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VAN DIE REPUBLIEK VAN SUID-AFRIKA

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GOVERNMENT GAZETTE

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DEPARTEMENT VAN GESONDHEID

No. R. 378 3 Maart 1978

SUID-AFRIKAANSE APTEKERSRAAD

Die Minister van Gesondheid 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 volgende regulasies betreffende die diploma in farmasie uitgevaardig:

REGULASIES BETREFFENDE DIE DIPLOMA IN FARMASIE

1. Die studiekursus vir die Diploma in Farmasie strek oor vier jaar van voltydse studie wat deur die Suid-Afrikaanse Aptekersraad goedgekeur word.

2. '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.

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

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

(b) hy in die matrikulasie-eksamen in Wiskunde en in een van die volgende vakke in die standaardgraad geslaag het: Biologie, Chemie, Dierkunde, Fisika, Fisiologie, Natuur- en Skeikunde of Plantkunde; of

GOVERNMENT NOTICE

DEPARTMENT OF HEALTH

No. R. 378 3 March 1978

SOUTH AFRICAN PHARMACY BOARD

The Minister of Health 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, made the following regulations relating to the diploma in pharmacy:

REGULATIONS RELATING TO THE DIPLOMA IN PHARMACY

1. The course of study leading to the Diploma in Pharmacy shall extend over four years of full-time study approved by the South African Pharmacy Board.

2. A candidate shall obtain credit for a subject by passing the examination in that subject in accordance with these regulations. A candidate shall qualify for the diploma by obtaining credit for such qualifying courses as are prescribed by these regulations.

3. No person shall be admitted as a candidate for the diploma unless—

(a) he holds the Matriculation Certificate of the Joint Matriculation Board or a certificate of full exemption from that examination issued by the said Board; and

(b) he has in the matriculation examination passed in Mathematics and one of the following subjects at standard grade: Biology, Botany, Chemistry, Physical Science, Physics, Physiology or Zoology; or

(c) hy, voor die instelling van die standaard- en hoër grade in die matrikulasie-eksamen in 'n eksamen van matrikulasiestandaard geslaag het in Wiskunde en in een van die volgende vakke: Biologie, Chemie, Dierkunde, Fisika, Fisiologie, Natuur- en Skeikunde of Plantkunde.

4. Die eksamens is in die volgende afdelings:

Eerste jaar: Farmasie I.
Tweede jaar: Farmasie II.
Derde jaar: Farmasie III.
Vierde jaar: Farmasie IV.

5. (1) Die vakke waarin eksamen afgelê word, is—

Farmasie I:

(a) Chemie I, Dierkunde, Fisika en Plantkunde; of
(b) Biologie, Chemie I, Fisika en Wiskunde.

Farmasie II:

Chemie II, Farmakognosie, Farmaseutika I en Fisiologie.

Farmasie III:

Farmakologie I, Farmaseutiese Chemie I, Farmaseutika II en Gesondheidsvoorligting (halwe kursus).

Farmasie IV:

Farmakologie II, Farmaseutiese Chemie II, Farmaseutika III, Farmasie-administrasie en Geregtelike Farmasie.

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

6. Die getal teorievraestelle en die duur van die teorie-eksamens is soos volg:

Farmasie I:

Chemie I: Twee vraestelle wat elk twee uur duur.
Biologie, Dierkunde, Fisika, Plantkunde, Wiskunde: Een drie-uurvraestel vir elke vak.

Farmasie II:

Chemie II: Twee vraestelle wat elk drie uur duur.
Farmakognosie, Farmaseutika I, Fisiologie: Een drie-uurvraestel vir elke vak.

Farmasie III:

Farmakologie I: Een vraestel wat drie uur duur.
Farmaseutiese Chemie I, Farmaseutika II: Twee drie-uurvraestelle vir elke vak.
Gesondheidsvoorligting: Een vraestel wat twee uur duur.

Farmasie IV:

Farmakologie II, Farmaseutiese Chemie II, Farmasie-administrasie, Geregtelike Farmasie: Een drie-uurvraestel vir elke vak.
Farmaseutika III: Twee vraestelle wat elk drie uur duur.

7. 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 en Gesondheidsvoorligting, die Raad by elke kollege 'n interne eksaminator moet aanstel, wat aan die onderrig in hierdie vakke mag deelgeneem het en wat die vraestelle vir kandidate aan sy eie kollege opstel, en 'n moderator wat die vraestelle goedkeur en as eksterne eksaminator optree.

8. Die eksamens word jaarliks in November afgeneem by sentra wat die Raad bepaal, en aanvullingseksamens kan, na goeddunke van die Raad, in Januarie of Februarie elke jaar afgeneem word.

(c) he has, prior to the introduction of the standard and the higher grades in the matriculation examination, passed examinations of matriculation standard in Mathematics and in one of the following subjects: Biology, Botany, Chemistry, Physical Science, Physics, Physiology or Zoology.

