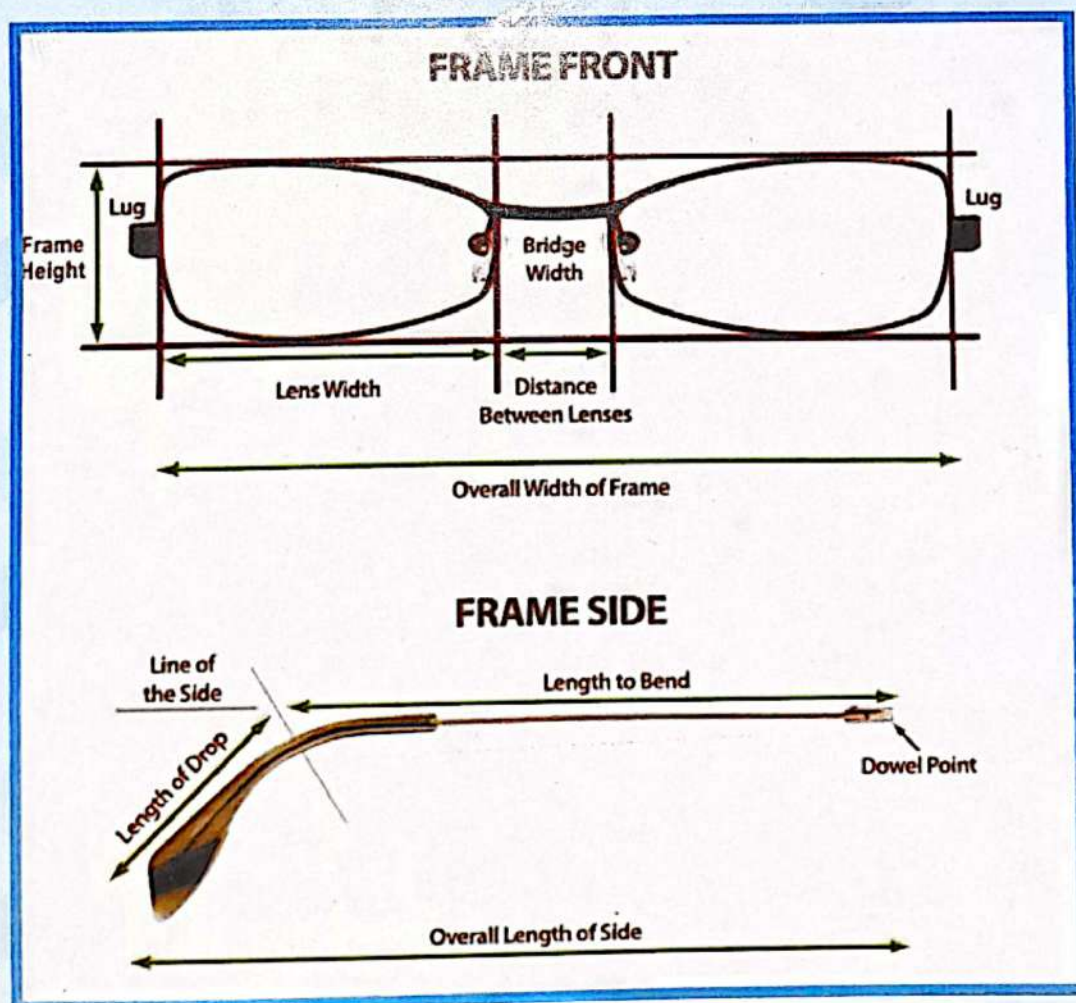


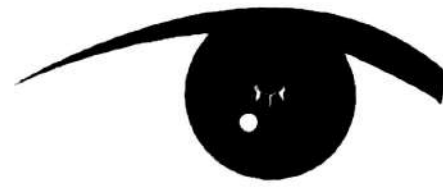


**OPTOMETRISTS & DISPENSING OPTICIANS
REGISTRATION BOARD OF NIGERIA**



PRACTICAL MANUAL NATIONAL DIPLOMA IN DISPENSING OPTICIANRY PROGRAMME





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PRACTICAL MANUAL FOR DISPENSING OPTICIANRY STUDENTS

NATIONAL DIPLOMA IN DISPENSING OPTICIANRY PROGRAMME IN NIGERIA

A publication of
**OPTOMETRISTS AND DISPENSING OPTICIANS
REGISTRATION BOARD OF NIGERIA**

ODORBN

Revised 2025

ISBN: 978-978-699-026-2

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PREFACE

This practical manual serves as a comprehensive guide for National Diploma in Dispensing Opticianry students, providing a systematic approach to acquiring essential theoretical knowledge and practical skills in dispensing opticianry practice.

The 14-week practical course has been carefully structured to progress from fundamental optical principles to advanced clinical applications. Beginning with geometrical optics and light behaviour, students advance through lens materials, frame technology, precision measurements, and sophisticated dispensing techniques. Each week builds upon previous knowledge, ensuring a solid foundation for professional practice.

This manual emphasizes hands-on learning through practical exercises, laboratory work, and realworld applications. Students will master the use of essential instruments including lensometers, lens clocks, edging machines, and measurement tools. The inclusion of detailed diagrams, step-by-step procedures, and comprehensive scoring systems ensures objective assessment of competency development.

The content aligns with current industry standards and professional requirements, preparing graduates for immediate entry into the dispensing opticianry field. Topics range from basic optical theory to advanced frame adjustments, lens enhancements, and prescription verification - skills essential for competent dispensing opticianry practice.

