksamen in 'n vak of vakke aan te meld indien siekte of ander omstandighede wat vir die Raad aanvaarbaar is, verhoed dat hy hom vir 'n gewone eksamen, uitgesonderd 'n aanvullingseksamen, in sodanige vak of vakke aanmeld of verhoed dat hy die eksamen voltooi: Met dien verstande dat—

(i) die kandidaat binne sewe dae na die datum van die eksamen die hoofopsiener van die betrokke eksamensentrum van 'n mediese sertifikaat moet voorsien;

(ii) die Raad kan weier om 'n egrotateksamen toe te staan, sonder om sy redes te gee;

(iii) die Raad 'n kandidaat kan beveel om hom vir 'n eksamen aan te meld in 'n sentrum wat deur die Raad bepaal word.

(b) Die Raad kan 'n kandidaat wat voor of ten tyde van 'n eksamen of tydens die voorbereiding vir 'n eksamen, uitgesonderd 'n aanvullingseksamen, die verlies van 'n naverwant gely het, toelaat om hom vir 'n spesiale eksamen aan te meld in die vak of vakke waarvoor hy hom nie gedurende daardie tyd vir eksamen aangemeld het nie: Met dien verstande dat—

(i) die Raad kan weier om 'n spesiale eksamen toe te staan, sonder om sy redes te gee;

(ii) die Raad kan vereis dat 'n kandidaat sodanige dokumentêre bewys ter stawing van sy aansoek moet indien as wat die Raad nodig ag;

(iii) die Raad kan vereis dat 'n kandidaat hom vir 'n eksamen aanmeld in 'n sentrum wat die Raad bepaal.

(c) 'n Kandidaat wat hom ingevolge (a) of (b) vir 'n eksamen wil aanmeld, moet 'n skriftelike aansoek by die Registrateur indien binne 14 dae na die datum waarop die eksamen in die betrokke vak of vakke gehou is.

(d) 'n Kandidaat vir 'n egrotateksamen of 'n spesiale eksamen moet hom aanmeld vir die eksamen in regulasie 7 (12) bedoel.

(5) *Internal theory examinations*.—Internal theory examinations shall be conducted twice in each year by internal examiners appointed by the Board at the technikon at which the candidate is taking his course of study.

(6) *Internal practical examinations*.—Practical examinations shall be conducted by internal examiners appointed by the Board at the technikon at which the candidate is taking his course of study. The Board shall appoint an external moderator for each practical subject at each institution, who shall approve the practical examination question papers, shall inspect at least one of the practical examinations and shall examine the work done by the candidates and report thereon to the Board. The nature and the number of practical examinations which shall be conducted during the year in each subject shall be determined by the Board.

(7) *Admission to an examination*.—(a) No candidate shall be admitted to an examination unless he has paid the prescribed examination entrance fee, which shall be submitted together with the examination entrance form.

(b) No candidate shall be admitted to an examination unless he holds a certificate issued by the technikon at which he is taking his course of study, to the effect that he has satisfactorily attended not less than 75 per cent of the classes of the prescribed course of study in the subject of examination and has obtained a year mark of not less than 35 per cent in that subject: Provided that a candidate who has obtained credit for all but one of the courses prescribed for Pharmacy I, Pharmacy II, Pharmacy III or Pharmacy IV, shall be permitted to present himself for examination in that course or half-course at the next ordinary examination without being required to obtain the said certificate.

(8) *Aegrotat and special examinations*.—(a) The Board may permit a candidate to present himself for an aegrotat or special examination in a subject or subjects if he is prevented by illness or other circumstances which are acceptable to the Board from presenting himself for, or completing, an ordinary examination, other than a supplementary examination, in such subject or subjects: Provided that—

(i) the candidate shall within seven days of the date of the examination furnish the chief invigilator of the examination centre concerned with a medical certificate;

(ii) the Board may refuse to grant an aegrotat examination, without disclosing its reasons;

(iii) the Board may direct a candidate to present himself for examination at a centre determined by the Board.

(b) The Board may permit a candidate who has suffered the loss of a close relative before or at the time of an examination, or during preparation for the examination, other than a supplementary examination, to present himself for a special examination in the subject or subjects for examination in which he did not present himself at such time: Provided that—

(i) the Board may refuse to grant a special examination, without disclosing its reasons;

(ii) the Board may require a candidate to submit such documentary evidence in support of his application as the Board deems necessary;

(iii) the Board may require a candidate to present himself for examination at a centre determined by the Board.

(c) A candidate who wishes to present himself for an examination in terms of (a) or (b) shall submit a written application to the Registrar within 14 days of the date on which the examination in the subject or subjects concerned took place.

(d) A candidate for an aegrotat examination or a special examination shall present himself for the examination referred to in regulation 7 (12).

(e) 'n Student wat hom aanmeld vir die eksamen in regulasie 7 (12) bedoel, moet al die vraestelle in die uitstaande vak of vakke skryf al het hy sekere vraestelle van die vak of vakke reeds afgelê toe hy verhinder is om die eksamen te voltooi.

(9) *Inskrywing vir eksamens.*—(a) 'n Kandidaat vir toelating tot 'n eksamen moet voor of op 1 September of, in die geval van die aanvullingseksamens, voor of op 14 Januarie, 'n aansoek by die Registrateur indien op die vorm wat die Raad goedgekeur het: Met dien verstande dat 'n kandidaat wat om 'n goeie en genoegsame rede nie sy eksameninskrywingsvorm op 1 September kan indien nie, toegelaat moet word om 'n laat aansoek in te dien, mits die ingevulde eksameninskrywingsvorm nie later as 14 September deur die Registrateur ontvang word nie en die kandidaat inskrywingsgeld betaal wat gelyk is aan twee maal die bedrag van die geld wat voorgeskryf is vir die eksamen waarvoor hy wil inskryf.

(b) Die Registrateur moet ontvangs van elke eksameninskrywing erken en moet die kandidaat van die datums en tye van die eksamens verwittig indien sy inskrywing aanvaar word.

(c) Die Registrateur moet die kandidaat voorsien van 'n eksamenkaart waarop sy eksamennommer verskyn, welke kaart by elke eksamen getoon moet word: Met dien verstande dat die kandidaat, benewens sy eksamenkaart, ook positiewe bewys van sy identiteit moet toon voordat hy tot die eksamenlokaal toegelaat kan word.

(10) *Vrystelling van eksamens.*—(a) Die Raad kan vrystelling van die eksamen in 'n vak of vakke voorgeskryf vir Farmasie I en II toestaan op grond van 'n eksamen waarin geslaag is aan 'n universiteit of ander inrigting wat die Raad vir die doel aanneemlik vind: Met dien verstande dat die diploma nie aan 'n kandidaat toegeken word nie tensy hy die kursusse voorgeskryf vir Farmasie III en Farmasie IV voltooi het aan een van die technikons in regulasie 8 genoem.

(b) 'n Applikant wat om vrystelling van 'n eksamen aansoek doen moet die voorgeskrewe vrystellingsgeld saam met sy aansoek indien.

(11) *Jaar-, eksamen- en slaagpunte.*—(a) 'n Jaarpunt vir elke vak word bereken deur die punte behaal in die interne teorie-eksamens bedoel in regulasie 7 (5) en die punte behaal in die interne praktiese eksamens bedoel in regulasie 7 (6) in die verhouding 1:1 te laat tel: Met dien verstande dat by vakke waar interne praktiese eksamens nie voorgeskryf word nie, die gemiddelde van die punte behaal in die regulasie 7 (5) bedoelde eksamens as die jaarpunt geld.

(b) 'n Eksamenpunt vir elke vak word bereken deur die gemiddelde van die punte te neem wat in die voorgeskrewe vraestelle in elke vak in die eksterne eksamen behaal is. Die finale punt word bereken deur die eksamenpunt in die verhouding 2:1 met die jaarpunt bedoel in regulasie 7 (11) (a) te laat tel.

(c) Die minimum finale punt wat 'n kandidaat in elke vak moet behaal om die betrokke vak te slaag, is 50 persent: Met dien verstande dat die eksamenpunt vir elke vak in die eksterne eksamen nie minder as 40 persent mag wees nie.

(d) Alle punte moet as 'n persentasie uitgedruk word.

(e) Elke technikon moet elke jaar, nie later as 30 Oktober nie, ten opsigte van elke vak 'n puntestaat aan die Registrateur stuur waarin teenoor die naam van elke student wat aan die betrokke technikon ingeskryf is, die volgende aangegee word:

(i) Die punte behaal in die interne teorie-eksamens bedoel in regulasie 7 (5);

(ii) die punte behaal in die interne praktiese eksamens bedoel in regulasie 7 (6); en

(iii) die jaarpunt bereken volgens regulasie 7 (11) (a).

(e) A student who presents himself for the examination referred to in regulation 7 (12), shall write all the papers in the outstanding subject or subjects even though he may already have written certain papers in the subject or subjects at the time when he was prevented from completing the examination.

(9) *Entrance for examination.*—(a) A candidate for admission to an examination shall submit an application to the Registrar on the form approved by the Board on or before 1 September or in the case of the supplementary examinations, on or before 14 January: Provided that a candidate who, for a good and sufficient reason, is not able to submit his examination entry form on 1 September shall be allowed to submit a late application if the completed examination entrance form is received by the Registrar not later than 14 September and the candidate pays an entrance fee equal to twice the amount of the fee prescribed for the examination for which he wishes to enter.

(b) The Registrar shall acknowledge receipt of each examination entry form and shall advise the candidate, if his entry is accepted, of the dates and times of the examination.

(c) The Registrar shall provide the candidate with an examination card, bearing his examination number, which must be produced at every examination: Provided that the candidate shall also produce positive proof of identity in addition to his examination card before he may be admitted to the examination room.

(10) *Exemption from examinations.*—(a) The Board may grant exemption from the examination in a subject or subjects prescribed for Pharmacy I and II on the ground of an examination passed at a university or other institution acceptable to the Board for the purpose: Provided that the diploma shall not be awarded to a candidate unless he has completed the courses prescribed for Pharmacy III and Pharmacy IV at one of the technikons listed in regulation 8.

(b) An applicant who applies for exemption from an examination shall submit the prescribed exemption fee together with his application.

(11) *Year, examination and pass marks.*—(a) A year mark for each subject is calculated by letting the marks obtained in the internal theory examinations referred to in regulation 7 (5) and the marks obtained in the internal practical examinations referred to in regulation 7 (6) count in the proportion of 1:1: Provided that in the case of subjects where no internal practical examinations are prescribed, the average of the marks obtained in the examinations referred to in regulation 7 (5), shall count as the year mark.

(b) An examination mark for each subject is calculated by taking the average marks obtained in the prescribed papers in each subject in the external examination. The final marks are calculated by letting the examination mark count in the ratio of 2:1 with the year mark referred to in regulation 7 (11) (a).

(c) The minimum final mark which a candidate must obtain in each subject to pass that subject, is 50 per cent: Provided that the examination mark for each subject in the external examination shall not be less than 40 per cent.

(d) All marks shall be expressed as a percentage.

(e) Not later than 30 October of each year, each technikon shall, in respect of each subject, submit a mark sheet to the Registrar, indicating the following opposite the name of each student who is enrolled at the technikon:

(i) The marks obtained in the internal theory examinations referred to in regulation 7 (5);

(ii) the marks obtained in the intermal practical examination referred to in regulation 7 (6); and

(iii) the year mark calculated in terms of regulation 7 (11) (a).

(12) *Aanvullingseksamens*.—Die Raad kan 'n kandidaat wat in 'n eksamen druip, toelaat om hom in Januarie of Februarie van die daaropvolgende jaar vir 'n aanvullingseksamen aan te meld: Met dien verstande dat—

(a) 'n kandidaat hom nie vir 'n aanvullingseksamen in 'n vak mag aanmeld nie indien hy 'n eksamenpunt van minder as 40 persent in die betrokke vak behaal het;

(b) 'n kandidaat hom nie vir aanvullingseksamens in meer as drie vakke in elke studiejaar mag aanmeld nie;

(c) daar van 'n kandidaat wat toegelaat word om hom vir 'n aanvullingseksamen aan te meld, vereis kan word dat hy die eksamen in 'n sentrum aflê wat die Raad bepaal;

(d) indien 'n student vir 'n aanvullingseksamen in 'n vak kwalifiseer en sy finale persentasie wat hy in die hoofeksamen behaal het hoër is as sy jaarpunt in daardie vak, die jaarpunt deur sodanige finale persentasie vir doeleindes van die berekening van sy finale uitslag in die aanvullingseksamen, vervang word.

(13) Die sertifikaat in regulasie 7 (7) (b) bedoel, bly geldig vir die daaropvolgende aanvullingseksamen: Met dien verstande dat, indien die student weer in die aanvullingseksamen druip, hy die voorgeskrewe studiekursus in daardie vak moet herhaal voordat hy hom vir 'n verdere eksamen aanmeld.

GOEDGEKEURDE INRIGTINGS

8. (1) Die volgende is goedgekeurde inrigtings waar 'n studiekursus vir die Diploma in Farmasie gevolg kan word:

Kaapse Technikon.
Natalse Technikon.
Port Elizabethse Technikon.
Pretoriase Technikon.
Witwatersrandse Technikon.

(2) 'n Technikon genoem in subregulasie (1) moet nie later nie as 31 Maart in elke jaar lyste van die name van alle studente wat in elke studiejaar vir die Diploma in Farmasie ingeskryf is, by die Raad indien.

HERROEPING

9. Die regulasies wat kragtens Goewermentskennisgewing R. 378 van 3 Maart 1978 gepubliseer en by Goewermentskennisgewing R. 930 van 1 Mei 1981 gewysig is, word hierby herroep tot die mate in regulasie 5 (1) uiteengesit.

AANHANGSEL

LEERPLANNE VIR DIE DIPLOMA IN FARMASIE

Die leerplanne wat kragtens Goewermentskennisgewing R. 378 van 3 Maart 1978 afgekondig is, bly van krag vir die tydperke in regulasie 4 (1) uiteengesit. Duidelikheidshalwe word hulle in hierdie Bylae herpubliseer met 'n toepaslike verduidelikende nota, tesame met die nuwe leerplanne.

BIOCHEMIE

1. *Proteïene*.

1.1 Die sentrale funksionele rol van proteïene.

1.2 Proteïenstruktuur.

1.2.1 Die hiërargie in proteïenstruktuur.

1.2.2 Konfigurasie en spesifisiteit.

1.2.3 Konformasie.

2. *Ensiemologie*.

2.1 Biokatalise en biotransformasie.

2.2 Ensieme Kinetika.

2.2.1 Die Michaelis-Mententeorie.

2.2.2 Die funksionele betekenis van Km en Vm.

2.2.3 Ensieminhibisie.

(12) *Supplementary examinations*.—The Board may permit a candidate who has failed an examination to present himself for a supplementary examination in January or February of the following year: Provided that—

(a) a candidate shall not present himself for a supplementary examination in a subject if he obtained an examination mark of less than 40 per cent in that subject;

(b) a candidate shall not present himself for supplementary examinations in more than three subjects in each year of study;

(c) a candidate who is permitted to present himself for re-examination may be required to write the examination at a centre determined by the Board;

(d) if a student qualifies for a supplementary examination in any subject, and the final percentage which he obtained in the main examination is higher than his year mark in that subject, such final percentage is substituted for the year mark for the purposes of calculating his final result in the supplementary examination.

(13) The certificate referred to in regulation 7 (7) (b) remains valid for the following supplementary examination: Provided that, if the student fails in the supplementary examination, he shall repeat the prescribed course of study in that subject before he presents himself for a further examination.

APPROVED INSTITUTIONS

8. (1) The following are approved institutions where a course of study for the Diploma in Pharmacy may be followed:

Cape Technikon.
Natal Technikon.
Port Elizabeth Technikon.
Pretoria Technikon.
Witwatersrand Technikon.

(2) A technikon referred to in subregulation (1) shall, not later than 31 March of each year, submit to the Board lists of the names of all students who are enrolled in each year of study for the Diploma in Pharmacy.

REPEAL

9. The regulations published under Government Notice R. 378 of 3 March 1978 and amended by Government Notice R. 930 of 1 May 1981 are hereby repealed to the extent set out in regulation 5 (1).

ANNEXURE

SYLLABI FOR THE DIPLOMA IN PHARMACY

The syllabi published under Government Notice R. 378 of 3 March 1978 remain of force and effect for the periods set out in regulation 4 (1). For the sake of clarity they are republished in this schedule with an appropriate explanatory note, together with the new syllabi.

BIOCHEMISTRY

1. *Proteins*.

1.1 The central functional role of proteins.

1.2 Protein structure.

1.2.1 The hierarchy in protein structure.

1.2.2 Configuration and specificity.

1.2.3 Conformation.

2. *Enzymology*.