4. The examinations shall be in the following sections:

First year: Pharmacy I.
Second year: Pharmacy II.
Third year: Pharmacy III.
Fourth year: Pharmacy IV.

5. (1) The subjects of examination shall be—

Pharmacy I:

(a) Botany, Chemistry I, Physics and Zoology; or
(b) Biology, Chemistry I, Mathematics and Physics.

Pharmacy II:

Chemistry II, Pharmaceutics I, Pharmacognosy and Physiology.

Pharmacy III:

Health Education (half-course), Pharmaceutical Chemistry I, Pharmaceutics II and Pharmacology I.

Pharmacy IV:

Forensic Pharmacy, Pharmaceutical Chemistry II, Pharmaceutics III, Pharmacology II and Pharmacy Administration.

(2) The scope of the examinations shall be in accordance with the syllabuses set out in the Schedule to these regulations.

6. The number of theory question papers and the duration of the theory examinations shall be as follows:

Pharmacy I:

Chemistry I: Two papers of two hours duration each.
Biology, Botany, Mathematics, Physics, Zoology: One three-hour paper for each subject.

Pharmacy II:

Chemistry II: Two papers of three hours' duration each.
Pharmaceutics I, Pharmacognosy, Physiology: One three-hour paper for each subject.

Pharmacy III:

Health Education: One paper of two hours' duration.
Pharmacology I: One paper of three hours' duration.
Pharmaceutical Chemistry I, Pharmaceutics II: Two three-hour papers for each subject.

Pharmacy IV:

Forensic Pharmacy, Pharmaceutical Chemistry II, Pharmacology II, Pharmacy Administration: One three-hour paper for each subject.

Pharmaceutics III: Two three-hour papers.

7. 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 Health Education and Pharmacy Administration, the Board shall appoint at each college an internal examiner who may have taken part in the teaching of these subjects and who shall set the question papers for candidates in his own college, and a moderator, who shall approve the question papers and act as an external examiner.

8. The examinations shall be held in November each year at centres determined by the Board and, in the discretion of the Board, supplementary examinations may be held in January or February each year.

9. Interne teorie-eksamens word minstens twee keer elke jaar aan die kollege waar die kandidaat sy studiekursus volg, afgeneem deur interne eksaminatore wat die Raad aanstel.

10. (1) Praktiese eksamens of ander toetse van praktiese vaardigheid in ander vakke as Farmaseutika II (praktika), word aan die kollege waar die kandidaat sy studiekursus volg, afgeneem deur interne eksaminatore wat die Raad aanstel.

Die Raad stel 'n eksterne moderator aan vir elke praktiese vak aan elke inrigting, welke moderator die vraestelle ten opsigte van die praktiese eksamen of ander toetse van praktiese vaardigheid 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 aantal praktiese eksamens wat gedurende die jaar in elke vak afgeneem moet word, word deur die Raad bepaal.

(2) Die eksamen in Farmaseutika II (praktika) behels die volgende:

(a) Minstens twee Mikrobiologie-eksamens, wat 20 persent van die totale punte uitmaak;

(b) minstens twee klastoetse in algemene resepteerkunde, wat 20 persent van die totale punte uitmaak;

(c) 'n praktikumboek-punt, wat 20 persent van die totale punte uitmaak;

(d) 'n eksterne eksamen in algemene resepteerkunde wat 40 persent van die totale punte uitmaak en wat opgestel word deur twee sentrale eksaminatore wat die Raad aanstel, en by elke sentrum nagesien word deur twee plaaslike eksterne eksaminatore wat die Raad aanstel.

11. '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 voldoende rede nie sy eksameninskrywingsvorm op 1 September kan indien nie, toegelaat 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.

12. Geen kandidaat mag tot 'n eksamen toegelaat word nie tensy hy die voorgeskrewe eksameninskrywingsgeld betaal het, wat saam met die eksameninskrywingsvorm ingedien moet word

13. (1) Die Raad kan 'n kandidaat toelaat om hom vir 'n egrotateksamen in 'n vak of vakke aan te meld indien siekte verhoed dat hy hom vir 'n gewone eksamen, uitgesonderd 'n aanvullingseksamen, in sodanige vak of vakke aanmeld of dat hy die eksamen voltooi: Met dien verstande dat—

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

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

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

(2) Die Raad kan 'n kandidaat wat voor of ten tyde van 'n eksamen, uitgesonderd 'n aanvullingseksamen, die verlies van 'n naverwant gely het, toelaat om hom vir 'n 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—

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

9. Internal theory examinations shall be conducted at least twice in each year by internal examiners appointed by the Board at the college at which the candidate is taking his course of study.

10. (1) Practical examinations or other tests of practical ability, in subjects other than Pharmaceutics II (Practical), shall be conducted by internal examiners appointed by the Board at the college 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 or other tests of practical ability, 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 number of practical examinations to be conducted during the year in each subject shall be as determined by the Board.