The scoring system provides both students and instructors with clear benchmarks for progress evaluation. This structured assessment approach ensures consistent learning outcomes and maintains educational standards across different institutions.

We acknowledge the contributions of experienced educators and practicing dispensing opticians who have shaped this course to meet the evolving needs of the optical industry. Their expertise ensures that graduates possess both theoretical understanding and practical competence required for professional success.

Students are encouraged to approach each week's activities with dedication and attention to detail.

The dispensing opticianry profession demands precision, professionalism, and continuous learning -qualities that this manual aims to instill from the earliest stages of education.

This practical manual represents your pathway to becoming a skilled dispensing optician, capable of delivering quality services to the community.

Please, accept the assurances of my highest regards.

Dr. Obinna Edwin Awiaka

Registrar/CEO

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**OPTOMETRISTS AND DISPENSING OPTICIANS REGISTRATION
BOARD OF NIGERIA
5070/5071 UNITY ESTATE, KARU ABUJA
PRACTICAL MANUAL FOR FINAL YEAR STUDENTS
IN DISPENSING OPTICIANRY PROGRAMME**

INSTRUCTIONS:- This practical manual prepared for final year students of National Diploma of Dispensing Opticianry Programme in Nigeria. It is a fourteen weeks laboratory exercises with sixty eight practical questions. Students are supposed to carry out these exercises under the supervision of a faculty staff who must assess, mark and sign off each student's work. Students are responsible for carrying this manual and ensuring that they are submitted to the Head of Department at the end of the fourteen weeks. For a student to qualify for Board examination, that student must have attended seventy five percent (75%) of the laboratory exercise. The cumulative mark of this laboratory exercise constitutes twenty five (25%) of the final Board examination.

STUDENT'S NAME:.....

MATRICULATION NUMBER:.....

INDEXING NUMBER:.....

DATE:.....