2.1 Biocatalysis and biotransformation.

2.2 Enzyme kinetics.

2.2.1 The Michaelis-Menten theory.

2.2.2 The functional significance of Km and Vm.

2.2.3 Enzyme inhibition.

2.3 Klassifikasie van ensieme.
2.3.1 Oksidoreduktases.
2.3.2 Transferases.
2.3.3 Hidrolases.
2.3.4 Liases.
2.3.5 Isomerases.
2.3.6 Ligases (sintetases).
2.4 Regulering van ensiemaktiwiteit.
2.4.1 Allosterisme.
2.4.2 Post-translasionele modifikasie van ensieme.
2.4.3 Ensieminduksie.
3. *Kokatalisatore.*
3.1 Definisies: Kokatalisatore: Koënsiem- en prostetiese groepe.
3.2 Klassifikasie van koënsieme.
3.3 Spesie-spesifisiteit in koënsiemfunksies.
4. *Biologiese oksidasie.*
4.1 Oksidasie-reduksie-reaksies.
4.1.1 Dihidrogenering.
4.1.1.1 Oksidases (O_2 as H-ontvanger).
4.1.1.2 Koënsiemgekoppelde dehidrogenases (substraat as H-ontvanger).
4.1.2 Suurstoftoevoeging.
4.1.2.1 Oksigenases (produk: dihidroksiderivaat).
4.1.2.2 Mono-oksigenase (produk: monohidroksiderivaat).
4.1.3 Elektronoordrag (meta-alloproteïene).
4.2 Intrasellulêre lokalisasie van biologiese oksidasie.
4.2.1 Mitochondriale sisteme.
4.2.2 Mikrosomales sisteme.
4.2.3 Sitoplasmiese sisteme.
4.3 Terminale metaboliese weë van biologiese oksidasie.
4.3.1 Die Krebs-siklus.
4.3.2 Die respiratoriese ketting.
4.3.3 Oksidatiewe fosforilering.
5. *Koolhidraatmetabolisme.*
5.1 Strukturele kenmerke van koolhidrate.
5.2 Glikogenolise en glikolise.
5.3 Glikoneogenese.
5.4 Heksose-monofosfaatverskuiwing.
6. *Lipiedmetabolisme.*
6.1 Strukturele kenmerke van lipiede.
6.2 B-oksidasie van vetsure.
6.3 Lipogenese en lipolise.
7. *Proteïen- en Aminosuurmetabolisme.*
7.1 Proteïenmetabolisme.
7.1.1 Basiese meganisme van proteïensintese.
7.1.2 Spesifisiteit in proteïensintese.
7.2 Aminosuurmetabolisme.
7.2.1 Ureumsintese (Ureum siklus).
7.2.2 Katabolisme van die C-skelet.
7.2.3 Genetiese defekte in die aminosuurmetabolisme.
8. *Nukleïensuurmetabolisme.*
81. Purien- en pirimidienbiosintese.
8.2 Purien- en pirimidienkatabolisme.

2.3 Classification of enzymes.
2.3.1 Oxido-reductases.
2.3.2 Transferases.
2.3.3 Hydrolases.
2.3.4 Lyases.
2.3.5 Isomerases.
2.3.6 Ligases (Synthetases).
2.4 Regulation of enzyme activity.
2.4.1 Allosterism.
2.4.2 Post-translational modification of enzymes.
2.4.3 Enzyme induction.
3. *Co-catalysts.*
3.1 Definitions: Co-catalysts: Coenzyme and prosthetic groups.
3.2 Classification of coenzymes.
3.3 Species specificity in coenzyme function.
4. *Biological Oxidation.*
4.1 Oxidation-reduction reactions.
4.1.1 Dehydrogenation.
4.1.1.1 Oxidases (02 as H-acceptor).
4.1.1.2 Dehydrogenases associated with coenzymes (substrate as H-acceptor).
4.1.2 Incorporation of oxygen.
4.1.2.1 Oxygenases (product—dihydroxy derivative).
4.1.2.2 Mono-oxygenases (hydroxylases) (product-monohydroxy derivative).
4.1.3 Electrontransport (metalloproteins).
4.2 Intracellular localization of biological oxidation.
4.2.1 Mitochondrial systems.
4.2.2 Microsomal systems.
4.2.3 Cytoplasmic systems.
4.3 Terminal metabolic pathways of biological oxidation.
4.3.1 The Krebs cycle.
4.3.2 The respiratory chain.
4.3.3 Oxidative phosphorylation.
5. *Carbohydrate metabolism.*
5.1 The structure characteristics of carbohydrates.
5.2 Glycogenolysis and glycolysis.
5.3 Glyconeogenesis.
5.4 Hexose-monophosphate shunt.
6. *Lipid metabolism.*
6.1 The structure characteristics of lipids.
6.2 B-oxidation of fatty acids.
6.3 Lipogenesis and lipolysis.
7. *Protein and amino acid metabolism.*
7.1 Protein metabolism.
7.1.1 The basic mechanism of protein synthesis.
7.1.2 Specificity in protein synthesis.
7.2 Amino acid metabolism.
7.2.1 Urea synthesis (Urea cycle).
7.2.2 Catabolism of the C-chain.
7.2.3 Genetic defects in amino acid metabolism.
8. *Nucleic acid metabolism.*
8.1 Biosynthesis of purines and pyrimidines.
8.2 Catabolism of purines and pyrimidines.

9. *Water en Mineraalmetobolisme.*

10. *Prakties.*

Dit is wenslik dat sekere gedeeltes van die leerplan ook by wyse van praktika aan die student verduidelik word, mits dit nie meer as vyf praktiese sessies oorskry nie.

BIOLOGIE

Teorie

1. Lewe: Die kenmerke van lewende organismes. Die omvang van die biologie.

2. Die fisies-chemiese grondslag van lewe.

3. Selle en weefsels en hul funksies.

4. Selmetabolisme.

5. Vervoer- en sirkulasiestelsels.

6. Voeding, vertering en metabolisme.

7. Senuweebeheer en koördinasie.

8. Hormoonstelsels.

9. Die beginsel van homeostase.

10. Osmoregulering en uitskeiding.

11. Genetika.

12. Voortplanting en ontwikkeling.

13. Ekologie, parasitologie.

14. Die verskeidenheid van lewensvorme: Geselekteerde voorbeelde uit virusse, bakterieë, fungi, mosse, varings, gimnosperme, angiosperme, laer en hoër ongewerwelde diere, die filum Chordata, grondbeginsels van die klassifikasie van lewende organismes, binominale nomenklatuur.

Prakties

Disseksie en bestudering van die anatomie van 'n soogdier.

Identifikasie en bestudering van parasiete.

Identifikasie en bestudering van enkele plante en diere van belang vir die apteker.

CHEMIE

AFDELING 1

Algemene en Fisiese Chemie

1.1 Stoïgiometrie.

1.2 Die gastoestand.

1.3 Die vloeibare en vaste toestand.

1.4 Oplossing en metodes om konsentrasie uit te druk.

1.5 Kolloïede.

1.6 Saambindende eienskappe.

1.7 Elektrochemie.

1.8 Sure en basisse.

1.9 Chemiese ewewig.

AFDELING 2

Anorganiese en Analitiese Chemie

2.1 Atoomstruktuur en die periodieke tabel.

2.2 Algemene eienskappe van die elemente.

2.3 Bindingsvermoë.

2.4 Indeling van chemiese reaksies en reagense.

2.5 Balansering van vergelykings.

2.6 Teorie van volumetriese analise.

2.7 Teorie van kwalitatiewe analise.

9. *Water and Mineral Metabolism.*

10. *Practical.*

It is desirable that certain portions of the syllabus be explained to the student by means of practicals, provided that they do not exceed five practical sessions.

BIOLOGY

Theory

1. Life: Feature of living organisms. The scope of biology.

2. The physical-chemical basis of life.

3. Cells and tissues, and their functions.

4. Cell metabolism.

5. Transport and circulatory systems.

6. Nutrition, digestion and metabolism.

7. Nerve control and co-ordination.

8. Hormone systems.

9. The principle of homeostatis.

10. Osmoregulation and excretion.

11. Genetics.

12. Reproduction and development.

13. Ecology, parasitology.

14. The diversity of life forms: Selected examples from viruses, bacteria, fungi, bryophytes, ferns, gymnospers, angiosperms, lower and higher invertebrates, the phylum Chordata, basic principles of classification of living organisms, binomial nomenclature.

Practical

Dissection and study of the anatomy of a mammal.

Identification and study of parasites.

Identification and study of selected plants and animals of importance to the pharmacist.

BOTANY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

A. Theory

1. Biology, its meaning and scope, and its two great subdivisions, botany and zoology; its value as a cultural and as a pharmaceutical subject. Meaning and scope of the more important subdivisions of biology; taxonomy, morphology, anatomy, physiology, genetics, evolution.

2. The plant kingdom and its main subdivisions and their features: bacteria, algae, fungi, lichens, bryophytes, pteridophytes, gymnosperms and angiosperms as examples of the diversity of forms of plant life and of evolutionary history and tendencies.

3. The plant as a living organism; form, function of the roots, stem, leaves, flowers, fruit of a typical green herbaceous land plant and of a woody perennial showing secondary thickening. The influence of the habitat (soil and aerial) on plant organs. Nature of the modifications of organs for special functions. The cell and cell division. The tissues of typical angiosperms—their structure, arrangement and functions in brief. A typical flower—its structure and the functions of the various parts; the fruit and seed structure, dispersal, germination of seed.

4. Elements of plant physiology—water-relations, photosynthesis, nutrition, growth, respiration, digestion, tropisms in relation to gravity, light, water, storage of reserves. Parasitism, saprophytism, epiphytism.

5. A brief comparative study of the form, structure, life-history and reproduction of Bacillus subtilis, Tobacco Mosaic Virus, Chlamydomonas, Spirogyra, Diatome, Fucus, Rhizopus nigricans, Saccharomyces, Claviceps, Pinicillium, Agaricus (psalliota), Funaria, Dryopteris, Pinus, a typical Monocotyledon, a typical Diccotyledon.

AFDELING 3

Organiese Chemie

3.1 Inleiding.

3.1.1 Hibridisasie.

3.1.2 Isomerisme.

3.1.3 Elektroniese effekte en faktore wat elektroniese verspreiding beïnvloed.

3.2 Sistematiese (I.U.P.A.C.-) nomenklatuur.

3.3 Basiese reaksiekinetika.

3.4 Alifatiese organiese chemie.

3.4.1 Koolwaterstowwe.

3.4.2 Haliede.

3.4.3 Alkohole.

3.4.4 Karbonielverbindings.

3.4.5 Eters.

3.4.6 Amiene.

3.4.7 Nitriele.

3.4.8 Karboksielsure en hul derivate.

3.5 Reaksiemeganisme van addisie-, eliminasie- en substitusie-reaksies.

3.6 Praktiese organiese chemie.

3.6.1 Tegnieke en apparaat vir organiese praktika.

3.6.2 Tipiese reaksies van uitgesoekte funksionele groepe.

AFDELING 4

Praktiese Chemie

4.1 Kwalitatiewe analise van uitgesoekte katione en anione.

4.2 Volumetriese analise: Standaardisering, neutralisasie, redoks- en presipitasietitrasies.

4.3 Organiese analise.

4.3.1 Kwalitatiewe bepaling van stikstof, swael en halogeen in organiese verbindings.

4.3.2 Kenmerkende reaksies van uitgesoekte funksionele groepe.

CHEMIE II

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Afdeling 1: Fisiese Chemie:

1.1 Gasse, vloeistowwe en vaste stowwe.

1.2 Chemiese binding.

1.3 Oplossings en fase-ewewigte.

1.4 Chemiese kinetika.

1.5 Ioniese ewewigte.

1.6 Elektrochemie.

1.7 Kern- en radiochemie.

Afdeling 2: Analitiese Chemie:

2.1 Die beginsels van volumetriese analise.

2.2 Chromatografiese tegnieke.

2.3 'n Inleiding tot instrumentele tegnieke van analise.

Afdeling 3: Anorganiese Chemie:

3.1 Die sistematiese en vergelykende chemie van uitgesoekte elemente.

3.2 Komplekse.

Afdeling 4: Organiese Chemie:

4.1 Metodes van suiwering en bepaling van fisiese konstantes.

6. Principles of taxonomy as illustrated by a brief study of the representative of the following families: Liliaceae, Gramineae, Ranunculaceae, Leguminosae, Solanaceae, Compositae, Labiatae, Scrophulariaceae.

B. Practical

The examination, dissection, macroscopic and microscopic examination, description and drawing of plant material drawn from the list given above; demonstrations of ecological and physiological features to be arranged. The examination should aim at determining the powers of observation of the candidate, his capacity for describing and drawing faithfully what he has seen, and his capacity for interpreting botanical phenomena.

CHEMISTRY

SECTION 1

General and Physical Chemistry

1.1. Stoichiometry.

1.2 The gaseous state.

1.3 The liquid and solid states.

1.4 Solution and methods of expressing concentration.

1.5 Colloids.

1.6 Colligative properties.

1.7 electrochemistry.

1.8 Acids and bases.

1.9 Chemical equilibrium.

SECTION 2

Inorganic and Analytical Chemistry

2.1 Atomic structure and the periodic table.

2.2 General properties of the elements.

2.3 Combining power.

2.4 Classification of chemical reactions and reagents.

2.5 Balancing of equations.

2.6 Theory of volumetric analysis.

2.7 Theory of qualitative analysis.

SECTION 3

Organic Chemistry

3.1 Introduction.

3.1.1 Hybridisation.

3.1.2 Isomerism.

3.1.3 Electronic effects and factors affecting electronic distribution.

3.2 Systematic (I.U.P.A.C.) nomenclature.

3.3 Basic reaction kinetics.

3.4 Aliphatic organic chemistry.

3.4.1 Hydrocarbons.

3.4.2 Halides.

3.4.3. Alcohols.

3.4.4 Carbonyl compounds.

3.4.5 Ethers.

3.4.6 Amines.

3.4.7 Nitriles.

3.4.8 Carboxylic acids and their derivatives.

3.5 Reactions mechanism of addition, elimination and substitution reactions.

3.6 Practical organic chemistry.

3.6.1 Techniques and apparatus for organic practicals.

3.6.2 Typical reactions of selected functional groups.

4.2 Die bepaling van molekulêre formules van uitgesoekte verbindings.

4.3 'n Meer gevorderde bespreking van stereoïsomerie.

4.4 Prototropie en uitgesoekte molekulêre omskakelings.

4.5 Bespreking van die chemie van uitgesoekte klasse van verbindings uit die alifatiese, karbosikliese, aromatiese en heterosikliese reekse met beknopte illustrasie van die toepassing van instrumentele metodes soos infrarooi- en massaspektrometrie vir opklaring van struktuur.

Afdeling 5: Praktiese Chemie:

5.1 Kwalitatiewe analise van die elemente.

5.2 Volumetriese analise: Standaardisering, neutralisasie, presipitasie, redoks, kompleksometriese en adsorpsietitrasies.

5.3 Instrumentele analise.

5.4 Bereiding van suiwering en organiese verbindings op semimikroskaal.

DIERKUNDE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1. Klein soogdier (bv. rot, konyn, marmot of kat)—uitwendige kenmerke, vel en aanhangsels. Spysverteringstelsel—hoofdele van die spysverteringskanaal en verwante organe. Ensieme en hormone—oorsig van hul funksies by vertering.

Peristalsis.

Mond—slym, ptialien.

Maag—pepsien, HCl, rennien.

Pankreas—tripsinogeen, steapsien, amilopsien.

Dunderm—erepsien, enterokinase, lipase, lewer.

Galpigmente en soute.

Rektum—absorpsie van water, uitwerping van onverteerde voedsel, uitskeiding vanuit die bloedvate van die wande.

Bloedvatstelsel—hart, belangrike bloedvate.

Aard van arterieë, venes, poortare, kapillêre.

Funksies van bloedvervoer, beskerming (fagositose, stolling, agglutinasie).

Handhawing van konstante temperatuur.

Respiratoriese stelsel.

Senustelsel—rugmurg en senuwees: Brein en kopsenuwees.

Simpatiese stelsel—refleksboog. Funksies van dele in die algemeen.

Skeletstelsel—werwelkolom, skedel, ledemateskelet.

Name van bene—funksies—aanhegting van spiere, ondersteuning, beskerming.

Urogenitale stelsel—niere, geslagskliere, buise en aanverwante kliere.

Plasenta.

Endokriene stelsel—belangrikste kliere en hul funksies in die algemeen.

2. Mikroskopiese anatomie van soogdiere—struktuur en fisiologie.

Dierselle—struktuur en vermenigvuldiging. Mitose, Meiose.

Epiteelweefsel—tragea, esofagus, maag, ingewande, vel, lewer, pankreas, nier.

SECTION 4

Practical Chemistry

4.1 Qualitative analysis of selected cations and anions.

4.2 Volumetric analysis: Standardisation, neutralisation, redox and precipitation titrations.

4.3 Organic analysis.

4.3.1 Qualitative determination of nitrogen, sulphur and halogen in organic compounds.

4.3.2 Characteristic reactions of selected functional groups.

CHEMISTRY II

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Section 1: Physical Chemistry:

1.1 Gases, liquids and solids.

1.2 Chemical bonding.

1.3 Solutions and phase equilibria.

1.4 Chemical kinetics.

1.5 Ionic equilibria.

1.6 Electrochemistry.

1.7 Nuclear and radiochemisty.

Section 2: Analytical Chemistry:

2.1 The principles of volumetric analysis.

2.2 Chromatographic techniques.

2.3 An introduction to instrumental techniques in analysis.

Section 3: Inorganic Chemistry:

3.1 The systematic and comparative chemistry of selected elements.

3.2 Complexes.

Section 4: Organic Chemistry:

4.1 Methods of purifacation and determination of physical constants.

4.2 The determination of molecular formulae of selected compounds.

4.3 A more advanced discussion of stereo-isomerism.

4.4 Prototropy and selected molocular rearrangements.

4.5 Discussion of the chemistry of selected classes of compounds drawn from the aliphatic, carbocyclic, aromatic and heterocyclic series with brief illustrations of the application of instrumental methods such as infrared and mass spectrometry to the elucidation of structure.