(2) The Pharmaceutics II (Practical) examination shall comprise the following:

(a) At least two Microbiology examinations, which shall carry 20 per cent of the total mark;

(b) at least two class tests, in general dispensing which shall carry 20 per cent of the total mark;

(c) a practical-book mark, which shall carry 20 per cent of the total mark;

(d) an external examination in general dispensing, which shall carry 40 per cent of the total mark, and shall be set by two central examiners appointed by the Board and Marked at each centre by two local external examiners appointed by the Board.

11. 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.

12. No candidate shall be admitted to an examination unless he has paid the prescribed examination entrance fee, which shall be submitted with the examination entrance form.

13. (1) The Board may permit a candidate to present himself for an aegrotat examination in a subject or subjects if he is prevented by illness from presenting himself for, or completing, an ordinary examination, other than a supplementary examination, in such subject or subjects: Provided that—

(a) 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;

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

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

(2) The Board may permit a candidate who has suffered the loss of a close relative before or at the time of an 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—

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

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

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

(3) 'n Kandidaat wat hom ingevolge (1) of (2) 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.

(4) 'n kandidaat vir 'n egrogateksamen of 'n spesiale eksamen moet hom aanmeld vir die eksamen in regulasie 19 bedoel.

14. Geen persoon mag tot 'n eksamen toegelaat word nie, tensy hy in besit is van 'n sertifikaat uitgereik deur die kollege waar hy sy studiekursus volg, tot dien effekte dat hy minstens 75 persent van die klasse van die voorgeskrewe studie-kursus in die eksamenvak bevredigend bygewoon het en 'n punt van minstens 35 persent in die teoretiese deel van die klaswerk in hierdie vak gedurende die jaar behaal het: Met dien verstande dat 'n kandidaat wat erkenning ontvang het vir al die kursusse, uitgesonderd een kursus, voorgeskryf vir Farmasie I, Farmasie II of Farmasie IV of, in die geval van Farmasie III, erkenning ontvang het vir al die kursusse uitgesonderd een volle kursus en een halwe kursus toegelaat word om hom vir eksamen in daardie kursus of halwe kursus by die volgende gewone eksamen aan te meld sonder dat dit van hom verwag word om bedoelde sertifikaat te verkry: Met dien verstande verder dat, indien hy weer in die eksamen druip, hy die voorgeskrewe studiekursus in daardie vak moet herhaal voordat hy hom vir 'n verdere eksamen aanmeld.

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

(2) 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.

16. (1) 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 kolleges vir gevorderde tegniese onderwys in regulasie 17 genoem.

(2) 'n Applikant om vrystelling van 'n eksamen moet die voorgeskrewe inskrywingsgeld saam met sy aansoek indien.

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

Kaapse Kollege vir Gevorderde Tegniese Onderwys.
Natalse Kollege vir Gevorderde Tegniese Onderwys.
Port Elizabethse Kollege vir Gevorderde Tegniese Onderwys.
Pretoriase Kollege vir Gevorderde Tegniese Onderwys.
Witwatersrandse Kollege vir Gevorderde Tegniese Onderwys.

(2) 'n Kollege vir gevorderde tegniese onderwys 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.

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

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

(3) A candidate who wishes to present himself for examination in terms of (1) or (2) 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.

(4) A candidate for an aegrotat examination or a special examination shall present himself for the examination referred to in regulation 19.

14. No person shall be admitted to an examination unless he holds a certificate issued by the college 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 mark of not less than 35 per cent in the theoretical part of the classwork in that subject during the year: Provided that a candidate who has obtained credit for all but one of the courses prescribed for Pharmacy I, Pharmacy II or Pharmacy IV, or, in the case of Pharmacy III, has obtained credit for all except one full course and one half-course, 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: Provided further that, if he fails the examination again, he shall be required to repeat the prescribed course of study in that subject before presenting himself for further examination.

15. (1) 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.

(2) 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.

16. (1) The Board may grant exemption from 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 colleges for advanced technical education listed in regulation 17.

(2) An applicant for exemption from examination shall submit the prescribed entrance fee with his application.

17. (1) The following shall be approved institutions at which a course of study leading to the Diploma in Pharmacy may be taken:

Cape College for Advanced Technical Education.
Natal College for Advanced Technical Education.
Port Elizabeth College for Advanced Technical Education.
Pretoria College for Advanced Technical Education.
Witwatersrand College for Advanced Technical Education.

(2) A college for advanced technical education referred to in subregulation (1) shall submit to the Board not later than 31 March in each year lists of the names of all students enrolled in each year of study for the Diploma in Pharmacy.

18. (1) Die Raad moet, wanneer hy besluit of 'n kandidaat in die eksamen in 'n vak geslaag het, die punte wat die kandidaat gedurende die jaar in die interne teorie-eksamens behaal het, in aanmerking neem.

(2) Die maksimum punte wat vir prestasie in die interne teorie-eksamens toegeken word, is een derde van die totale punte wat in die teoriedeel van die vak toegeken word.

(3) Die punte vir die interne praktiese eksamen, wat ingevolge regulasie 10 aan 'n kandidaat toegeken word, is die finale punte wat aan hom in daardie afdeling van elke vak toegeken word.