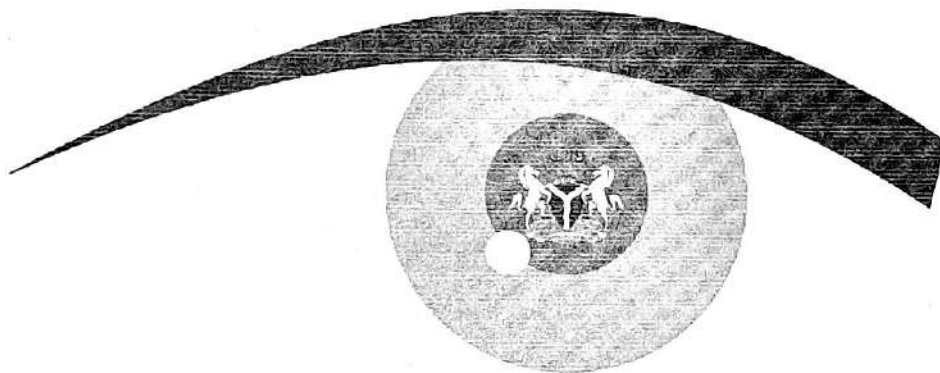
**STUDENT'S PASSPORT
PHOTOGRAPH**

**GEOMETRICAL BEHAVIOUR OF LIGHT, RAY DIAGRAM,
MIRROR & LENS IMAGE FORMATION AND PRISM**

Obtainable scores: 30

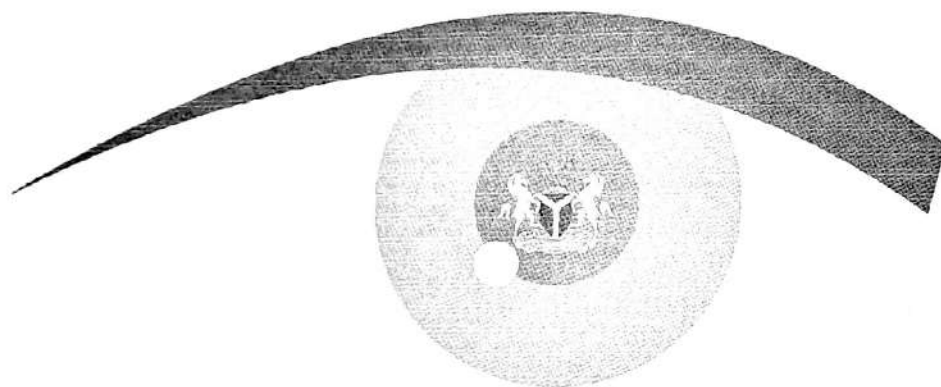
1. Draw diagrams using group of rays and wave front to illustrate converging, diverging and parallel pencils of rays (**6 marks**)
2. Construct a ray diagram showing the formation of a virtual image produced by a plane mirror. List the characteristics of the image formed by a plane mirror (**4 marks**)
3. Show the formation of real and virtual images formed by curved mirrors (**10 marks**)
4. Show the formation of real and virtual images formed by lenses. Describe various lens forms (**10 marks**)
5. Demonstrate the dispersion of light using the Prism. Use diagrams to explain the prismatic representation of converging and diverging lenses (**6 marks**)