Section 5: Practical Chemistry:

5.1 Qualitative analysis of the elements.

5.2 Volumetric analysis: Standardisation, neutralisation, precipitation, redox, complexometric and adsorption titrations.

5.3 Instrumental analysis.

5.4 Preparation and purification of organic compounds on semi-micro scale.

FORENSIC PHARMACY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Candidates will be examined on their knowledge of the following legislation in so far as it has a bearing on the practice of pharmacy:

1. The Pharmacy Act, 1974 (Act 53 of 1974), and regulations made under the Act.

Bindweefsel—los, digte elastiese, kolagene en retikulêre: vet, pigment, limf- en longweefsel; been, kraakbeen en bloed (met inbegrip van stolling).

Spierweefsel—gestreepte, hart en gladde.

Senuweefsel—ganglia en sinapse, neuroglia.

Sensoriese organe en weefsels—smaakknoppies, eindknoppies, liggaampies van Paccini, eindplate, spierspoele, vry senu-uiteindes, reuk-epiteel, oog, oor.

Geslagsorgane—testis, ovarium, gametogenese, geslagsbepaling.

3. Klassifikasie in hooftrekke—basiese beginsels van klassifikasie; groepering van diere in spesies, geslagte, families, klasse, stamme.

4. Algemene studie van die volgende invertebrata:

Protozoa—Amoeba, Entamoeba, Trichomonas Trypanosoma, Plasmodium, Babesia.

Nemathelmintes—Trichocephalus (Trichuris), Strongyloïdes, haakwurm, Enterobius, Ascaris.

Plathyhelmintes—Schistosoma, Fasciola, Taenia, Echinococcus.

Arthropoda—kreef of kakkerlak of sprinkaan (algemene morfologie). Weeluis, muskiet, vlooi, tsetsevlieg, huisvlieg, luis en kewer (alleenlik eksterne bou, monddele en lewensloop).

Arachnida—bosluise en myte (eksterna bou, lewensloop en gashere).

5. Parasitisme.

6. Oorerwing—Mendelse oorerwing soos geïllustreer deur die oorerwing van eenvoudige en geslagsgebonde kenmerke.

7. Embriologie van die padda.

Prakties

Die volledige disseksie van die stelsels (uitgesonderd die spierstelsel) van 'n klein soogdier, kreef of kakkerlak of sprinkaan. Uitkenning van die bene van die skelet, en van skyfies wat die makroskopiese struktuur toon van diere of dele van diere wat in die teoretiese leerplan genoem word.

FARMAKOGNOSIE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1. Die geskiedenis en ontwikkeling van Farmakognosie.

2. Die klassifikasiemetodes wat toegepas word by die studie van natuurlike produkte.

3. Die studie van natuurlike produkte met verwysing na die biologiese en geografiese bronne, kweek, versameling en bereiding vir die mark, handelsvariëteite, vervalsing, opberging, evaluering, bestanddele en hul werking en gebruike. Hierdie aspekte moet behandel word waar dit van toepassing is en soos bepaal deur die huidige belangrikheid daarvan vir die farmaseutiese en mediese wetenskappe.

4. Chirurgiese wonddekkings en suture.

5. Die belangrikste inheemse giftige plante.

Prakties

1. Ondersoek en beskrywing van die makroskopiese eienskappe van ru-artsenymiddels.

2. Mikroskopiese ondersoek en beskrywing van ru-artsenymiddels, op sigself, verontreinig en/of mengsels.

3. Uitvoering van fitochemiese voorproewe op plante en uitvoering van tegnieke wat gebruik word by die analise van natuurlike produkte.

Regulations made under the Medical, Dental and Pharmacy Act, 1928 (Act 13 of 1928), in so far as they have not been replaced by regulations made under the Medicines and Related Substances Control Act, 1965, or by new regulations under the Pharmacy Act, but excluding the Therapeutic Substances Regulations.

3. The Liquor Act, 1928 (Act 30 of 1928): Sections 5, 130, 131, 140 and 175 and regulations made under sections 130 and 131.

4. The Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972):

4.1 Sections 1 (i), (iv), (vi), (vii), (xiv) and (xxiii), 2, 5, 8, 9 and 15 (a general knowledge only is required of the last-mentioned section);

4.2 The following regulations made under the Act:

4.2.1 The regulations on natural and artificial sweeteners, published under Government Notice R. 1881 of 12 October 1973;

4.2.2 Subregulations (3), (5), (21) and (24) of the regulation on labelling published under Government Notice R. 908 of 27 May 1977.

Until the new regulations are published under this Act on the following matters, students should become acquainted with the relevant regulations made under the old Foods, Drugs and Disinfectants Act and still in force, viz regulations 32 (disinfectants), 35 (ointments, creams and powders), 35*bis* (toothpastes, tooth powders and mouthwashes) and 40 (honey).

5. Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947):

5.1 The sections relating to stock remedies, viz 1 (definitions only), 3, 7 and 21.

5.2 A general knowledge of the regulations relating to the registration and sale of stock remedies, in so far as they have a bearing on the practice of pharmacy, viz 1, 2 and 7. (Published under Government Notice R. 857 of 28 May 1971.)

6. The Medicines and Related Substances Control Act, 1965 (Act 101 of 1965):

6.1 In particular the following sections: 1 (i), (iii), (iv), (x), (xii), (xiii), (xv), (xvii), (xix), (xx), (xxiii), (xxiv), (xxv), (xxvi), (xxvii), (xxviii), (xxix), (xxx), (xxxi), (xxxii), (xxxiii), (xxxiv), (xxxv), (xxxvi), (xxxvii), (xxxviii), (xxxix), (xl) and (xli), 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22A (and the Schedules), 23, 24, 26, 28, 29, 30, 32, 33, 35, 36 and 37.

6.2 Regulations made under the Act (Government Notice R. 352 of 21 February 1975). Candidates should have a general knowledge of the categories of medicines which are subject to registration in terms of the Act as well as of the procedure when applying for registration of a medicine and of the classification of medicines (regulations 2, 3, and 4). A detailed knowledge of the following regulations is necessary: 9, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32, 33 and 34.

7. The Hazardous Substances Act, 1973 (Act 15 of 1973), and the regulations made under the Act relating to Group I and II Hazardous Substances.

8. The Abuse of Dependence-producing Substances and Rehabilitation Centres Act, 1971 (Act 41 of 1971), in particular the following sections in so far as they have not been replaced by the provisions of the Medicines and Related Substances Control Act: 1 (iii), (iv), (xiii), (xix), (xxii), (xxxi), 2, 2A, 3, 4, 4A, 5 and 15. Parts I, II and III of the Schedule.

4. Uitvoering van offisiële identifikasietoetse op natuurlike produkte en suiwer stowwe van natuurlike oorsprong.

5. Ondersoek en beskrywing van materiaal met betrekking tot die vesels wat daarin aanwesig is en die verspreiding daarvan.

FARMAKOLOGIE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1. Die omvang van Farmakologie.

2. Oordrag van geneesmiddels en farmakodinamika:

2.1 Absorpsie van middels in die organisme en faktore wat sodanige absorpsie beïnvloed.

2.2 Verspreiding van middels in die organisme en faktore wat sodanige verspreiding beïnvloed.

2.2.1 Passiewe vervoer van middels.

2.2.2 Aktiewe vervoer van middels.

2.3 Metabolisme van geneesmiddels en faktore wat sodanige metabolisme beïnvloed.

2.4 Uitskeiding van geneesmiddels en faktore wat sodanige uitskeiding beïnvloed.

3. Geneesmiddel-reseptoraksies:

3.1 Interaksie van een of meer middels met een reseptorsisteem:

3.1.1 Chemiese struktuur en werking.

3.1.2 Dosisreaksiekurwes.

3.1.3 Kompetitiewe interaksie.

3.1.4 Affiniteit en intrinsieke aktiwiteit.

3.2 Interaksie van een of meer middels met verskillende reseptorsisteme:

3.2.1 Nie-kompetitiewe interaksies.

3.2.2 Chemiese antagonisme.

3.2.3 Funksionele interaksies.

3.2.4 Verbindings met veelvoudige werkings.

3.2.5 Spesifieke en nie-spesifieke geneesmiddelwerking.

3.2.6 pH en werking van geneesmiddels.

3.3 Die verband tussen stimulus en effek:

3.3.1 Alles-of-niks-reaksie.

3.3.2 Drumpelverskynsels.

3.3.3 Reseptorreserwe.

4. Inleiding tot geneesmiddelontwerp.

5. Middels met 'n werking op die senustelsel:

5.1 Middels met 'n werking op die perifere senustelsel:

5.1.1 Die alfa- en beta-simpatomimetiese en die alfa- en beta-simpatolitiese middels.

5.1.2 Indirekte simpatomimetiese en die alfa- en beta-simpatolitiese middels.

5.1.3 Parasimpatomimetiese en parasimpatolitiese middels.

5.1.4 Ganglion-stimulerende en -blokkerende middels.

5.1.5 Kurariformemiddels.

5.1.6 Nie-spesifieke muskolotrofiese middels.

5.2 Middels met 'n werking op die sentrale senustelsel:

5.2.1 Stimulanse van die sentrale senustelsel en dopaminergiese middels.

5.2.2 Depressiva van die sentrale senustelsel en dopaminolitiese middels.

9. The Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act 56 of 1974), sections 36 (in so far as this section relates to pharmacy), 52 and 57.

Note.—The above knowledge will extend to any amendments to the specified sections of schedules and to any relevant regulations or amendments thereof published on or before 30 April of the current year.

HEALTH EDUCATION

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Aim.—To prepare the pharmacist and provide him with background information to enable him to provide within the framework of his profession, information and advice to the public on public health matters.

1. Introduction:

1.1 The meaning and significance of health education.

1.2 Theories and beliefs about health, disease and hygiene in South Africa.

1.3 Attitutes to illness and suffering in South Africa and the means of changing them.

1.4 The role of the pharmacist in health education.

1.5 Sources of health education information.

2. Factors which cause disease.

3. Infectious and communicable diseases, including their spread and prevention.

4. The problems related to and services available for common physical and mental disabilities.

5. Health topics currently of interest.

6. Health aspects of food and nutrition.

7. Control of insects and other pests.

8. Correct use, storage and disposal of medicines.

9. Family planning.

10. Maternal health care and services.

11. Environmental factors influencing health.

12. First aid.

MATHEMATICS

1. Algebra:

1.1 Exponents and logarithms.

1.2 Solution of equations.

1.3 Simultaneous linear equations.

1.4 The binomial theorem.

2. Trigonometry:

2.1 Radian measure.

2.2 Trigonometric ratio of arbitrary angles (functions).

2.3 Trigonometric identities.

2.4 Inverse trigonometric functions.

3. Graphs:

3.1 Graphs of straight line, parabola, hyperbola, exponential and logarithmic functions.

3.2 Determination of physical laws from experimental results.

4. Calculus:

4.1 Differentiation and intergration of polynomials, logarithmic and exponential functions.

4.2 Applications of differentiation and integration.

4.2.1 Tangents.

4.2.2 Maxima and minima.

4.2.3 Rates of change.

5.2.3 Middels wat gedrag beïnvloed.

5.2.4 Analgetika en antipiretika.

5.2.5 Middels wat die hoessentrum onderdruk.

6. Histaminergiese middels en antihistaminika.

7. Geneesmiddels en allergie.

8. Geneesmiddels en die behandeling van brongopatie en rinopatie.

9. Plaaslike anestetika.

10. Geneesmiddels en die spysverteringskanaal:

10.1 Middels met 'n werking in die mond, keel en esofagus.

10.2 Emetika en anti-emetika.

10.3 Teësure, absorbeermiddels en carminativa.

10.4 Lakseermiddels.

11. Geneesmiddels en die kardiovaskulêre stelsel:

11.1 Hartglikosiede.

11.2 Middels wat die hartspier onderdruk.

11.3 Dilateermiddels vir kononêre bloedvate.

11.4 Middels wat hipertensie teëwerk.

11.5 Middels wat die bloedcholesterolspieël verlaag.

12. Middels wat die water- en soutbalans beïnvloed:

12.1 Suur-basisbalans en intraveneuse vloeistofterapie.

12.2 Diuretika en antidiuretika.

12.3 Die ione (kalium, kalsium, magnesium, fluoried, jodied, ens.)

13. Geneesmiddels en die bloedvormende stelsel:

13.1 Middels wat effektief teen bloedarmoede is.

13.2 Stollingsteëmiddels en stollingsmiddels.

14. Die hormone:

14.1 Hormone van die hipofise.

14.2 Estrogene, progestogene en androgene, insluitende orale geboortebeperkende middels.

14.3 Anaboliese steroïede.

14.4 Hormone van die bynierkorteks.

14.5 Adrenalien.

14.6 Tiroïedhormone en antitiroïdemiddels.

14.7 Insulien en orale antidiabetika.

15. Vitamiene en antivitamiene.

16. Ensieme en terapeutiese stowwe.

17. Immunisasie.

18. Chemoterapeutiese middels:

18.1 Middels in gebruik teen bakteriële infeksie.

18.2 Middels in gebruik teen fungusinfeksies.

18.3 Middels in gebruik teen protosoïese infeksies.

18.4 Middels in gebruik teen infeksies wat deur flagellate en botte veroorsaak word.

18.5 Middels in gebruik teen infeksies wat deur Nematoda en Cestoda veroorsaak word.

18.6 Chemoterapie van kanker.

19. Gasse, dampe en lugbesoedeling.

20. Insekdoders en knaagdierdoders.

21. Ontsmettingsmiddels, bakterisiede en bakteriostatikums.

22. Onkruiddoders.

23. Biochemiese individualiteit, farmakologiese individualiteit, farmakogenetika.

4.2.4 Areas.

4.2.5 Volumes.

4.3 Elementary differential equations.

5. Statistics:

5.1 Graphical representation of data.

5.2 Measures of central tendency (arithmetic and geometric means, median, variance and standard deviation).

5.3 Probability.

5.4 Normal, binomial and Poisson distributions.

5.5 Confidence limits.

5.6 Hypothesis testing.

5.7 Correlation and regression.

5.8 Sampling.

5.9 Chi-square test.

6. Computer Programming:

6.1 Elementary (B.A.S.I.C.) programming.

6.2 Use of existing software covering the above topics in statistics.

PHARMACEUTICS I

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1.1 General:

1.1.1 Introduction and orientation of the student to the modern practice of pharmacy, and the scope of Pharmaceutics in the pharmacy curriculum.

1.1.2 Classification of medicinal preparations and general principles of the modern scientific approach in the design of dosage forms.

1.1.3 Pharmacopoeias and formularies, and their use; drug nomenclature.

1.1.4 Systems of measurement used in pharmacy and methods of calculation used in dispensing.

1.1.5 Determining mass and volume: pharmaceutical balances and their sensitivity and capacity. The correct choice of volumetric measures.

2.1 Physical Pharmacy.

Principles of those fields of physical chemistry which are of importance in pharmaceutical manipulations and in the design of medicinal dosage forms, and which involve a study of the following with special reference to their pharmaceutical applications:

2.1.1 Change of state. Solid-liquid-gas equilibria and transformations and factors affecting them. The phase rule. Efflorescence and deliquescence.

2.1.2 Polymorphism of drugs.

2.1.3 Solutions and solubility. Colligative properties of solutions.

2.1.4 The colloidal state. Coarse suspensions and colloidal dispersions; their properties, methods of preparation and stabilisation. Stokes' law and its applications.

2.1.5 Surface and interfacial phenomena: Adsorption, surface and interfacial tension, surface-active agents. Emulsions and emulsifying agents.

2.1.6 The flow properties of fluids and plastic systems—viscosity, rheology and gel formation.

2.1.7 The applications of ionisation and hydrogen ion concentration in pharmacy; theory and applications of ion exchange.

Prakties

1. Geneesmiddeloordrag.

2. Die gebruik van geïsoleerde orgaansisteme om die volgende te demonstreer:

2.1 Kompetitiewe antagonisme.

2.2 Kompetitiewe dualisme.

2.3 Nie-kompetitiewe antagonisme.

3. Bepaling van affiniteite en intrinsieke aktiwiteite van verskeie geneesmiddels.

4. Die uitwerking van verskeie middels op die bloeddruk, hartspoed en respirasie van genarkotiseerde diere.

5. Kwantitatiewe bepaling van die uitwerking wat stimulanse en depressiva van die sentrale senustelsel op die lokomotoriese aktiwiteit van proefdiere het.