(4) Die minimum punte wat 'n kandidaat moet behaal om in 'n eksamen te slaag, is 50 persent, met 'n subminimum van 40 persent in die eksterne eksamen: Met dien verstande dat bedoelde subminimum nie van toepassing is op die finale praktikumpunte wat ingevolge subregulasie (3) vir 'n kandidaat ingedien is nie.

(5) Die totale punt wat vir 'n vak toegeken word, word bereken deur die totale teorie- en totale praktikumpunte te kombineer in die verhouding wat die Raad bepaal.

19. Die Raad kan 'n kandidaat wat in 'n eksamen druip, toelaat om hom in Januarie of Februarie van die daaropvolgende jaar vir 'n hereksamen in daardie vak aan te meld: Met dien verstande dat—

(a) 'n kandidaat hom nie vir 'n hereksamen in meer as twee vakke in Farmasie I, Farmasie II en Farmasie IV mag aanmeld nie, en nie vir 'n hereksamen in meer as twee vakke in Farmasie III nie, behalwe dat 'n kandidaat wat in Gesondheidsvoorligting druip sowel as in twee ander vakke hom vir hereksamen in al drie vakke kan aanmeld: Met dien verstande verder dat hy in minstens twee van die volgende vakke gelyktydig in die finale jaar moet slaag: Farmakologie II, Farmaseutiese Chemie II, Farmaseutika III;

(b) 'n kandidaat hom nie vir 'n hereksamen in 'n vak mag aanmeld nie indien hy minder as 40 persent van die moontlike punte in daardie vak behaal;

(c) 'n kandidaat hom nie vir 'n hereksamen ingevolge (a) mag aanmeld nie, tensy hy in die oorblywende eksamens van die betrokke afdeling geslaag het;

(d) 'n kandidaat hom nie vir 'n hereksamen in 'n vak in Farmasie IV, uitgesonderd Farmasie-administrasie, mag aanmeld nie, tensy hy in die interne eksamen geslaag het en die subminimum in die eksterne eksamen behaal het;

(e) 'n kandidaat hom nie vir 'n hereksamen in Farmasie-administrasie mag aanmeld nie, tensy hy 'n gemiddelde punt van minstens 40 persent behaal het in die toetse wat gedurende die jaar in hierdie vak afgeneem is;

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

(g) 'n kandidaat vir hereksamen namens wie 'n finale praktikumpunt kragtens regulasie 18 ingedien is, kan verkies om 'n interne praktiese aanvullingseksamen sowel as die eksterne teorie-eksamen af te lê, in welke geval die kollege sodanige eksamen(s) afneem en die finale punt behaal aan die Registrateur voorlê: Met dien verstande dat indien die kandidaat verkies om nie so 'n eksamen af te lê nie die finale praktikum-punt hierbo bedoel in aanmerking geneem word wanneer bepaal word of die kandidaat in die eksamen geslaag het.

20. Die minimum punte wat 'n kandidaat moet behaal om in 'n aanvullingseksamen, 'n egrotateksamen of 'n spesiale eksamen te slaag, is dié wat in regulasie 18 voorgeskryf word.

21. 'n Kandidaat wat nie in die eksamens in minstens twee van die kursusse wat vir Farmasie I, Farmasie II of Farmasie IV voorgeskryf word, of in minstens een van die kursusse en die halwe kursus wat vir Farmasie III

18. (1) The Board, in determining whether a candidate has passed an examination in a subject, shall take into account the marks obtained by the candidate in internal theory examinations during the year.

(2) The maximum marks awarded for performance in the internal theory examination shall be one-third of the total marks awarded in the theory part of the subject.

(3) The marks for the internal practical examination awarded to a candidate in terms of regulation 10 shall be the final marks awarded to him in that section of each subject.

(4) The minimum marks which a candidate is required to obtain for a pass in an examination shall be 50 per cent, with a subminimum of 40 per cent in the external examination: Provided that the subminimum referred to shall not apply to final practical marks submitted on behalf of a candidate in terms of subregulation (3).

(5) The total mark awarded for a subject shall be calculated by combining the total theory and total practical marks in a ratio determined by the Board.

19. The Board may permit a candidate who fails an examination to present himself for re-examination in that subject in January or February of the following year: Provided that—

(a) a candidate shall not present himself for re-examination in more than two subjects in Pharmacy I, Pharmacy II, and Pharmacy IV, and for re-examination in Pharmacy III in not more than two subjects, save that a candidate who fails in Health Education in addition to two other subjects may present himself for re-examination in all three subjects: Provided further that he passes at least two of the following subjects simultaneously in the final year: Pharmacology II, Pharmaceutical Chemistry II, Pharmaceutics III;

(b) a candidate shall not present himself for re-examination in a subject if he obtains less than 40 per cent of the possible marks in that subject;

(c) a candidate shall not present himself for re-examination in terms of (a) unless he has passed the remaining examinations of the section concerned;