6. Capita selecta.

FARMASEUTIESE CHEMIE I

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

1. Medisinale Chemie:

1.1 Anorganies:

1.1.1 'n Studie van die bereiding, reaksies en onsuiwerhede van anorganiese farmaseutiese verbindings met verwysing na die werking en gebruike van hierdie verbindings.

1.1.2 Die teorie en mediese toepassing van radioaktiewe farmaseutiese verbindings en preparate.

1.1.3 Röntgenografie en kontrasmiddels.

1.2 Organies:

1.2.1 'n Studie van farmaseutiese verbindings met spesiale verwysing na sintese, onsuiwerhede fisiese eienskappe wat die terapeutiese aktiwiteit beïnvloed, toksiteit en die verband tussen struktuur en werking:

1.2.1.1 Natuurlike verbindings met verwysing na die vorming van sinteties geneesmiddels daaruit, met inbegrip van elementêre aspekte van die biosintese.

1.2.1.2 Uigesoekte sintetiese geneesmiddels en geneesmiddelgroepe.

1.2.2 Die metabolisme van uitgesoekte geneesmiddels en geneesmiddelgroepe.

2. Farmaseutiese Analise:

2.1 Kwalitatiewe reaksies en grenstoetse met die oog op die identifikasie en die bepaling van die suiwerheid van organiese en anorganiese farmaseutiese verbindings.

2.2 Toepassing van elementêre fisiese metodes op die bepaling van die identiteit, suiwerheid, gehalte en terapeutiese aktiwiteit van farmaseutiese verbindings en preparate.

2.3 Analise van vette en olies van farmaseutiese belang.

2.4 Kwantitatiewe bepaling van bestanddele van geneesmiddels.

2.5 Diverse analitiese metodes soos van toepassing op geneesmiddels en doseringsvorme daarvan.

3. Prakties:

Praktiese toepassing van al die analitiese metodes en beginsels waarvan die teorie onder Farmaseutiese Analise behandel is.

FARMASEUTIESE CHEMIE 1

1. *Organiese Farmaseutiese Chemie*:

1.1 'n Studie van die nomenklatuur, struktuur, sintese en farmaseutiese chemiese reaksies van:

1.1.1 Geselekteerde alifatiese verbindings.

1.1.2 Alisikliese verbindings.

Practical

1. General:

1.1 Familiarisation with the apparatus used in a pharmaceutical laboratory and with the general layout, requirements and conduct of a dispensing department in a modern pharmacy.

1.2 The correct use of weighing and measuring equipment.

1.3 The correct manner of storing drugs.

2. The interpretation of prescriptions in both official languages and the dispensing of a selected range of medicinal dosage forms.

3. The preparation of a selected range of official compounded formulae of the British Pharmacopoeia and British Pharmaceutical Codex.

PHARMACEUTICS I

Theory

1.1 General:

1.1.1 Introduction and orientation of the student to the modern practice of pharmacy, and the scope of Pharmaceutics in the pharmacy curriculum.

1.1.2 Classification of medicinal preparations and general principles of the modern scientific approach in the design of dosage forms.

1.1.3 Pharmacopoeias and formularies, and their use; medicinal agents nomenclature.

1.1.4 Systems of measurement used in pharmacy and methods of calculation used in dispensing.

1.1.5 Determining of Mass and Volume; pharmaceutical balances and their sensitivity and capacity. The correct choice of volumetric measures.

2.1 Physical Pharmacy.

Fields of physical chemistry which are of importance in pharmaceutical manipulations and in the design of medicinal dosage forms, and which involve a study of the following with special reference to their pharmaceutical applications:

2.1.1 Change of state.

Solid-liquid-gas equilibria and transformations and factors affecting them. The phase rule.

Efflorescence and deliquescence.

2.1.2 Polymorphism of medicinal agents.

2.1.3 Solutions and solubility. Colligative properties of solutions.

2.1.4 The colloidal state. Coarse suspensions and colloidal dispersions; Stokes' law.

2.1.5 Surface and interfacial phenomena; Adsorption, surface and interfacial tension. Surface-active agents. Emulsions and emulsifying agents.

2.1.6 The flow properties of fluids and plastic systems—viscosity, rheology and gel formation.

2.1.7 Pharmaceutical application of ionic equilibria and hydrogen ion concentrations. Theory and pharmaceutical applications of ion exchange.

Practical

1. Basic dispensing operations: A study of basic dispensing techniques and the preparation of pharmaceutical dosage forms, excluding sterile products.

2. Selected investigations into those phenomena of physical pharmacy studied in the theory syllabus.

1.1.3 Aromatiese verbindings en poli-kernagtige verbindings.

1.1.4 Inleiding tot heterosikliese en heteroaromatiese verbindings met spesifieke verwysing na verbindings van farmaseutiese belang.

1.2 Stereochemie van.

1.2.1 Alifatiese verbindings met meer as een opties aktiewe koolstofatoom.

1.2.2 Sikliese verbindings met spesifieke verwysing na verbindings van farmaseutiese belang.

2. *Fisiese Farmaseutiese Chemie:*

2.1 Termodinamika.

2.2 Chemiese kinetika met farmaseutiese toepassings.

2.3 Elektrochemie.

2.4 Sure, basisse, pH, pKa en hul farmaseutiese toepassings.

3. *Anorganiese Farmaseutiese Chemie:*

3.1 Uitgesoekte anorganiese medisinale verbindings, kontrole daarvan en grenstoetse.

3.2 Bronne van onsuiwerhede in farmaseutiese produkte.

4. *Farmaseutiese Analise:*

Die teoretiese beginsels en farmaseutiese toepassings van.

4.1 Suur-basis-titrasies (in waterige en nie-waterige media).

4.2 Redoks-titrasies.

4.3 Presipitasie-titrasies.

4.4 Kompleksiometriese titrasies.

4.5 Potensiometriese en konduktometriese titrasies.

5. *Prakties.*

5.1 Bereiding en suiwering van organiese farmaseutiese verbindings.

5.2 Identifikasie en titrimetriese bepaling van farmaseutiese verbindings en doseervorms.

5.3 Grenstoetse.

5.4 Kwaliteitskontrolering van olies en vette.

FARMASEUTIESE CHEMIE II

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

1. Medisinale Chemie.

'n Studie van die volgende geneesmiddels en geneesmiddelgroepe met spesiale verwysing na die sintese, onsuiwerhede, fisiese eienskappe wat die terapeutiese aktiwiteit beïnvloed, toksisiteit en die verband tussen struktuur en werking:

Katesjolamiene en verwante verbindings.

Kwaternêre ammoniumverbindings.

Histamien, antihistamiene en fenotiasienderivate.

Barbiturate, hipnotika en xantienderivate.

Anestetika.

Analgetika met inbegrip van antipiretika.

Kortikoïede en geslagshormone.

Stikstofmosterdverbindings en ander sitostatiese middels.

Antibiotika.

Sulfoonamiede, sulfone en orale hipoglisemiese stowwe.

Insulien.

Stollingsteenmiddels en vitamien K.

Knaagdierdoders, insekdoders, plantdoders.

Vitamiene.

PHARMACEUTICS II

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. Pharmaceutical Operations and Principles of Manufacture. The following unit processes are examined with particular emphasis on the maintenance of high standards in the pharmaceutical manufacturing industry with respect to product quality and uniformity:

1.1 Extraction processes, principles of drug extraction and their application to large-scale methods. Maceration, percolation, infusion and other methods of extraction of crude drugs of natural origin.

1.2 Processes involving heat transfer. A general consideration of the problems encountered in the supply and transfer of heat in manufacturing operations:

1.2.1 Evaporation—Basic theory and its application in the design and operation of typical large evaporators.

1.2.2 Drying—Principles involved and pharmaceutical considerations; a study of the various types of plants in common use, including freeze-driers.

1.2.3 Distillation—The distillation of miscible and immiscible liquid systems and the preparation of Purified Water, Destructive distillation.

1.3 Particle size reduction and mixing:

1.3.1 Communition of solid material and reduction of globule size in emulsions.

1.3.2 Mixing.

1.3.3 Particle size separation; measurement of particle and globule size.

1.3.4 Clarification of fluids: Filtration, sedimentation, centrifugation.

1.3.5 The choice of materials for the construction of pharmaceutical plant.

2. A study of galenical products of the B.P. and B.P.C. and other official compounded formulae.

3. A study of the properties and uses of pharmaceutical adjuvants in formulation.

4. Basic Microbiology:

4.1 Introduction and historical development of the subject.

4.2 Bacteriology:

4.2.1 Nomenclature, classification, morphology, reproduction, identification, isolation of specific types, and factors affecting the growth of bacteria.

4.2.2 The composition and uses of culture media in the cultivation and examination of bacteria.

4.2.3 Bacterial biochemistry and staining methods.

4.2.4 Bacterial enumeration.

4.2.5 Distribution and occurrence of bacteria in the environment.

4.3 Moulds and yeast—Classification and differentiation, general characteristics, growth requirements, pathogenic types. Their usefulness in the biosynthesis of antibiotics etc.

4.4. Rickettsiae—General characteristics.

4.5 Viruses—Their classification, characteristics and properties, and methods of cultivation. Bacteriophages.

4.6 Mutation and variation in bacteria and viruses—Consequences and ecological considerations.

Practical

1. The dispensing and compounding of those dosage forms and official preparations not undertaken during Pharmaceutics I.

2. Farmaseutiese Analise.

Toepassing van die volgende metode op die bepaling van die identiteit, suiwerheid en gehalte van farmaseutiese verbindings en preparate:

Spektrometrie.

Elektrometrie.

Potensiometrie en polarografie.

Chromatografie.

Katioon-anioontitrasies.

X-straaldiffraksie.

Kompleksometrie.

3. Prakties:

3.1 Toepassing van die metodes wat onder 2 behandel word op farmaseutiese doseringsvorme.

3.2 Uitoefening van analitiese kontrole oor farmaseutiese preparate.

3.3 Die sintese, opsporing van onsuiwerhede en algemene reaksies van uitgesoekte voorbeelde van farmaseutiese verbindings wat onder 1 behandel word.

FARMASEUTIKA 1

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1.1 Algemeen:

1.1.1 Inleiding en oriëntering van die student ten opsigte van die moderne praktyk van farmasie; die bestek van Farmaseutika in die farmasieleergang.

1.1.2 Klassifikasie van medisinale preparate en algemene beginsels van die moderne wetenskaplike benadering by die ontwerp van doseringsvorme.

1.1.3 Farmakopees en formuleboeke en die gebruik daarvan; benamingstelsel vir geneesmiddels.

1.1.4 Stelsels van meting wat in farmasie gebruik word en berekeningsmetodes in gebruik by reseptering.

1.1.5 Bepaling van Massa en Volume: farmaseutiese balanse en die sensitiwiteit en kapasiteit daarvan. Die korrekte keuse van volumetriese maatglasse.

2.1 Fisiese Farmasie.

Beginsels van die afdeling van Fisiese Chemie wat van belang is by farmaseutiese bewerking en by die ontwerp van doseringsvorme, en wat 'n studie van die volgende, met spesiale verwysing na die farmaseutiese toepassings daarvan, behels:

2.1.1 Toestandsverandering. Vaste Stof-vloeistof-gas: Ewewigte en omsettings, en faktore wat daarop betrekking het. Die fasereël. Effloressensie en vervloeiing.

2.1.2 Polimorfisme van geneesmiddels.

2.1.3 Oplossings en oplosbaarheid. Kolligatiewe eienskappe van oplossings.

2.1.4 Die kolloïdale toestand. Growwe suspensies en kolloïdale dispersies: Eienskappe, bereidingsmetodes en stabilisering. Stokes se wet en die toepassing daarvan.

2.1.5 Oppervlak- en tussenvlakverskynsels: Adsorpsie, oppervlak- en tussenvlakspanning, oppervlakaktiewe stowwe. Emulsies en emulgeermiddels.

2.1.6 Die vloei-eienskappe van vloeistowwe en plastieksisteme 1–1 viskositeit, reologie en jelvorming.

2.1.7 Die toepassing van ionisasie en waterstofioonkonsentrasie in Farmasie; teorie en toepassings van ioonuitruiling.

2. Pharmaceutical Technology:

2.1 The student will be expected to become acquainted with the use of the following types of equipment in pharmaceutical preparative work: Filtration apparatus; evaporating, distilling, condensing and drying equipment. Homogenisers, comminuting and particle size separation equipment; apparatus for measurement of particles in suspensions and globules in emulsions.

2.2 Investigation of the physico-chemical properties of pharmaceutical adjuvants, and of their uses as suspending, dispersing, emulsifying, solubilising, thickening and gelling agents.

2.3 The measurement and control of pH in pharmaceutical preparations.

2.4 Measurement of density of fluids.

3. Microbiology—Application of the theory syllabus with emphasis on the cultivation and isolation of various types of micro-organisms, biochemical tests and staining methods, bacterial enumeration and microscopic studies.

PHARMACEUTICS III

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. Formulation of medicines:

1.1 The general approach to modern drug formulation and choice of dosage form and route of administration. Pharmaceutical, chemical, pharmacological, microbiological and biopharmaceutical considerations in the design of formulae and choice of adjuvants:

1.2 A detailed study of the various dosage forms which are in current use, with emphasis on formulation, methods of preparation and standardisation in the production of medicines of optimal therapeutic activity, elegance, stability and convenience of administration.

1.3 The stabilisation of pharmaceutical products, methods of eliminating or limiting microbial contamination; their importance in various dosage forms. The evaluation of stability.

1.4 The importance of particle size in the formulation of medicaments and the processing of drugs.

1.5 Presentation and packaging of pharmaceutical preparations, and package testing methods.

2. Applied pharmaceutical microbiology:

2.1 Sterilisation methods:

2.1.1 A critical appraisal of the various methods of sterilisation applicable to medicinal preparations, dressings and equipment used in the medical and pharmaceutical professions.

2.1.2 The testing for sterility of these items.

2.2 Aseptic technique—The design and operating conditions of a laboratory for the preparation or manufacture of sterile products requiring aseptic manipulation. Sources of contamination and their elimination.

2.3 The formulation and preparation of sterile medicaments:

2.3.1 Products for parenteral administration, and their route of injection. Pyrogens. Plasma substitutes and blood products.

2.3.2 Ophthalmic preparations and other products which may be required in sterile form.

Prakties

1. Algemeen:

1.1 Bekendstelling met die apparaat wat in 'n farmaseutiese laboratorium gebruik word en met die algemene uitleg, vereistes en beheer van die resepteerafdeling in 'n moderne apteek.

1.2 Korrekte gebruik van weeg- en meetapparaat.

1.3 Korrekte wyse van opberging van geneesmiddels.

2. Interpretasie van voorskrifte in albei amptelike tale en die reseptering van 'n uitgesoekte reeks doseringsvorme.

3. Die bereiding van 'n uitgesoekte reeks offisiële saamgestelde formules van die Britse Farmakopee en die Britse Farmaseutiese Kodeks.

FARMASEUTIKA I

Teorie

1.1 Algemeen:

1.1.1 Bekendstelling van die student aan en sy oriëntering in die moderne praktyk van apteekwese, en die omvang van Farmaseutika in die farmasie-leergang.

1.1.2 Klassifisering van medisinale preparate en algemene beginsels van die moderne wetenskaplike benadering by die ontwerp van doseringsvorme.

1.1.3 Farmakopees en formulariums, en hulle gebruik; die name van geneesmiddels.

1.1.4 Stelsels van meting wat in apteekwese en die metodes van berekening wat by reseptering gebruik word.

1.1.5 Bepaling van Massa en Volume; farmaseutiese balanse en hulle sensitiwiteit en kapasiteit. Die korrekte keuse van volumetriese meetapparate.

2.1 Fisiese Farmasie.

Terreine van die fisiese chemie wat belangrik is by farmaseutiese bewerkings en by die ontwerp van medisinale doseringsvorme, en wat 'n studie van die volgende, met spesiale verwysing na die farmaseutiese toepassing daarvan, behels:

2.1.1 Verandering van toestand.

Vastestof-vloeistof-gas-ewewigte en transformasies en faktore wat dit beïnvloed. Die fasereël.

Effloressensie en vervloeiing.

2.1.2 Polimorfisme van geneesmiddels.

2.1.3 Oplossings en oplosbaarheid.

Saambindende eienskappe van oplossings.

2.1.4 Die kolloïdale toestand. Growwe suspensies en kolloïdale dispersies; Stokes se wet.

2.1.5 Oppervlak- en tussenvlakverskynsels. Adsorpsie, oppervlak- en tussenvlakspanning. Oppervlakaktiewe middels. Emulsies en emulgeermiddels.

2.1.6 Die vloei-eienskappe van vloeistowwe en plastiese sisteme—viskositeit, reologie en jelvorming.

2.1.7 Farmaseutiese aanwending van ioniese ewewigte en waterstofioonkonsentrasie. Teorie en farmaseutiese aanwendings van ioonuitruiling.

Prakties

1. Basiese reseptering: 'n Studie van basiese resepteertegnieke en die bereiding van farmaseutiese doseringsvorme, uitgesonderd steriele produkte.

2. Uitgesoekte ondersoeke na die verskynsels van fisiese farmasie wat in die teorieleerplan bestudeer is.

FARMASEUTIKA II

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

2.4 Chemical disinfection:

2.4.1 The activity, mode of action, formulation and presentation of disinfectants and other antimicrobial substances which are used for the disinfection of, or limiting of microbial growth in, rooms and atmospheres, pharmaceutical materials, apparatus or preparations, or which are applied topically to the skin or mucous membranes, but excluding those disinfectants such as chemotherapeutic agents which are used solely for the treatment of infections within the body.

2.4.2 The evaluation of disinfectants.

2.5 Antibiotics—The occurrence, stability, methods of production and formulation of a selected number of antibiotics in common use, and their standardisation by biological methods where applicable.

2.6 Immunology:

2.6.1 A general outline of the processes of infection and of the defence mechanisms of the body.

2.6.2 A detailed study of the preparation, properties and uses of antigen and antibody products of various types, including diagnostic preparations which are in current use.

3. Biopharmaceutics:

3.1 Pharmaceutical factors affecting drug absorption.

3.2 Utilisation of the distribution characteristics of drugs in the various tissues of the body, and of pharmacokinetic principles in the choice of route of administration, dose and dosage form of medicaments.

3.3 Utilisation of biopharmaceutical principles and parameters in the formulation of dosage forms, especially prolonged action medicaments, and their evaluation.

Practical

1. The formulation of pharmaceutical products for maximum therapeutic activity and stability, and the stability testing of these products.

2. Applied microbiology:

2.1 The formulation and preparation of perenteral, ophthalmic, and other medicaments in sterile form. Aseptic procedures.

2.2 The sterilisation of medicaments, dressings and pharmaceutical equipment by established methods, and the evaluation of sterilisation methods. Testing for sterility.

2.3 The evaluation of chemical disinfectants.

2.4 The preparation of vaccines.

3. Drug evaluation—The practical application of biopharmaceutical methods of evaluation of formulated medicaments using *in vitro* and/or *in vivo* techniques, with special emphasis on unit oral dosage forms.

PHARMACEUTICAL CHEMISTRY I

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

1. Medicinal Chemistry:

1.1 Inorganic:

1.1.1 A study of the preparation, reactions and impurities of inorganic pharmaceutical compounds with reference to the action and use of these compounds.

1.1.2 The theory and medical application of radioactive pharmaceutical compounds and formulations.

1.1.3 Röntgenography and contrast media.

1.2 Organic:

1.2.1 A study of pharmaceutical compounds with particular reference to the synthesis, impurities, physical properties affecting therapeutic activity, toxicity and the relationship between structure and action.

Teorie

1. Farmaseutiese Prosesse en Beginsels van Vervaardiging. Tydens die studie van onderstaande eenheidsprosesse word daar besondere klem gelê op die handhawing van 'n hoë standaard ten opsigte van die kwaliteit en eenvormigheid van produkte van die farmaseutiese vervaardigingsnywerheid:

1.1 Ekstraksieprosesse. Beginsels van ekstraksie van artsenymiddels en die toepassing daarvan op grootskaalse metodes. Maserasie, perkolasie, infusie en ander metodes van ekstraksie van ru-artsenymiddels van natuurlike oorsprong.

1.2 Prosesse waarby hitte-oordrag betrokke is. 'n Algemene oorsig van die probleme wat teëgekom word by hittetoevoer en -oordrag by vervaardigingsprosedures:

1.2.1 Verdamping—Basiese teorie en die toepassing daarvan op die ontwerp en bediening van tipiese grootskaalse verdampers.

1.2.2 Droging—Toepaslike beginsels en farmaseutiese oorwegings; 'n studie van die verskillende tipes apparaat algemeen in gebruik, insluitende vriesdroërs.

1.2.3 Distillasie—Die distillasie van mengbare en onmengbare vloeistofstelsels en die bereiding van Gesuiwerde Water. Destruktiewe distillasie.

1.3 Verkleining van deeltjiegrootte en menging:

1.3.1 Vergruising van soliede materiale en verkleining van druppelgrootte in emulsies.

1.3.2 Menging.

1.3.3 Skeiding volgens deeltjiegrootte: Meting van deeltjie- en druppelgrootte.

1.3.4 Verheldering van vloeistowwe—Filtrasie, sedimentasie, sentrifugering.

1.3.5 Die keuse van materiale vir die oprigting van 'n farmaseutiese aanleg.

2. 'n Studie van galeniese produkte van die B.P. en B.P.C. en ander offisiële saamgestelde formules.

3. 'n Studie van die eienskappe en gebruike van farmaseutiese hulpstowwe in formulering.

4. Basiese Mikrobiologie:

4.1 Inleiding en geskiedkundige ontwikkeling van die vak.

4.2 Bakteriologie:

4.2.1 Benamingstelsel, klassifikasie, morfologie, voortplanting, identifikasie, isolering van bepaalde tipes, faktore wat die groei van bakterieë beïnvloed.

4.2.2 Die samestelling en gebruik van kweekbodems vir die kweek en ondersoek van bakterieë.

4.2.3 Bakteriële biochemie en kleuringsmetodes.

4.2.4 Bakterietelling.

4.2.5 Verspreiding en voorkoms van bakterieë in die omgewing.

4.3 Skimmels en gisse: Klassifikasie en differensiasie, algemene eienskappe, groeivereistes, patogene tipes. Nuttigheid daarvan by die biosintese van antibiotika, ens.

4.4 Rickettsiae—Algemene eienskappe.

4.5 Virusse—Klassifikasie, kenmerke en eienskappe, metodes van kweking. Bakteriofage.

4.6 Mutasie en variasie by bakterieë en virusse. Gevolge daarvan en ekologiese oorwegings.

Prakties

1. Die respetering en samestelling van dié doseringsvorme en offisiële preparate wat nie gedurende Farmaseutika I afgehandel is nie.

1.2.1.1 Natural compounds with reference to the formation of synthetic medicinals therefrom, together with elementary aspects of biosynthesis.

1.2.1.2 Selected synthetic medicinals and medicinal classes.

1.2.2 The metabolism of selected medicinals and medicinal classes.

2. Pharmaceutical Analysis:

2.1 Qualitative reactions and limit tests with a view to the identification and determination of the purity of organic and inorganic pharmaceutical compounds.

2.2 Application of elementary physical methods to the determination of the identity, purity, quality and therapeutic activity of pharmaceutical compounds and formulations (preparations).

2.3 Analysis of fats and oils of pharmaceutical importance.

2.4 Quantitative determination of the components of medicinals.

2.5 Miscellaneous analytical methods of application to medicinals and their dosage forms.

3. Practical:

Practical application of all the analytical methods and principles dealt with theoretically in Pharmaceutical Analysis.

PHARMACEUTICAL CHEMISTRY I

1. *Organic Pharmaceutical Chemistry:*

1.1 A study of the nomenclature structure, synthesis and pharmaceutical chemical reactions of:

1.1.1 Selected aliphatic compounds.

1.1.2 Alicyclic compounds.

1.1.3 Aromatic compounds and polynuclear compounds.

1.1.4 Introduction to heterocyclic and heteroaromatic compounds with special reference to compounds of pharmaceutical importance.

1.2 Stereochemistry of

1.2.1 Aliphatic compounds with more than one optically active carbon atom.

1.2.2 Cyclic compounds with special reference to compounds of pharmaceutical importance.

2. *Physical Pharmaceutical Chemistry:*

2.1 Thermodynamics.

2.2 Chemical kinetics with pharmaceutical applications.

2.3 Electrochemistry.

2.4 Acids, bases, pH, pKa and their pharmaceutical applications.

3. *Inorganic Pharmaceutical Chemistry:*

3.1 Selected inorganic medicinal compounds, control thereof and limit tests.

3.2 Sources of impurities in pharmaceutical products.

4. *Pharmaceutical Analysis:*

The theoretical principles and pharmaceutical applications of

4.1 Acid-base titrations (in aqueous and non-aqueous media).

4.2 Redox titrations.

4.3 Precipitation titrations.

4.4 Complexiometric titrations.

4.5 Potentiometric and conductometric titrations.

2. Farmaseutiese Tegnologie:

2.1 Daar word van die student verwag om met die gebruik van die volgende soorte toerusting vir farmaseutiese voorbereiding vertroud te raak: Apparaat vir filtrasie, verdamping, distillasie, kondensasie en droging; homogeniseerders, vergruisers; apparaat vir skeiding volgens deeltjiegrootte en vir meting van deeltjies in suspensie en van druppels in emulsies.

2.2 Ondersoek van die fisies-chemiese eienskappe van farmaseutiese hulpstowwe en hul gebruike as middels vir suspensie, dispersie en emulgering, solubilisering, verdikking en jelvorming.

2.3 Die meting en kontrole van pH in farmaseutiese preparate.

2.4 Bepaling van digtheid van vloeistowwe.

3. Mikrobiologie—Toepassing van die teorieplan met beklemtoning van die kweking en isolering van verskeie tipes mikroörganismes, biochemiese toetse en kleuringsmetodes, bakterietelling en mikroskopiese studie.

FARMASEUTIKA III

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1. Formulering van Medisinale Preparate:

1.1 Die algemene benadering van moderne geneesmiddelformulering en keuse van doseringsvorm en toedieningsroete. Farmaseutiese, chemiese, farmakologiese, mikrobiologiese en biofarmaseutiese oorwegings by die ontwerp van formules en keuse van hulpstowwe.

1.2 'n Studie in besonderhede van die verskillende doseringsvorme in algemene gebruik, met beklemtoning van formulering, bereidingsmetodes en standaardisasie by die produksie van medisyne van optimale terapeutiese aktiwiteit, keurigheid, stabiliteit en toedieningsgerief.

1.3 Stabilisasie van farmaseutiese produkte; metodes om besmetting deur mikro-organismes uit te skakel of te beperk; die belang daarvan by verskillende doseringsvorme. Waardebepaling van stabiliteit.

1.4 Die belang van deeltjiegrootte by die formulering van medisinale preparate en die verwerking van geneesmiddels.

1.5 Aanbieding en verpakking van farmaseutiese preparate, en verpakkingstoetstegnieke.

2. Toegepaste Farmaseutiese Mikrobiologie:

2.1 Sterilisasiemetodes:

2.1.1 'n Kritiese waardering van die verskillende sterilisasiemetodes wat van toepassing is op medisinale preparate, wonddekkings en toerusting wat in die mediese en die farmaseutiese professie gebruik word.

2.1.2 Steriliteitstoetsing van bogenoemde.

2.2 Aseptiese Tegniek—Die ontwerp en werktoestande van 'n laboratorium vir die bereiding of vervaardiging van steriele produkte wat asepties gehanteer moet word. Bronne van besmetting en die uitskakeling daarvan.

2.3 Formulering en bereiding van steriele medisinale preparate:

2.3.1 parenterale produkte en die toedieningsroetes daarvan.

Pirogene.

Plasmavervangmiddels en bloedprodukte.

2.3.2 Oogkundige preparate en ander produkte wat in steriele vorm nodig is.

2.4 Chemiese ontsmetting:

2.4.1 Die aktiwiteit, werkingswyse, formulering en aanbieding van ontsmettingsmiddels en ander antimikrobiese preparate wat gebruik word vir die ontsmetting van of

5. *Practical Work:*

5.1 Preparation and purification of organic pharmaceutical compounds.

5.2 Identification and titrimetric determination of pharmaceutical compounds and dosage forms.

5.3 Limit tests.

5.4 Quality control of fats and oils.

PHARMACEUTICAL CHEMISTRY II

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

1. Medicinal Chemistry.

A study of the following medicinals and medicinal groups with special reference to the synthesis, impurities, physical properties affecting therapeutic activity, toxicity and the relationship between structure and action:

Catecholamines and related compounds.

Quaternary ammonium compounds.

Histamine, antihistamines and phenothiazine derivatives.

Barbiturates, hypnotics and xanthine derivatives.

Anaesthetics.

Analgesics, including antipyretics.

Corticoids and sex hormones.

Nitrogen mustards and other cytostatics.

Antibiotics.

Sulphonamides, sulphones and oral hypoglycaemics.

Insulin.

Anticoagulants and Vitamin K.

Rodenticides, insecticides and herbicides.

Vitamins.

2. Pharmaceutical Analysis.

Application of the following methods to the determination of the identity, purity and quality of pharmaceutical compounds and formulations (preparations):

Spectrometry.

Electrometry.

Potentiometry and polarography.

Chromatography.

Cationic-anionic titrations.

X-ray diffraction.

Complexometry.

3. Practical:

3.1 Application of the methods dealt with under 2 to pharmaceutical dosage forms.

3.2 Exercise of analytical control over pharmaceutical formulations (preparations).

3.3 The synthesis, detection of impurities and general reactions of selected examples of pharmaceutical compounds dealt with under 1.

PHARMACOGNOSY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. The history and development of Pharmacognosy.

2. The methods of classification of natural products.

3. The study of natural products with reference to biological and geographical origin, cultivation, collection and preparation for the market, commercial varieties, adulteration, storage, evaluation, constituents and their actions and uses. These aspects should be studied where applicable as determined by their present pharmaceutical and medicinal importance.

beperking van mikrobiese groei in kamers en atmosfere, farmaseutiese materiale, apparaat of preparate, of wat aan die vel of slymbliese aangewend word, maar met uitsluiting van ontsmettingsmiddels soos chemoterapeutiese middels wat uitsluitlik vir behandeling van infeksies binne die liggaam gebruik word.

2.4.2 Die waardebepaling van ontsmettingsmiddels.

2.5 Antibiotika—Die voorkoms, stabiliteit, produksiemetodes en formulering van 'n uitgesoekte aantal antibiotika wat algemeen in gebruik is, en hul standaardisasie deur biologiese metodes waar toepaslik.

2.6 Immunologie:

2.6.1 Algemene oorsig van infeksieprosesse en van verdedigingsmeganismes van die liggaam.

2.6.2 'n Studie in besonderhede van die bereiding, eienskappe en gebruike van verskeie tipes antigeen- en antiliggaamprodukte, insluitende diagnostiese preparate, wat algemeen gebruik word.

3. Biofarmaseutika:

3.1 Farmaseutiese faktore wat die absorpsie van geneesmiddels beïnvloed.

3.2 Benutting van die verspreidingseienskappe van geneesmiddels in die verskillende weefsels van die liggaam en van farmakokinetiese beginsels by die keuse van toedieningsroete, dosis en doseringsvorm van geneesmiddels.

3.3 Benutting van biofarmaseutiese beginsels en parameters by die formulering van doseringsvorme, veral van medisinale produkte wat verlengde uitwerking toon en die waardebepaling daarvan.

Prakties

1. Formulering van farmaseutiese produkte vir maksimale terapeutiese aktiwiteit en stabiliteit, en die stabiliteitstoetsing van hierdie produkte.

2. Toegepaste mikrobiologie:

2.1 Formulering en bereiding van parenterale, oogkundige en ander medisinale preparate in steriele vorm. Aseptiese werkwyses.

2.2 Sterilisasie van medisinale preparate, wonddekkings en farmaseutiese toerusting deur bewese metodes, en die waardebepaling van sterilisasiemetodes. Steriliteitstoetsing.

2.3 Waardebepaling van chemiese ontsmettingsmiddels.

2.4 Bereiding van vaksines.

3. Waardebepaling van geneesmiddels—Praktiese toepassing van biofarmaseutiese metodes van waardebepaling van geformuleerde medisinale preparate terwyl van in vitro- en/of in vivo-tegnieke gebruik gemaak word, met spesiale klem op orale eenheidsdoseringsvorme.

FARMASIE-ADMINISTRASIE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

1. Administrasie:

1.1 Oorsig van Maatskappyreg en die invloed daarvan op kleinhandelapteekwese, inkomstebelastingwette, Ongevallewet, Winkelure-ordonnansies, Wet op Winkels en Kantore, Werkloosheidsversekeringsfonds, kommersiële verspreidingshandel.

1.2 Die tipes kleinhandelbesighede: Eenmansaak, vennootskap, private maatskappy, openbare maatskappy, regspersoon.

1.3 Die dryf van 'n besigheid:

1.3.1 Lisensies.

1.3.2 Versekering.

4. Surgical dressings and sutures.

5. The more important indigenous poisonous plants.

Practical

1. Examine and describe the macroscopical characters of crude drugs.

2. Examine microscopically crude drugs when presented alone, mixed or contaminated and report upon them.

3. Screen plants phytochemically and perform techniques used in natural product analysis.

4. Perform official identification tests on natural products and pure substances of natural origin.

5. Examine and report upon materials with respect to the fibres present and to their distribution.

PHARMACOLOGY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. The scope and Pharmacology.