(d) a candidate shall not present himself for re-examination in a subject in Pharmacy IV other than Pharmacy Administration unless he has obtained a pass in the internal examination and has obtained the subminimum in the external examination;

(e) a candidate shall not present himself for re-examination in Pharmacy Administration unless he has obtained an average mark of not less than 40 per cent in the tests conducted in this subject during the year;

(f) 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;

(g) a candidate for re-examination on whose behalf a final practical mark has been submitted in terms of regulation 18 may elect to undergo a supplementary internal practical examination in addition to the external theory examination, in which case the college shall conduct such examination(s) and submit the final mark obtained to the Registrar: Provided that if the candidate does not elect to undergo such examination(s), the final practical mark referred to above shall be taken into account in determining whether the candidate has passed the examination(s).

20. The minimum marks which a candidate is required to obtain for a pass in a supplementary examination, an aegrota examination or a special examination shall be those prescribed in regulation 18.

21. A candidate who does not pass the examination in at least two of the courses prescribed for Pharmacy I, Pharmacy II or Pharmacy IV or at least one of the

voorgeskryf word, slaag nie, ontvang geen erkenning vir enige van die kursusse wat hy vir daardie studiejaar voltooi het nie, en hy moet aan die vereistes van regulasie 14 voldoen voordat hy hom weer vir eksamen kan aanmeld.

22. (1) Behalwe soos by hierdie regulasie bepaal, mag 'n kandidaat nie tot kursusse in Farmasie II of Farmasie III of Farmasie IV toegelaat word nie, tensy hy erkenning ontvang het vir al die vakke voorgeskryf vir onderskeidelik Farmasie I of Farmasie II of Farmasie III.

(2) 'n Kandidaat wat erkenning ontvang het vir drie van die kursusse wat vir Farmasie I voorgeskryf is, met inbegrip van Chemie I, word tot die kursusse Chemie II en Fisiologie wat vir Farmasie II voorgeskryf is, toegelaat, en ontvang erkenning vir hierdie kursusse indien hy in die eksamens daarin slaag, mits hy tegelykertyd in die eksamen in die uitstaande kursus vir Farmasie I slaag.

(3) 'n Kandidaat wat erkenning ontvang het vir drie van die kursusse wat vir Farmasie II voorgeskryf is, word tot die halwe kursus Gesondheidsvoorligting wat vir Farmasie III voorgeskryf is, toegelaat, en ontvang erkenning vir hierdie halwe kursus indien hy in die eksamen daarin slaag, mits hy tegelykertyd in die eksamen in die uitstaande kursus vir Farmasie II slaag.

(4) 'n Kandidaat wat kragtens subregulasies (2) en (3) inskryf vir eksamens in kursusse wat vir Farmasie I of Farmasie II of Farmasie III voorgeskryf is, moet, ondanks die voorbehoudsbepaling van regulasie 14, in besit wees van die sertifikaat in daardie regulasie bedoel ten opsigte van elke sodanige kursus.

23. Die volgende Goewermentskennisgewings, wat betrekking het op die reëls en minimum leergang vir die Diploma in Farmasie, word hierby ingetrek:

R. 21 van 5 Januarie 1968, R. 3210 van 5 September 1969, R. 2134 van 4 Desember 1970, R. 2135 van 4 Desember 1970, R. 734 van 7 Mei 1971, R. 1733 van 1 Oktober 1971, R. 1734 van 1 Oktober 1971, R. 2236 van 10 Desember 1971, R. 2237 van 10 Desember 1971, R. 2290 van 15 Desember 1972, R. 2291 van 15 Desember 1972, R. 2160 van 16 November 1973, R. 1565 van 6 September 1974 en R. 985 van 23 Mei 1975.

BYLAE

LEERPLANNE VIR DIE DIPLOMA IN FARMASIE

Biologie

1. Lewe: Kenmerke van lewende organismes, omvang en terrein van die biologie.
2. Die molekulêre basis van lewe.
3. Selle en weefsels: Hul bou en funksie.
4. Die verskeidenheid van lewensvorme: Geselekteerde voorbeelde uit: Virusse, bakterieë, fungi, mosse, varings, gimnosperme, angiosperme, laer en hoër ongewerwelde diere, die filum Chordata, grondbeginsels van klassifikasie van lewende organismes, binomiale nomenklatuur.
5. Vervoer- en sirkulasiestelsels.
6. Respirasie: Gaswisseling, glikolise, sitroensuursiklus, elektronoordragsisteem, energieproduksie.
7. Vertering, metabolisme en voeding.
8. Beheerstelsels: senuwee- en hormonale stelsel.
9. Homeostase en uitskeiding.
10. Genetika.
11. Voortplanting en ontwikkeling.
12. Ekologie, parasitologie.