2. Drug transference and pharmacodynamics:

2.1 Drug absorption in the organism and factors influencing drug absorption.

2.2 Drug distribution in the organism and factors influencing drug distribution:

2.1.1 Passive transport of drugs.

2.2.2 Active transport of drugs.

2.3 Drug metabolism and factors influencing drug metabolism.

2.4 Drug excretion and factors influencing drug excretion.

3. Drug-receptor interactions:

3.1 Interaction of one or more drugs with one receptor system:

3.1.1 Chemical structure and action.

3.1.2 Dose-response curves.

3.1.3 Competitive interaction.

3.1.4 Affinity and intrinsic activity.

3.2 Interaction of one or more drugs with different receptor systems:

3.2.1 Non-competitive interactions.

3.2.2 Chemical antagonism.

3.2.3 Functional interactions.

3.2.4 Compounds with multiple actions.

3.2.5 Specific and non-specific drug action.

3.2.6 The pH and drug action.

3.3 The relation between stimulus and effect:

3.3.1 The all-or-none-response.

3.3.2 Threshold phenomena.

3.3.3 Receptor reserve.

4. An introduction to drug design.

5. Drugs acting on the nervous sytem:

5.1 Drugs acting on the peripheral nervous system:

5.1.1 The alpha and beta sympathomimetic and the alpha and beta sympatholytic drugs.

5.1.2 Indirect sympathomimetics and sympatholytics.

5.1.3 Parasympathomimetic and parasympatholytic drugs.

1.3.3 Huurkoopooreenkomste, huur en verhuur: Algemene aspekte.

1.3.4 Personeelvoorregte—kledingreëls, verlof, ens.

2. Bestuur:

2.1 Beginsels van moderne bestuur:

2.1.1 Organisasie: Organisasiekaarte, gesagslyne, kommunikasie, verantwoording en verantwoordelikheid, menseverhoudings.

2.1.2 Beplanning: Doelstellings, begroting.

2.1.3 Leiding.

2.1.4 Beheer.

2.1.5 Personeel en personeelverhoudings.

3. Finansiële administrasie:

3.1 Basiese boekhouding.

3.2 Die balansstaat—doel en belang.

3.3 Definisies en toepassings:

3.3.1 Leningskapitaal, bedryfskapitaal, aandelekapitaal.

3.3.2 Bates en laste.

3.3.3 Krediteure en debiteure, insluitende debiteurebeheer.

3.3.4 Voorraad, voorraadpeil, voorraadbeheer.

3.4 Handelsrekenings (opstel van handelsrekening, balansstaat, ens.)

3.5 Interpretasie van handelsrekening:

3.5.1 Verkope.

3.5.2 Bruto en netto wins, ens.

3.6 Begroting.

3.7 Aankope en voorraadbeheersisteem.

4. Verkryging van 'n aptekersbesigheid.

5. Bemarking en afsettegniek in die distribusiehandel met besondere verwysing na die kleinhandelapteekwese.

6. Die apteker in diens van die publiek.

Algemene oorsig van sy morele en etiese verantwoordelikhede as professionele persoon.

7. Die struktuur van apteekwese in Suid-Afrika:

7.1 Amptelike Farmasie—Aptekersvereniging van Suid-Afrika.

7.2 Kleinhandelapteekwese.

7.3 Groothandel- en Industriële Farmasie.

7.4 Inrigtingsapteekwese.

7.5 Akademiese Farmasie.

7.6 Wet op Mediese Skemas:

7.6.1 Kontraktuele reseptering.

FARMASIE-ADMINISTRASIE A

1. *Inleiding*.

(a) Belangrikheid en aard van bestuur.

(b) Omvang van die bestuurstaak.

(c) Die apteker as bestuurder.

(d) Die etiek van bestuur.

2. *Funksies van bestuur*.

(a) Besluitvorming en beleidsformulering.

(b) Organisering en personeelvoorsiening.

(c) Beplanning en kontrole.

(d) Kommunikasie en dirigering.

(e) Dinamika van bestuur.

3. *Operasionele aktiwiteite van bestuur*.

(a) Vervaardiging.

(b) Finansies.

(c) Bemarking.

(d) Personeel.

5.1.4 Ganglionic stimulant and ganglionic blocking drugs.

5.1.5 Curariform drugs.

5.1.6 Non-specific musculotrophic drugs.

5.2 Drugs acting on the central nervous system:

5.2.1 Central nervous system stimulants and dopaminergic drugs.

5.2.2 Central nervous system depressants and dopaminolytic drugs.

5.2.3 Drugs affecting behaviour.

5.2.4 Analgesics and antipyretics.

5.2.5 Drugs suppressing the cough centre.

6. Histaminergic and antihistamine drugs.

7. Drugs and allergy.

8. Drugs and the treatment of bronchopathy and rhinopathy.

9. Local anaesthetics.

10. Drugs and the gastro-intestinal tract:

10.1 Drugs acting in the mouth, throat and oesophagus.

10.2 Emetics and anti-emetics.

10.3 Antacids, absorbents and carminatives.

10.4 Laxatives.

11. Drugs and the cardiovascular system:

11.1 Cardiac glycosides.

11.2 Drugs depressing cardiac muscle.

11.3 Coronary vasodilators.

11.4 Antihypertensive drugs.

11.5 Blood cholesterol lowering agents.

12. Drugs affecting the water and salt balance:

12.1 Acid-base balance and intravenous fluid therapy.

12.2 Diuretics and antidiuretics.

12.3 The ions (potassium, calcium, magnesium, fluoride, iodite, etc.).

13. Drugs and the hematopoietic system:

13.1 Drugs effective in anaemias.

13.2 Anticoagulant and coagulant drugs.

14. The hormones:

14.1 Hormones of the pituitary gland.

14.2 Estrogens, progestogens and androgens, including oral contraceptives.

14.3 Anabolic steroid.

14.4 Andrenocortical hormones.

14.5 Adrenaline.

14.6 Thyroid hormones and antithyroid drugs.

14.7 Insulin and oral antidiabetic drugs.

15. Vitamins and antivitamins.

16. Enzymes and therapeutic substances.

17. Immunisation.

18. Chemotherapeutic agents:

18.1 Drugs used in bacterial infections.

18.2 Drugs used in fungal infections.

18.3 Drugs used in protozoan infections.

18.4 Drugs used in infections caused by flagellates and flukes.

4. *Dissiplinêre fundering van bestuur.*

(a) *Ekonomie* (aspekte van):

(1) Bruikbaarheid.

(2) Wet van Afnemende Meeropbrengste.

(3) Ekonomiese stelsels—

bestaansekonomie;

beheerde ekonomie;

kapitalistiese ekonomie: monopolie; oligopolie; suiwer konkurrensie (mededinging); vraag en aanbod; elastisiteit.

(4) Ekonomiese sektore.

(5) Eienaarskap: alleenbesitter, vennootskap, maatskappy.

(6) Winsdrempelanalise.

(7) Invoer- en uitvoervervanging.

(b) *Bestuursrekeningkunde.*

(1) Boekhou teenoor finansiële bestuur.

(2) Onderliggende begrippe: waarde van geld; ondernemingsentiteit; lopende onderneming; koste; dubbelkontrole; aanwas; realisering.

(3) Fundamentele gebruike: konsekwensie; konserwatisme; wesenlikheid.

(4) Belangrikste finansiële state.

(5) Ontleding van finansiële state.

(c) *Die gedragswetenskappe.*

(1) Enkele basiese sosio-psigologiese konsepte: Hawthorne-studies; persoonlike behoeftes en Maslow/Scheim/McGregor/Herzberg.

(2) Moreel in die werksituasie: sosiale faktore; groepe en groepdinamika; toesig; kommunikasie; die werk; deelneming.

(3) Motivering en personeelaktivering.

(4) Organisatoriese verandering.

(d) *Kwantitatiewe metodes, inligtingsdinamika en rekenaars.*

(1) Bedyfsekonometrie en bestuurstegnieke: bv. toustaanteorie, simulasie, netwerkontleding, ens.

(2) Bestuursinligtingstelsels en die rekenaar.

5. *Funksionele bestuur.*

Finansiële bestuur:

(1) Winsbeplanning en finansiële vooruitskatting.

(2) Die begrotingsisteem: verskeie praktiese begrotings, buigsaamheid, begrotingsbeheer.

(3) Finansiering: kort termyn: handelskrediet; banke; ander.

Lang termyn: aandele; lenings; huurkoop en verhuring; koste van kapitaal.

(4) Belasting: persoonlike; ondernemings; maatskappye; ander.

(5) Inflasie en die uitwerking daarvan op die sakelewe: vraaginflasie; inflasie van die kostekant.

(6) Enkele belangrike daaglikse finansiële aktiwiteite: daaglikse boeke; banksake en die bankbestuurder; handelsdokumente; rekonsiliasie; ens.

FISIKA

Teorie

1. Meganika:

1.1 Eenhede en metings.

1.2 Vektore.

1.3 Gelykmatig versnelde beweging.

1.4 Momentum, krag, energie en drywing.

1.5 Momente, sirkelbewegings.

18.5 Drugs used in infections caused by nematodes and cestodes.

18.6 Chemotherapy of cancer.

19. Gases, vapours and air pollution.

20. Insecticides and rodenticides.

21. Disinfectants, bactericides and bacteriostatics.

22. Weed killers.

23. Biochemical individuality, pharmacological individuality, pharmacogenetics.

Practical

1. Drug transference.

2. The use of isolated organ systems to demonstrate:

2.1 Competitive antagonism.

2.2 Competitive dualism.

2.3 Non-competitive antagonism.

3. Determination of affinities and intrinsic activities of various drugs.

4. The effect of various drugs on blood pressure, heart rate and respiration of anaesthetized animals.

5. Quantitative determination of the effects on locomotor activity of test animals of stimulants and depressants of the central nervous sytem.

6. Capita selecta.

PHARMACY ADMINISTRATION

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

1. Administration:

1.1 Review of Company Law and its influence on retail pharmacy, tax laws, Workmen's Compensation Act, Shop Hours Ordinances, Shops and Offices Act, Unemployment Insurance Fund and commercial distributive trade.

1.2 The types of retail businesses: Sole owner, partnership, private company, public company, body corporate.

1.3 Running a business:

1.3.1 Licences.

1.3.2 Insurance.

1.3.3 Hire purchase agreements, and leases and leasing: General aspects.

1.3.4 Staff privileges—dress regulations, leave, etc.

2. Management:

2.1 Principles of modern management:

2.1.1 Organisation: Organisation charts, lines of authority, communicaton, accountability and responsibility, human relations.

2.1.2 Planning: Objectives, budgeting.

2.1.3 Leading. Leadership.

2.1.4 Control.

2.1.5 Staff and staff relationships.

3. Financial Administration:

3.1 Elementary bookkeeping.

3.2 The balance sheet—purpose and importance.

3.3 Definitions and applications:

3.3.1 Loan capital, working capital, share capital.

3.3.2 Liabilities and assets.

3.3.3 Creditors and debtors, including debtor control.

3.3.4 Stock, stock levels, stock control.

2. Eienskappe van materie.
2.1 Fluiede, hidrostatika, diffusie en viskositeit.
2.2 Gasse, kinetiese teorie.
2.3 Vloeistowwe, oppervlakspanning.
2.4 Vaste stowwe, elastisiteit.
3. Warmte.
3.1 Uitsetting van vaste stowwe, vloeistowwe en gasse.
3.2 Meting van warmte.
3.3 Toestandverandering.
3.4 Oordrag van warmte.
3.5 Termodinamika.
4. Golwe en optika.
4.1 Ossilasies en golwe.
4.2 Drukgolwe, klank.
4.3 Elektromagnetiese golwe, fisiese optika.
4.4 Geometriese optika.
5. Elektrisiteit.
5.1 Elektrostatika.
5.2 Elektriese stroom.
5.3 Magnetisme en elektromagnetisme.
5.4 Wisselstroom.
5.5 Elektriese metings.
6. Atoomfisika.
6.1 Atoomstruktuur en spektra.
6.2 Die kern, radioaktiwiteit.
6.3 Ioniserende straling.

Prakties

Die skatting van die akkuraatheid van metings.

Eksperimente wat die basiese beginsels illustreer wat in die teoretiese kursus behandel word.

FISIOLOGIE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Teorie

1. Mikroskopiese bou van selle en weefsels:
1.1 Sitologie van dierlike en menslike selle.
1.2 Selfunksies, beheer oor sellulêre prosesse en seldeling, beheer oor proteïensintese, funksies van gene.
1.3 Histologie van die weefsels en belangrike organe van die liggaam.
2. Die funksionele organisering van die liggaam en die beheer oor die inwendige omgewing:
2.1 Organisering van die liggaam in selle, weefsels, organe en sisteme.
2.2 Die teorie van reguleringsisteme en homeostase.
3. Liggaamsvloeistowwe en uitskeiding:
3.1 Ekstrasellulêre en intrasellulêre vloeistowwe, membraantransport en osmotiese ewewigte.
3.2 Kapillêre dinamika en vloeistofwisseling.
3.3 Die limfvatsisteem, interstisiële vloeistofwisseling en edeem.
3.4 Spesiale vloeistofsisteme van die liggaam: Serebrospinale vloeistof, okulêre, pleurale en ander.
3.5 Vorming van urine deur die niere en uitskeiding van urine abnormale urinebestanddele.
3.6 Beheer oor die samestelling en volume van liggaamstowwe.
3.7 Beheer oor die suur-basis-ewewig van die liggaam.

3.4 Trading statements (drawing up of trading statements, balance sheet, etc.).
3.5 Interpretation of trading statement:
3.5.1 Sales.
3.5.2 Gross and net profit, etc.
3.6 Budgeting.
3.7 Buying and stock control system.
4. Acquiring a pharmaceutical business.
5. Marketing and merchandising in distributive trade, with special reference to retail pharmacy.
6. The Pharmacist as a Servant of the Public. General review of his moral and ethical responsibilities as a professional man.
7. The Structure of Pharmacy in South Africa:
7.1 Official pharmacy—Pharmaceutical Society of South Africa.
7.2 Retail pharmacy.
7.3 Wholesale and industrial pharmacy.
7.4 Institutional pharmacy.
7.5 Academic pharmacy.
7.6 Medical Schemes Act:
7.6.1 Contractual dispensing.

PHARMACY ADMINISTRATION A

1. *Introduction.*
(a) Importance and nature of management.
(b) Scope of the managerial task.
(c) The Pharmacist as manager.
(d) The ethics of management.
2. *Functions of management.*
(a) Decision making and policy formulation.
(b) Organising and staffing.
(c) Planning and control.
(d) Communication and directing.
(e) Dynamics of management.
3. *Operational activities of management.*
(a) Manufacturing.
(b) Finance.
(c) Marketing.
(d) Personnel.
4. *Disciplinary foundations of management.*
(a) *Economics* (aspects of):
(1) Utility.
(2) Law of Diminishing Return.
(3) Economic systems—
subsistence;
controlled;
capitalistic: monopolies; oligopolies; pure competition; supply and demand; elasticity.
(4) Economic sectors.
(5) Ownership: sole owner, partnership, company.
(6) Break-even analysis.

4. Bloed en immuniteit:

4.1 Struktuur, ontwikkeling en lewensgeskiedenis van rooi bloedselle. Anemie en polisitemie.

4.2 Liggaamsweerstand teen infeksie: Die retikuloëndoteliale sisteem, leukosiete, immuniteit, allergie en inflammasie.

4.3 Die bloedgroepe, transfusie, weefsel- en orgaanoorplantings, bloedstolling en hemostase.

5. Die kardiovaskulêre sisteem:

5.1 Die hart—fisiologie van hartspier, eksitasie en geleiding, ritmisiteit, elektrokardiogram, pompwerking van die hart, afwykings van normale funksie.

5.2 Bloedsirkulasie, arteriële druk en vloei, hipertensie, kardiale omset, veneuse druk, skok, spesiale sirkulasiegebiede soos koronêre en longsirkulasie.

5.3 Beheer oor die hart- en bloedvatfunksies, invloed van oefening.

6. Respirasie:

6.1 Meganiese beginsels van respirsie, longventilasie, kunsmatige asemhaling.

6.2 Beginsels van gaswisseling, vervoer van suurstof en koolsuurgas deur die bloed en liggaamsvloeistowwe.

6.3 Die beheer oor asemhaling en afwykings van normale respirasie-funksies.

6.4 Lugvaart-, ruimtevaart-, diepseeduik- en industriële fisiologie.

7. Spysvertering en metabolisme:

7.1 Bewegings van die spysverteringskanaal, sekresie en beheer daaroor.

7.2 Vertering en absorpsie van voedingstowwe.

7.3 Metabolisme van koolhidrate, vette en proteïene.

7.4 Dieetsamestelling, voeding, beheer oor voeding.

7.5 Energiewisseling en -transformering.

7.6 Beheer oor liggaamstemperatuur.

7.7 Steurings van die spysvertering en metabolisme.

8. Endokrinologie en reproduksie:

8.1 Endokriene regulering, die hipofise, neurosekresies.

8.2 Bynierkortekshormone, tiroïedfunksies en timus.

8.3 Insulien, glukagon, diabetes mellitus.

8.4 Paratiroïedfunksie, kalsiummetabolisme, been- en tandfisiologie.

8.5 Voortplanting en die endokriene regulering daarvan.

9. Die senustelsel en spierfisiologie:

9.1 Beginsels van Bio-elektrisiteit, membraan- en aksiepotensiale.

9.2 Spierfisiologie.

9.3 Sinapsfunksies, neurosisteme.

9.4 Algemene organisasie van die senustelsel.

9.5 Somestetiese sensasies en interpretasie van gewaarwordings deur die senustelsel.

9.6 Fisiologiese beginsels van gedagteprosesse en die beheer oor motoriese funksies.

9.7 Refleksfisiologie, funksies van die rugmurg, breinstam, basale ganglia en serebellum.

9.8 Die outonome senustelsel.

9.9 Outomasie, ritmisiteit, outonome balans, slaap en psigosomatiese toestande.

9.10 Die sintuie: Gesig, gehoor, smaak en reuk.

(7) Import and export replacement.

(b) *Managerial accounting.*

(1) Bookkeeping versus financial management.

(2) Basic concepts: money measurement; business entity; going concern; cost; dual aspect; accrual; realisation.

(3) Fundamental conventions: consistency; conservatism; materiality.

(4) Major financial statements.

(5) Analysis of financial statements.

(c) *The Behavioural Sciences.*

(1) Some basic sociopsychological concepts: Hawthorne studies; personal needs and Maslow/Schein/McGregor/Herzberg.

(2) Morals in the work situation: Social factors; groups and group dynamics; supervision; communication; the job; participation.

(3) Motivation and staff activation.

(4) Organisational change.

(d) *Quantitative methods, information dynamics and computers.*

(1) Operations research and managerial techniques: e.g. queuing theory, simulation, network analysis, etc.

(2) Management Information Systems and the computer.

5. *Functional management.*

(a) *Financial management:*

(1) Profit planning and financial forecasting.

(2) The budgeting system: various practical budgets, flexibility, control.

(3) Financing: short term: trade credit; banks; other long term: shares; loans; H P lease; cost of capital.

(4) Tax: personal; business; companies, other.

(5) Inflation and its effect on business: demand-pull inflation; cost-push inflation.

(6) Some important day-to-day financial activities: daily books; banking and the bank manager; trading documents; reconciliation; etc.

PHYSICS

Theory

1. Mechanics:

1.1 Units and measurements.

1.2 Vectors.

1.3 Uniformly accelerated motion.

1.4 Momentum, force, energy and power.

1.5 Moments, circular motion.

2. Properties of matter:

2.1 Fluids, hydrostatics, diffusion and viscosity.

2.2 Gases, kinetic theory.

2.3 Liquids, surface tension.

2.4 Solids, elasticity.

3. Heat:

3.1 Expansion of solids, liquids and gases.

3.2 Measurement of heat.

3.3 Change of state.

3.4 Transfer of heat.

3.5 Thermodynamics.

Prakties

1. Histologie.

2. Hematologie:

2.1 Bloedseltellings: Rooi bloedselle en wit bloedselle.

2.2 Hemoglobienbepalings.

2.3 Hematokrietwaarde.

2.4 Berekening van indekse.

2.5 Bepalings wat verband hou met bloedgroepe, hemolise, breekbaarheid, stolling, besinking.

2.6 Biochemiese bepaling van bloedbestanddele.

3. Kardinale en vaskulêre fisiologie:

3.1 Hemodinamika, bloeddruk en hartsnelheid onder verskillende toestande.

3.2 Eksperimentele fisiologie van die padda- en/of soogdierhart.

4. Spier- en senuweefisiologie:

4.1 Skeletspier en senuweebane—uitwerking van prikkels, summasie, tetanie, temperatuur, belading, vermoeienis, snelheid van impulsgeleiding, reflekse.

4.2 Kontraksie van gladde spier.

5. Urine-ontledings:

Normale en abnormale urinebestanddele.

6. Spysvertering en metabolisme:

Ensiembepalings, capita selecta.

FISIOLOGIE

Teorie

1. Inleiding tot menslike fisiologie en homeostase:

1.1 Basiese funksionele anatomie.

1.2 Organisasie van die liggaam in sisteme, organe, weefsels, selle, organelle, molekule en die retikulo-endoteriale sisteem.

1.3 Die interne omgewing en homeostase.

1.4 Beginsels van fisiologiese beheersisteme.

1.5 Selfisiologie.

1.5.1 Struktuur en samestelling, intra- en ekstrasellulêre bestanddele.

1.5.2 Funksionele sisteme van die sel.

1.5.3 Beheer van metaboliese reaksies in die sel.

2. Senuweefisiologie en koördinasiemeganismes:

2.1 Bio-elektrisiteit, membraan- en aksiepotensiale, die neuron, geleiding van impulse, soorte sinapse, prikkeloordragstowwe.

2.2 Organisasie, indeling en funksionele anatomie van die senuweestelsels.

2.3 Serebrospinale vloeistof, bloed-breinskans.

2.4 Sintuie: Vel, gesig, gehoor, ewewig, reuk en smaak, viserale, pyn, proprioseptiewe.

2.5 Funksies van die senuweestelsel: Koördinasie, bewussyn, EEG, slaap, emosie, gedrag, psigosomatiese aspekte, geheue en intellektuele funksies.

2.6 Integrasiefunksie van die brein. Die mens as eenheid.

3. Endokrinologie:

3.1 Humorale beheerstelsels, soorte en eienskappe van hormone, meganismes van hormoonwerking, neuro-endokriene verwantskappe (pineale en hipotalamus-funksie), prostaglandiene.

3.2 Endokriene kliere: Struktuur-funksie-verband, beheer van sekresies, funksie van hormone van.

3.2.1 Hipofise.

3.2.2 Trioïedklier.

4. Waves and optics:

4.1 Oscillations and waves.

4.2 Pressure waves, sound.

4.3 Electromagnetic waves, physical optics.

4.4 Geometric optics.

5. Electricity:

5.1 Electrostatics.

5.2 Electric current.

5.3 Magnetism and electromagnetism.

5.4 Alternating current.

5.5 Electrical measurements.

6. Atomic physics:

6.1 Atomic structure and spectra.

6.2 The nucleus, radioactivity.

6.3 Ionising radiation.

Practical

The estimation of accuracy of measurements.

Experiments illustrating the basic principles dealt with in the theoretical course.

PHYSIOLOGY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. Microscopical structure of cells and tissues:

1.1 Cytology of animal and human cells.

1.2 Cell functions, control of cellular processes and cell fission, control of protein synthesis, functions of genes.

1.3 Histology of the tissues and important organs of the body.

2. The functional organisation of the body and control of the internal environment:

2.1 Organisation of the body in cells, tissues, organs and systems.

2.2 The theory of regulating systems and homeostasis.

3. Body fluids and excretion:

3.1 Extracellular and intracellular fluids, membrane transport and osmotic equilibria.

3.2 Capillary dynamics and fluid exchange.

3.3 The lymphatic system, interstitial fluid exchange and oedema.

3.4 Special fluid systems of the body; cerebrospinal fluid, ocular fluids, pleural fluid, etc.

3.5 Formation of urine by the kidneys and excretion of urine, abnormal urinary constituents.

3.6 Control of the composition and volume of body fluids.

3.7 Control of the acid-base equilibrium of the body.

4. Blood and immunity:

4.1 Structure, development and life history of red blood cells. Anaemia and polycythaemia.

4.2 Resistance of the body against infection—the reticuloendothelial system, leucocytes, immunity, allergy and inflammation.

4.3 The blood groups, transfusion, transplant of tissues and organs, coagulation of blood and haemostasis.

3.2.3 Paratiroïedklier.

3.2.4 Bynier.

3.2.5 Pankreas.

3.2.6 Gonades.

4. Kardiovaskulêre en limfatiese stelsels:

4.1 Hart: Eienskappe van hartspier, eksitasie, geleiding, ritmisiteit, elektrokardiogram, kardinale siklus afwykings van normale funksie.

4.2 Sirkulasie, kardiale omset, vloei en perifere weerstand, arteriële en veneuse druk, hipertensie, pulmonale, koronêre en serebrospinale sirkulasie.

4.3 Beheer oor kardiovaskulêre funksie, effek van oefening.

4.4 Kapillêre dinamika en vloeistofwisseling.

4.5 Limfatiese stelsel en edeem (slegs oppervlakkige bespreking).

5. Spier- en beenfisiologie:

5.1 Struktuur en kontraksie van skeletspier (verskille tussen hart- en gladdespier), chemiese en meganiese aspekte.

5.2 Struktuur en vorming van been, organisasie van die skelet.

5.3 Beheer van beweging: spier en been as 'n funksionele eenheid.

6. Asemhaling en uitskeiding:

6.1 Meganiese beginsels van asemhaling, longventilasie en gaswisseling.

6.2 Neurale en humorale beheer van asemhaling.

6.3 Vervoer van suurstof en koolsuurgas deur bloed en liggaamsvloeistowwe.

6.4 Vorming van urine deur die nier, mikturisie.

6.5 Beheer van die suur-basis-balans van die liggaam.

7. Voeding, spysvertering en metabolisme:

7.1 Basiese beginsels van voeding.

7.2 Beheer van die beweging, sekresie, verterings- en absorpsiefunksies van die spysverteringskanaal.

7.3 Beheer van die metabolisme van koolhidrate, proteïene en lipiede.

7.4 Beheer van die liggaam se energiebalans.

7.5 Regulering van liggaamstemperatuur.

8. Voortplanting, erflikheid en groei:

8.1 Fisiologie van manlike en vroulike geslagsfunksies en endokrine beheer daarvan, reproduksie en fatale fisiologie.

8.2 Erflikheid, selontwikkeling en groei.

9. Omgewingsfisiologie en bedryfsfisiologie.

Prakties

Toepaslike eksperimentele werk in aansluiting by die verskillende aspekte wat in die teorie aangebied word.

GEREGTELIKE FARMASIE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Kandidate se kennis sal getoets word met betrekking tot die volgende wetgewing, vir sover dit op die praktyk van apteekwese betrekking het:

1. Die Wet op Aptekers, 1974 (Wet 53 van 1974), en regulasies kragtens die Wet uitgevaardig.

2. Regulasies uitgevaardig kragtens die Wet op Geneeshere, Tandartse en Aptekers, 1928 (Wet 13 van 1928), vir sover hulle nie vervang is deur regulasies uitgevaardig kragtens die Wet op die Beheer van Medisyne en Verwante

5. The cardiovascular system:

5.1 The heart—physiology of cardiac muscle, excitation and conduction rhythmicity, electrocardiogram, pumping action of the heart, deviations from normal function.

5.2 Circulation of blood, arterial pressure and arterial flow, hypertension, cardiac output, venous pressure, shock, special circulation areas such as coronary circulation and pulmonary circulation.

5.3 Control of the functions of the heart and vessels, influence of exercise.

6. Respiration:

6.1 Mechanical principles of respiration, pulmonary ventilation, artificial respiration.

6.2 Principles of gaseous exchange, transport of oxygen and carbon dioxide by the blood and body fluids.

6.3 Control of respiration and deviations from normal respiration.

6.4 Physiology of aviation, space travel and deep-sea diving and industrial physiology.

7. Digestion and metabolism:

7.1 Movements of the gastro-intestinal tract, secretion and control thereof.

7.2 Digestion and absorption of nutrients.

7.3 Metabolism of carbohydrates, fats and proteins.

7.4 Composition of diet, nutrition and its control.

7.5 Exchange and transformation of energy.

7.6 Control of body temperature.

7.7 Disorders of digestion and of metabolism.

8. Endocrinology and reproduction:

8.1 Endocrine regulation, the pituitary gland, neurosecretions.

8.2 Hormones of the adrenal cortex, functions of thyroid and thymus.

8.3 Insulin, glucagon, diabetes mellitus.

8.4 Function of parathyroids, calcium metabolism, physiology of bone and teeth.

8.5 Reproduction and its endocrine control.

9. The nervous system and physiology of muscle:

9.1 Principles of bio-electricity, membrane and action potentials.

9.2 Physiology of muscle.

9.3 Functions of synapses, neurosystems.

9.4 General organisation of the nervous system.

9.5 Somesthetic sensations and interpretation of perceptions by the nervous system.

9.6 Physiological principles of mind processes and the control of motor functions.

9.7 Physiology of reflexes, functions of spinal cord, brain stem, basal ganglia and cerebellum.

9.8 The autonomic nervous system.

9.9 Automation, rhythmicity, autonomic balance, sleep and psychosomatic conditions.

9.10 The senses: Vision, hearing, taste and smell.

Practical

1. Histology.

2. Haematology:

2.1 Blood cell counts: Red blood cells and white blood cells.

2.2 Haemoglobin determinations.

Stowwe, of deur nuwe regulasies uitgevaardig kragtens die Wet op Aptekers nie, maar met uitsondering van die Regulasies betreffende Terapeutiese Stowwe.

3. Die Drankwet, 1928 (Wet 30 van 1928): Artikels 5, 130, 131, 140 en 1975, en regulasies kragtens artikel 130 en 131 uitgevaardig.

4. Die Wet op Voedingsmiddels, Skoonheidsmiddels en Ontsmettingsmiddels, 1972 (Wet 54 van 1972):

4.1 Artikel 1 (i), (iv), (vi), (vii), (xiv) en (xxiii), 2, 5, 8, 9 en 15 (slegs 'n algemene kennis van laasgenoemde artikel word vereis);

4.2 Die volgende regulasies kragtens die Wet uitgevaardig:

4.2.1 Die regulasies betreffende natuurlike en kunsmatige versoeters, afgekondig by Goewermentskennisgewing R. 1881 van 12 Oktober 1973;

4.2.2 Subregulasies (3), (5), (21) en (24) van die regulasie betreffende etikettering afgekondig by Goewermentskennisgewing R. 908 van 27 Mei 1977.

Tot tyd en wyl daar nuwe regulasies betreffende ondergenoemde sake kragtens hierdie Wet afgekondig word, moet studente kennis dra van die betrokke regulasies uitgevaardig kragtens die ou Wet op Voedingsmiddels, Medisyne en Ontsmettingsmiddels en nog van krag, nl. regulasie 32 (ontsmettingsmiddels), 35 (salwe, rome en poeiers), 35*bis* (tandepastas, tandepoeiers en mondspoelings) en 40 (heuning).

5. Die Wet op Misstowwe, Veevoedsel, Landboumiddels en Veemiddels, 1947 (Wet 36 van 1947):

5.1 Die artikels wat betrekking het op veemiddels, nl. 1 (slegs omskrywings), 3, 7 en 21.

5.2 'n Algemene kennis van die regulasies betreffende die registrasie en verkoop van veemiddels vir sover hulle betrekking het op die praktyk van apteekwese, nl. 1, 2 en 7. (Afgekondig by Goewermentskennisgewing R. 857 van 28 Mei 1971.)

6. Die Wet op die Beheer van Medisyne en Verwante Stowwe, 1965 (Wet 101 van 1965):

6.1 In die besonder die volgende artikels: 1 (i), (iii), (iv), (x), (xii), (xiii), (xv), (xvii), (xix), (xx), (xxiii), (xxiv), (xxv), (xxvi), (xxvii), (xxviii), (xxix), (xxx), (xxxi), (xxxii), (xxxiii), (xxxiv), (xxxv), (xxxvi), (xxxvii), (xxxviii), (xxxix), (xl) en (xli), 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22A (en die Bylaes), 23, 24, 26, 28, 29, 30, 32, 33, 35, 36 en 37.

6.2 Regulasies kragtens die Wet uitgevaardig (Goewermentskennisgewing R. 352 van 21 Februarie 1975). Kandidate moet 'n algemene kennis hê van die kategorieë van medisyne wat ingevolge die Wet onderworpe is aan registrasie, asook van die prosedure om aansoek te doen om registrasie van 'n medisyne en van die klassifikasie van medisyne (regulasie 2, 3 en 4). 'n Uitvoerige kennis van die volgende regulasies is noodsaaklik: 9, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32, 33 en 34.

7. Die Wet op Gevaarhoudende Stowwe, 1973 (Wet 15 van 1973), en die regulasies kragtens die Wet uitgevaardig wat betrekking het op Groep I- en Groep II-gevaarhoudende stowwe.

8. Die Wet op die Misbruik van Afhanklikheidsvormende Stowwe en Rehabilitasiesentrums, 1971 (Wet 41 van 1971), in die besonder die volgende artikels vir sover hulle nie deur die Wet op die Beheer van Medisyne en Verwante Stowwe vervang is nie: 1 (iii), (iv), (xiii), (xix), (xxii), (xxxi), 2, 2A, 3, 4, 4A, 5 en 15. Dele I, II en III van die Bylae.

2.3 Haematocrit value.

2.4 Calculation of indices.

2.5 Determinations related to blood groups, haemolysis, fragility, coagulation, sedimentation.

2.6 Biochemical determination of constituents of blood.

3. Cardiac and vascular physiology:

3.1 Haemodynamics, blood pressure and heart rate under various conditions.

3.2 Experimental physiology of the heart of the frog and/or mammalian heart.

4. Physiology of muscle and nerves:

4.1 Skeletal muscle and nerve tracts: Effects of stimuli, summation, temperature, loading, fatigue, velocity of impulse conduction, reflexes, tetani.

4.2 Contraction of smooth muscle.

5. Urine analysis:

Normal and abnormal urinary constituents.

6. Digestion and metabolism:

Determination of enzymes, capita selecta.

PHYSIOLOGY

Theory

1. Introduction to human physiology and homeostasis:

1.1 Basic functional anatomy.

1.2 Organisation of the body in systems, organs, tissues, cells, organelles, molecules and the reticulo-endothelial systems.