Chemie I

Afdeling 1—*Algemene en Fisiese Chemie*

1.1 Atoomstruktuur en die Periodieke Tabel.
1.2 Algemene eienskappe van die elemente.
1.3 Bindingsvermoë.
1.4 Stoïgiometrie.
1.5 Ekwivalente massas en die bepaling daarvan.
1.6 Die gastoestand.

courses and the half-course prescribed for Pharmacy III shall not be granted credit for any of the courses completed by him for that year of study and shall be required to comply with the provisions of regulation 14 before he may again present himself for examination.

22. (1) Except as provided for in this regulation, no candidate shall be admitted to courses in Pharmacy II or Pharmacy III or Pharmacy IV unless he has obtained credit for all the courses prescribed in Pharmacy I or Pharmacy II or Pharmacy III, respectively.

(2) A candidate who obtained credit for three of the courses prescribed for Pharmacy I, including Chemistry I, shall be admitted to the courses Chemistry II and Physiology prescribed for Pharmacy II and shall be granted credit for those courses if he passes the examinations therein, on condition that he passes the examination in the outstanding Pharmacy I course at the same time.

(3) A candidate who has obtained credit for three of the courses prescribed for Pharmacy II shall be admitted to the half-course, Health Education, prescribed for Pharmacy III and shall be granted credit for this half-course if he passes the examination therein, on condition that he passes the examination in the outstanding Pharmacy II course at the same time.

(4) A candidate who enters for examinations in courses prescribed for Pharmacy I or Pharmacy II or Pharmacy III in terms of subregulations (2) or (3) shall, notwithstanding the proviso to regulation 14, be in possession of the certificate referred to in that regulation in respect of every such course.

23. The following Government Notices, relating to the rules and minimum curriculum for the Diploma in Pharmacy, are hereby withdrawn:

R. 21 of 5 January 1968, R. 3210 of 5 September 1969, R. 2134 of 4 December 1970, R. 2135 of 4 December 1970, R. 734 of 7 May 1971, R. 1733 of 1 October 1971, R. 1734 of 1 October 1971, R. 2236 of 10 December 1971, R. 2237 of 10 December 1971, R. 2290 of 15 December 1972, R. 2291 of 15 December 1972, R. 2160 of 16 November 1973, R. 1565 of 6 September 1974 and R. 985 of 23 May 1975.

SCHEDULE

SYLLABUSES FOR THE DIPLOMA IN PHARMACY

Biology

1. Life: Features of living organisms, scope of biology.
2. The molecular basis of life.
3. Cells and tissues: Their structure and function.
4. The diversity of life: Selected examples from:

Viruses, bacteria, fungi, bryophytes, ferns, gymnosperms, angiosperms, lower and higher invertebrates, the phylum Chordata, basic principles of classification of living organisms, binomial nomenclature.

5. Transport and circulatory systems.
6. Respiration: Gas exchange, glycolysis, citric acid cycle, electron transfer system, production of energy.
7. Digestion, metabolism and nutrition.
8. Control systems: Nervous and hormonal.
9. Homeostasis and excretion.
10. Genetics.
11. Reproduction and development.
12. Ecology, parasitology.

Botany

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.

1.7 Die vloeibare en vaste toestand.
1.8 Oplossings en metodes om konsentrasie uit te druk.
1.9 Kolloïede.
1.10 Saambindende eienskappe.
1.11 Elektrochemie.
1.12 Sure en basisse.
1.13 Chemiese ewewig.
1.14 Termochemie.

Afdeling 2—*Anorganiese en Analitiese Chemie*

2.1 Indeling van chemiese reaksies en reagense.
2.2 Balansering van vergelykings.
2.3 Die sistematiese beskrywende en vergelykende chemie van uitgesoekte elemente.
2.4 Teorie van volumetriese analise.
2.5 Teorie van kwalitatiewe analise.

Afdeling 3—*Organiese Chemie*

3.1 Inleiding. Organiese formuletipes.
3.2 Struktuur- en stereoïsomerie.
3.3 Formele en triviale benamings.

3.3.1 Alifatiese verbindings—'n Oorsig van basiese reaksieweë en die fomele chemie van alkane, alkene, alkyne, haloalkane, polihalogeenderivate van alkane, alkohole, aldehiede, ketone, eters, amiene, karboksielsure, suurchloriede, suuranhidriede, suuramiede, esters, nitriele.
3.3.2 Aromatisiteit in bensenoïede sisteme—Met verwysing na die bereiding en reaksies van benseen, tolueen, chloorbenseen, fenol, bensaldehied, bensoësuur, benseensulfoonsuur, nitrobenseen, anilien.

Afdeling 4—*Praktiese Chemie*

4.1 Kwalitatiewe analise van uitgesoekte katione en anione.
4.2 Volumetriese analise.—Standaardisering, neutralisasie, en presipitasietitrasies en redokstitrasies.
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

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.
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 metode soos infrarooi- en massaspektrometrie vir opklaring van struktuur.

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, Penicillium, Agaricus (Psalliota), Funaria, Dryoptreis, Pinus, a typical Monocotyledon, a typical Diccotyledon.
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 I

Section 1—*General and Physical Chemistry*

1.1 Atomic structure and the Periodic Table.
1.2 General properties of the elements.
1.3 Combining power.
1.4 Stoichiometry.
1.5 Equivalent masses and their determination.
1.6 The gaseous state.
1.7 The liquid and solid states.
1.8 Solutions and methods of expressing concentration.
1.9 Colloids.
1.10 Colligative properties.
1.11 Electrochemistry.
1.12 Acids and bases.
1.13 Chemical equilibrium.
1.14 Thermochemistry.

Section 2—*Inorganic and Analytical Chemistry*

2.1 Classification of chemical reactions and reagents.
2.2 Balancing of equations.
2.3 The systematic descriptive and comparative chemistry of selected elements.
2.4 Theory of volumetric analysis.
2.5 Theory of qualitative analysis.

Section 3—*Organic Chemistry*

3.1 Introduction. Types of organic formulae.
3.2 Structural and sterio-isomerism.
3.3 Formal and trivial nomenclature.

Afdeling 5—Praktiese Chemie

5.1 Kwalitatiewe analise van die elemente.
5.2 Volumetriese analise: Standaardisering, neutralisasie, presipitasie, redoks, kompleksometriese en adsorpsietitrasies.
5.3 Intrumentele analise.
5.4 Bereiding en suiwering van organiese verbindings op semimikroskaal.

Dierkunde

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, belangrikste 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.
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, reukepiteel, 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.

3.3.1 *Aliphatic compounds.*—A review of basic reaction routes and the formal chemistry of alkanes, alkenes, alkynes, haloalkanes, polyhalogen derivatives of alkanes, alcohols, aldhydes, ketones, ethers, amines, carboxylic acids, acid chlorides, acid anhydrides, acid amides, esters, nitriles.
3.3.2 *Aromaticity in benzenoid systems.*—With reference to the preparation and reactions of benzene, toluene, chlorobenzene, phenol, benzaldehyde, benzoic acid, benzenesulphonic acid, nitrobenzene, aniline.

Section 4—Practical Chemistry

4.1 Qualitative analysis of selected cations and anions.
4.2 Volumetric analysis: Standardisation, neutralisation, redox and precipation 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

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 radiochemistry.

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 purification and determination of physical constants.
4.2 The determination of molecular formulae of selected compounds.
4.3 A more advanced discussion of sterio-isomerism.
4.4 Prototropy and selected molecular 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

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.

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 (eksterne 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

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.

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

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. 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.

2. 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 be 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. Fertilisers, 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 section: 1 (i), (iii), (iv), (x), (xii), (xiii), (xv), (xvii), (xix), (xx), (xxiii), (xxiv), (xxv), (xxvi), (xxvii), (xxviii), (xxix), (xxx), (xxxi), (xxxii), (xxxiii), (xxxiv), (xxv), (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.

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.

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 senuselsel en dopaminolitiese middels.
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, absorbeermidels 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 koronêre 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.

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

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 Attitudes 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.*—Real and complex numbers, exponents and radicals, inequalities, polynomials and equations, permutations, combinations and the binomial theorem.
2. *Trigonometry.*—Trigonometric functions for arbitrary angles, trigonometric formulae, inverse trigonometric functions.
3. *Probability and statistics.*—Probability, frequency distributions, measures of central tendency of a distribution, standard deviation, the normal distribution, the Poisson distribution, significance t-test, Chi-square test, empirical curve fitting.
4. *Analysis.*—Differentiation and integration of polynomials, rational functions, logarithmic and exponential functions, trigonometric and inverse trigonometric functions. Application of differentiation and integration. Partial differentiation and the more common ordinary differential equations.

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; drug nomenclature.

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

1.1.5 Weighing and measuring; pharmaceutical balances and their sensitivity and capacity. The correct choice of volumetric measures.

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 ingebruik 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.

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 instrinsieke 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

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, toksisiteit en die verband tussen struktuur en werking:

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

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 plastics 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.

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 II

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 scale evaporators.

1.2.2 *Drying.*—Principles involved and pharmaceutical considerations; a study of the various types of plant 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.

3. Prakties:

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

Farmaseutiese Chemie II

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.

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 I

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 Weging en afmeting; 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.

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. Pharmaceutical Technology:

2.1 The student will be expected to become acqainted 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

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.

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—1viskositeit, reologie en jelvorming.

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

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 II

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.

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.

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 pharcaceutical products for maximum therapeutic activity and stability, and the stability testing of these products.

2. Applied microbiology:

2.1 The formulation and preparation of parenteral, opthalmic, 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.

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 baterieë.

4.2.3 Bakteriële biochemie en kleuringsmetodes.

4.2.4 Bakterietelling.

4.2.5 Verspreiding en voorkoms van baterieë 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 reseptering en samestelling van dié doseringsvorme en offisiële preparate wat nie gedurende Farmaseutika I afgehandel is nie.

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

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 mikroörganismes 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.

2.3 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

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.

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 II

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.