1.3 The internal environment and homeostasis.

1.4 Principles of physiological control systems.

1.5 Cell physiology.

1.5.1 Structure and composition, intracellular and extracellular components.

1.5.2 Functional systems of the cell.

1.5.3 Control of metabolic reactions in the cell.

2. Nerve physiology and co-ordination mechanisms:

2.1 Bio-electricity, membrane and action potentials, the neuron, transmission of impulses, types of synapses, neurotransmitters.

2.2 Organisation, classification and functional anatomy of the nervous systems.

2.3 Cerebrospinal fluid, blood-brain barrier.

2.4 Senses: Skin, vision, hearing, equilibrium, smell and taste, visceral, pain, proprioceptive.

2.5 Functions of the nervous system: Co-ordination, consciousness, EEG, sleep, emotion, behaviour, psycho-somatic aspects, memory and intellectual functions.

2.6 Integrating function of the brain. Man as a unit.

3. Endocrinology:

3.1 Humoral control systems, types and properties of hormones, mechanism of hormone function, neuro-endocrine relationships (pineal and hypothalamic functions) prostaglandins.

3.2 Endocrine glands: structure-function relationships, control of secretions, functions of hormones of.

3.2.1 hypophysis.

3.2.2 thyroid.

3.2.3 parathyroid.

3.2.4 adrenals.

3.2.5 pancreas.

3.2.6 gonads.

9. Die Wet op Geneeshere, Tandartse en Aanvullende Gesondheidsdiensberoepe, 1974 (Wet 56 van 1974), artikel 36 (vir sover hierdie artikel op apteekwese betrekking het), 52 en 57.

L.W.—Bogenoemde kennis is van toepassing op enige wysigings van die bepaalde artikels of bylaes en op enige reëls of regulasies wat daarop betrekking het of wysigings daarvan wat voor of op 30 April van die huidige jaar gepubliseer word.

GESONDHEIDSVOORLIGTING

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

Doel.—Om die apteker voor te berei en van die basiese agtergrondkennis te voorsien sodat hy in die beoefening en binne die omvang van sy beroep, aan die publiek inligting en voorligting kan verstrek oor volksgesondheidsaangeleenthede.

1. Inleiding:

1.1 Die aard en betekenis van gesondheidsvoorligting.

1.2 Teorieë en menings omtrent gesondheid, siekte en higiëne in Suid-Afrika.

1.3 Houdings teenoor siekte en lyding in Suid-Afrika en metodes om dit te verander.

1.4 Die rol van die apteker in gesondheidsvoorligting.

1.5 Bronne van inligting oor gesondheidsvoorligting.

2. Faktore wat siekte teweegbring.

3. Verspreiding en voorkoming van aansteeklike en oordraagbare siektes.

4. Probleme ten opsigte van, en dienste beskikbaar aan alledaagse fisiese en geestesgebreke.

5. Gesondheidsonderwerpe tans van belang.

6. Gesondheidsaspekte van voedsel en voeding.

7. Bestryding van insekte en ander plae.

8. Korrekte gebruik, bewaring en wegruiming van medisyne.

9. Gesinsbeplanning.

10. Moederkunde en babasorgdienste.

11. Omgewingsfaktore wat die gesondheid beïnvloed.

12. Noodhulp.

PLANTKUNDE

[Die volgende leerplan sal van krag bly vir die tydperk in regulasie 4 (1) gemeld.]

A. Teorie

1. Biologie, die betekenis en omvang en die twee groot onderafdelings daarvan, naamlik plantkunde en dierkunde; die waarde daarvan as kulturele en farmaseutiese vlak; die betekenis en omvang van die belangrikste onderafdelings van biologie; taksonomie, morfologie, anatomie, fisiologie, genetika, evolusie.

2. Die planteryk en die hoofonderafdelings daarvan met hul kenmerke; bakterieë, alge, swamme, korsmosse, briofiete, pteridofiete, gimnosperme en angiosperme as voorbeelde van die verskeidenheid van plantlewevorms en van evolusionêre geskiedenis en neigings.

3. Die plant as lewende organisme; vorm en funksie van die wortels, stingel, blare, vrugte van 'n tipiese groen kruidagtige landplant en van 'n houtagtige meerjarige plant wat sekondêre diktegroei vertoon. Die invloed van die habitat (grond en lug) op plantorgane. Die aard van die modifikasies van organe vir spesiale funksies. Die sel en seldeling. Die weefsels van tipiese angiosperme—kortliks hul bou, rangskikkings en funksies. 'n Tipiese blom—die bou daarvan en die funksies van die verskillende dele; die bou van die vrug en saad, verspreiding en ontkieming van saad.

4. Cardiovascular and lymphatic systems:

4.1 Heart: Properties of cardiac muscle, excitation, conduction, rhythm, electrocardiogram, cardiac cycle, deviations from normal functions.

4.2 Circulation, cardiac output, flow and peripheral resistance, arterial and venous pressure, hypertension, pulmonary, coronary and cerebrospinal circulation.

4.3 Control of cardiovascular function, effect of exercise.

4.4 Capillary dynamics and fluid transport.

4.5 Lymphatic system and oedema (only at a superficial level).

5. Muscle and bone physiology:

5.1 Structure and contraction of skeletal muscle (contrasts with heart muscle and smooth muscle), chemical and mechanical aspects.

5.2 Structure and formation of bone, organisation of the skeleton.

5.3 Control of movement, muscle and bone as a functional unit.

6. Respiration and excretion:

6.1 Mechanical principles of respiration, lung ventilation and gas exchange.

6.2 Neural and humoral control of respiration.

6.3 Transport of oxygen and carbon dioxide by blood and body fluids.

6.4 Formation of urine by the kidney, micturition.

6.5 Control of the acid/basebalance of the body.

7. Nutrition, digestion and metabolism:

7.1 Basic principles of nutrition.

7.2 Control of the movement, secretions, digestion and absorption functions of the gastro-intestinal tract.

7.3 Control of the carbohydrate, protein and lipid metabolism.

7.4 Control of the energy balance of the body.

7.5 Regulation of body temperature.

8. Reproduction, heredity and growth:

8.1 Physiology and humoral control of male and female sexual functions, reproduction and foetal physiology.

8.2 Heredity, cellular development and growth.

9. Environmental and occupational physiology.

Practical

Suitable experimental work which illustrates the different aspects of the theory.

ZOOLOGY

[The following syllabus will remain in force for the period referred to in regulation 4 (1).]

Theory

1. Small mammal (e.g. rat, rabbit, guinea pig or cat)—external features, skin and appendages. Digestive system—main parts of the alimentary canal and related organs. Enzymes and hormones—an outline of their functions in digestion.

Peristalsis.

Mouth—mucus, ptyalin.

Stomach—pepsin, HC1, rennin.

Pancreas—trypsinogen, steapsin, amylopsin.

Small intestine—erepsin, enterokinase, lipase.

Liver—bile pigments and salts.

Rectum—absorption of water, ejection of undigested food, excretion from vascular supply of walls.

4. Beginsels van plantfisiologie—waterverhoudings, fotosintese, voeding, groei, respirasie, vertering, tropismes met betrekking tot swaartekrag, lig, water, opberging van reserwes. Parasitisme, saprofitisme, epifitisme.

5. 'n Kort vergelykende studie van die vorm, bou, lewensgeskiedenis en voortplanting van Bacillus subtilis, Tabakmosaïekvirus, Chlamydomonas, Spirogyra, Diatome, Fucus, Rhizopus nigricans, Saccharomyces, Claviceps, Penicillium, Agaricus (psalliota), Funaria, Dryopteris, Pinus, 'n tipiese monokotiel, 'n tipiese dikotiel.

6. Beginsels van taksomie soos geïllustreer deur 'n kort studie van 'n verteenwoordigende voorbeeld van elk van die volgend families: Liliaceae, Gramineae, Ranunculaceae, Leguminoseae, Solanaceae, Compositae, Labiatae, Scrophulariaceae.

B. Prakties

Die ondersoek, disseksie, makroskopiese en mikroskopiese ondersoek, beskrywing en teken van plantmateriaal uit bostaande lys verkry; demonstrasies van ekologiese en fisiologiese kenmerke moet gereël word. Die eksamen moet veral die bepaling van die waarnemingsvermoë van die kandidaat beoog, asook sy vermoë om wat hy gesien het noukeurig te beskryf en getrou te teken, en sy vermoë om plantkundige verskynsels te interpreteer.

WISKUNDE

1. Algebra:

1.1 Eksponente en logaritmes.

1.2 Oplos van vergelykings.

1.3 Gelyktydige lineêre vergelykings.

1.4 Die binomiaalstelling.

2. Goniometrie:

2.1 Radiaalmaat.

2.2 Goniometriese verhouding van willekeurige hoeke (funksies).

2.3 Goniometriese identiteite.

2.4 Inverse goniometriese funksies.

3. Grafieke:

3.1 Grafieke van die reguit lyn, die parabool, die hiperbool, eksponensiale en logaritmiese funksies.

3.2 Bepaling van fisiese wette uit eksperimentele resultate.

4. Differensiaal- en Integraalrekening:

4.1 Differensiasie en integrasie van polinome, logaritmiese en eksponensiale funksies.

4.2 Toepassings van differensiasie en integrasie.

4.2.1 Raaklyne.

4.2.2 Maksima en minima.

4.2.3 Veranderingstempo's.

4.2.4 Oppervlaktes.

4.2.5 Volumes.

4.3 Elementêre differensiaalvergelykings.

5. Statistiek:

5.1 Grafiese voorstelling van data.

5.2 Mate van sentraliteit (rekenkundige en geometriese gemiddeldes, mediaan, variansie en standaardafwyking).

5.3 Waarskynlikheidsleer.

5.4 Normale, Binominale en Poisson-verdeling.

5.5 Betroubaarheidsgrense.

5.6 Hipotesetoetsing.

5.7 Korrelasie en regressie.

5.8 Streekproefneming.

5.9 Chi-kwadraattoets.

6. Rekenaarprogrammering:

6.1 Elementêre programmering (B.A.S.I.C.).

6.2 Gebruik van bestaande programmatuur wat bogenoemde onderwerpe in statistiek dek.

Vascular system—heart, principal blood vessels.

Nature of arteries, veins, portal veins, capillaries.

Functions of blood transport, protection (phagocytosis, clotting, agglutination).

Maintenance of constant temperature.

Respiratory system.

Nervous system—spinal cord and nerves: Brain and cranial nerves.

Sympathetic system—reflex arc. Function of parts in general.

Skeletal system—vertebral column, skull, appendicular skeleton.

Names of bones—functions—attachment of muscles, support, protection. Urogenital system—kidney, gonads, ducts and associated glands.

Placenta.

Endocrine system—principal glands and their functions in general.

2. Microscopic anatomy of mammal—structure and physiology.

Animal cells—structure and multiplication. Mitosis. Meiosis. Epithelial tissue—trachea, oesophagus, stomach, intestine, skin, liver, pancreas, kidney.

Connective tissue—loose, dense (elastic, collagenous and reticular); adipose, pigment, lymph and lung tissue; bone, cartilage and blood (including clotting).

Muscular tissue—striated, cardiac and smooth.

Nervous tissue—ganglia and synapses, neuroglia.

Sensory organs and tissues—taste buds, end bulbs.

Paccinian corpuscles, end plates, muscle spindles, free nerve endings, olfactory epithelium, eye, ear.

Sex organs—testis, ovary, gametogenesis, sex determination.

3. Outline of classification—basic principles of classification; aggregation of animals into species, genera, families, classes, phyla.

4. General study of the following invertebrates:

Protosoa—Amoeba, Entamoeba, Trichomonas, Trypanosoma.

Plasmodium.

Babesia.

Platyhelminthes—Schistosoma, Fasiola, Taenia, Echinococcus.

Nemathelminthes—Trichocephalus (Trichuris), Strongyloides, hookworm.

Enterobius, Ascaris.

Arthropoda—crayfish or cockroach or locust (general morphology). Bug, mosquito, flea, tsetse fly, housefly, louse and beetle (external structure, mouth parts and life history only).

Arachnida—ticks and mites (the external structure, life history and hosts).

5. Parasitism.

6. Heredity—Mendelian heredity as illustrated by the inheritance of simple and sex-linked characteristics.

7. Embryology of the frog.

Practical

The complete dissection of the systems (other than muscular) of a small mammal, crayfish or cockroach or locust. Identification of the bones of the skeleton, and of slides showing the macroscopic structure of animals or parts of animals mentioned in the theory syllabus.

BOTHALIA

Bothalia is 'n medium vir die publikasie van plantkundige artikels oor die flora en plantegroei van Suidelike Afrika. Een of twee dele van die tydskrif word jaarliks gepubliseer.

Die volgende dele is beskikbaar:

Vol. 3 Deel 1 uit druk	Vol. 8 Deel 1 1962 R3
2 1937 75c	2 1964 R3
3 1938 75c	3 1965 R3
4 1939 75c	4 1965 R3
Vol. 4 Deel 1 1941 75c	Supplement
2 1942 75c	
3 1948 75c	Vol. 9 Deel 1 1966 R3
4 1948 75c	2 1967 R3
	3 en 4
Vol. 5 1950 R3	1969 R6
Vol. 6 Deel 1 1951 R1,50	Vol. 10 Deel 1 1969 R3
2 1954 R2,50	2 1971 R3
3 1956 R2	3 1971 R3
4 1957 R2	4 1972 R3
Vol. 7 Deel 1 1958 R2	Vol. 11 Deel 1 en 2
2 1960 R3	1973 R6
3 1961 R3	3 1974 R3
4 1962 R3	4 1975 R3

Vol. 12 Deel 1 1976 R5
2 1977 R5
3 1978 R7,50

Verkrygbaar van die Direkteur, Afdeling Landbou-inligting, Privaatsak X144, Pretoria.

Verkoopbelasting moet by alle binnelandse bestellings ingesluit word.

BOTHALIA

Bothalia is a medium for the publication of botanical papers dealing with the flora and vegetation of Southern Africa. One or two parts of the journal are published annually.

The following parts are available:

Vol. 3 Part 1 out of print	Vol. 8 Part 1 1962 R3
2 1937 75c	2 1964 R3
3 1938 75c	3 1965 R3
4 1939 75c	4 1965 R3
Vol. 4 Part 1 1941 75c	Supplement
2 1942 75c	
3 1948 75c	Vol. 9 Part 1 1966 R3
4 1948 75c	2 1967 R3
	3 and 4
Vol. 5 1950 R3	1969 R6
Vol. 6 Part 1 1951 R1,50	Vol. 10 Part 1 1969 R3
2 1954 R2,50	2 1971 R3
3 1956 R2	3 1971 R3
4 1957 R2	4 1972 R3
Vol. 7 Part 1 1958 R2	Vol. 11 Part 1 and 2
2 1960 R3	1973 R6
3 1961 R3	3 1974 R3
4 1962 R3	4 1975 R3

Vol. 12 Part 1 1976 R5
2 1977 R5
3 1978 R7,50

Obtainable from the Director, Division of Agricultural Information, Private Bag X144, Pretoria.

Sales tax must accompany all inland orders.

THE ONDERSTEPOORT JOURNAL OF VETERINARY RESEARCH

Die "Onderstepoort Journal of Veterinary Research" word deur die Staatsdrukker, Pretoria, gedruk en is verkrygbaar van die Direkteur, Afdeling Landbou-inligting, Departement van Landbou-tegniese Dienste, Privaatsak X144, Pretoria, 0001, aan wie ook alle navrae in verband met die tydskrif gerig moet word.

Hierdie publikasie is 'n voortsetting van die "Reports of the Government Veterinary Bacteriologist of the Transvaal" wat terugdateer tot 1903 en waarvan 18 verskyn het tot 1932. Dit is gevolg deur 40 volumes van die "Onderstepoort Journal". Tans bestaan elke volume uit vier nommers wat teen R2 binnelands en R2,50 buitelands per nommer van bogenoemde adres verkrygbaar is.

Direkteure van laboratoriums ens. wat begerig is om publikasies om te ruil moet in verbinding tree met die Direkteur, Navorsings-instituut vir Veeartsenykunde, Pk. Onderstepoort, 0110, Republiek van Suid-Afrika.

Verkoopbelasting moet by binnelandse bestellings ingesluit word.

THE ONDERSTEPOORT JOURNAL OF VETERINARY RESEARCH

The Onderstepoort Journal of Veterinary Research is printed by the Government Printer, Pretoria, and is obtainable from the Director, Division of Agricultural Information, Department of Agricultural Technical Services, Private Bag X144, Pretoria, 0001, to whom all communications should be addressed.

This publication is a continuation of the Reports of the Government Veterinary Bacteriologist of the Transvaal which date back to 1903 and of which 18 have appeared up to 1932. These were followed by 40 volumes of the Onderstepoort Journal. At present each volume comprises four numbers which are obtainable at R2, other countries R2,50 per number from the above address.

Directors of laboratories etc. desiring to exchange publications are invited to communicate with the Director, Veterinary Research Institute, P.O. Onderstepoort, 0110, Republic of South Africa.

Sales tax must accompany inland orders.

INHOUD

CONTENTS

Gedruk deur en verkrygbaar by die Staatsdrukker,
Bosmanstraat, Privaatsak X85, Pretoria, 0001

Printed by and obtainable from the Government Printer,
Bosman Street, Private Bag X85, Pretoria, 0001