2. Toegepaste Farmaseutiese Mikrobiologie:

2.1 Sterilisasiemetodes:

2.1.1 'n Kritiese waardering van die verskillende sterilisasie metodes 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 beperking van mikrobiese groei in kamers en atmosfere, farmaseutiese materiale, apparaat of preparate, of wat aan die vel of slymvliese 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 beinsels 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.

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

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 and as determined by their present pharmaceutical and medicinal importance.

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

Theory

1. The scope of 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:

2.2.1 Passive transport of drugs.

2.2.2 Active transport of drugs.

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

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.
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.

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 system:

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.
5.1.4 Ganglionic stimulant and ganglionic blocking drugs.
5.1.5 Curariform drugs.
5.1.6 Nonspecific 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).

Fisika

Teorie

1. Meganika:

1.1 Vektore.
1.2 Eenvormig versnelde beweging.
1.3 Momentum.
1.4 Krag, energie en arbeidsvermoë.
1.5 Momente. Sirkelbeweging.

2. Eienskappe van materie:

2.1 Digtheid en relatiewe digtheid.
2.2 Die kinetiese teorie van gasse.
2.3 Elastisiteit.
2.4 Viskositeit.
2.5 Diffusie.
2.6 Oppervlakspanning.

3. Warmte:

3.1 Uitsetting van vaste stowwe en vloeistowwe.
3.2 Uitsetting van gasse.
3.3 Die meting van warmte.
3.4 Verandering van toestand.
3.5 Oorplasing van warmte.
3.6 Termodinamika.

4. Golfbeweging. Klank. Geometriese en Fisiese Optika.

5. Elektrostatika. Stroomelektrisiteit. Magnetisme. Elektromagnetisme.

6. Atoomfisika:

6.1 Atoomstruktuur.
6.2 Spektra.
6.3 X-strale.
6.4 Die kern.

Prakties

Die beraming van die akkuraatheid van praktiese metings. 'n Eksperimentele kursus wat die toeligting van basiese begrippe wat in die teoretiese kursus behandel word, ten doel het.

Fisiologie

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.

4. Bloed en immuniteit:

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

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.
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 system.
6. Capita selecta.

Pharmacy administration

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, communication, 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.

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 respirasie, 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 respirasiefunksies.
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.

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. 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.

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.

Physics

Theory

Mechanics:

1. Vectors.

1.2 Uniformly accelerated motion.
1.3 Momentum.
1.4 Force, energy and power.
1.5 Moments. Circular motion.

2. Properties of matter:

2.1 Density and relative density.
2.2 Kinetic theory of gases.
2.3 Elasticity.
2.4 Viscosity.
2.5 Diffusion.
2.6 Surface tension.

3. Heat:

3.1 Expansion of solids and liquids.
3.2 Expansion of gases.
3.3 Measurement of heat.
3.4 Change of state.
3.5 Transfer of heat.
3.6 Thermodynamics.

4. Wave motion. Sound. Geometric and Physical Optics.
5. Electrostatics. Current electricity. Magnetism. Electromagnetism.
6. Atomic Physics:

6.1 Atomic structure.
6.2 Spectra.
6.3 X-rays.
6.4 The nucleus.

Practical

The estimation of accuracy of practical measurements. An experimental course illustrating the basic principles dealt with in the theoretical course.

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.

Geregtelike Farmasie

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 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): Arikels 5, 130, 131, 140 en 175, en regulasies kragtens artikels 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).

Physiology

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 polycytaemia.

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

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

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.

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), (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.

9. Die Wet op Geneeshere, Tandartse en Aanvullende Gesondheidsdiens beroepe, 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

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.

8.3 Insulin, glucagon, diabetes mellitus.

8.4 Function of parathyroids, calcium metablism, 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.

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.

Zoology

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, HCl, 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.

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.

Plantkunde

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 vak; 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, rangskikking 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. 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 taksonomie soos geïllustreer deur 'n kort studie van 'n verteenwoordigende voorbeeld van elk van die volgende families: Liliaceae, Gramineae, Ranunculaceae, Leguminosae, 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.*—Reëls en komplekse getalle, eksponente en radikale, ongelykhede, veelterme en vergelykings, permutasies, kombinasies en die binomiaalstelling.

2. *Goniometrie.*—Goniometriese funksies vir willekeurige hoeke, goniometriese formules, inverse goniometriese funksies.

3. *Waarskynlikheidsleer en statistiek.*—Waarskynlikheid, frekwensieverdelings, posisiemaat, standaardafwyking, die normaalverdeling, die Poissonverdeling, betekenisvolheid, t-toets, Chi-kwadraattoets, empiriese krommepassing.

4. *Analise.*—Differensiasie en integrasie van veelterme, rasionale funksies, logaritmiese en eksponensiële funksies, goniometriese en inverse goniometriese funksies. Toepassings van differensiasie en integrasie. Parsiële differensiasie en eenvoudige gewone differensiaalvergelykings.

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:

Protozoa—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.

INHOUD

CONTENTS

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