ANSWERS



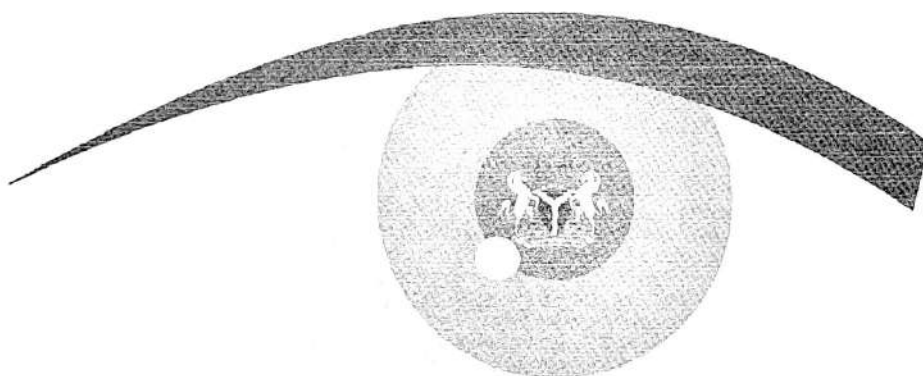
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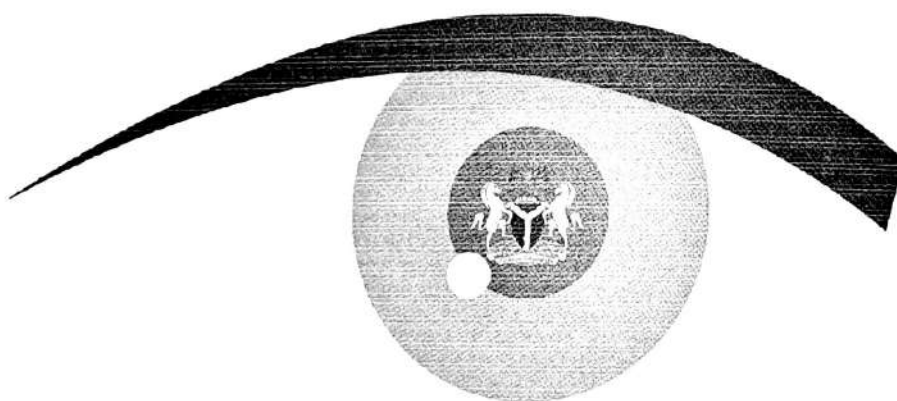
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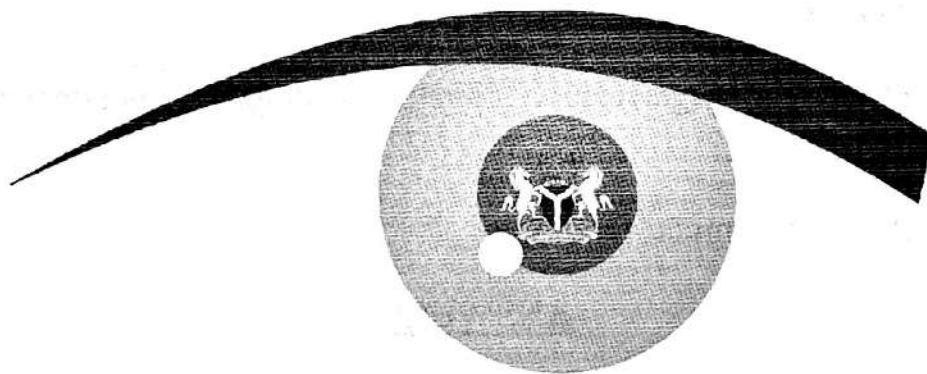
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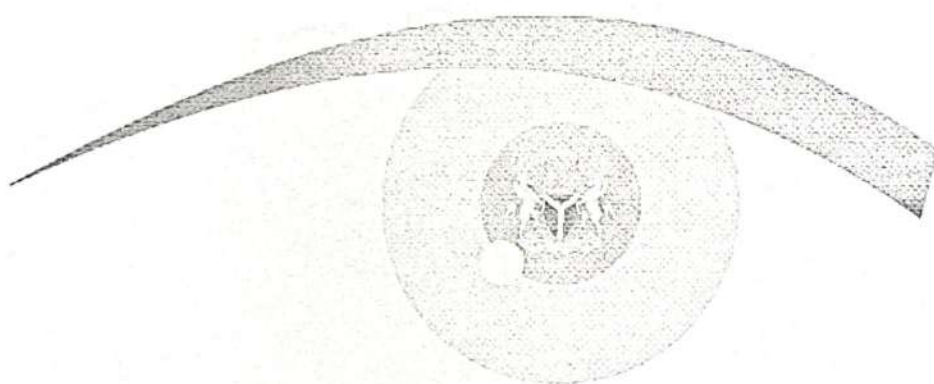
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**SPECULAR REFLECTION AND REFRACTION, LENS MATERIALS,
LENS CURVATURE AND MAGNIFICATION**

Obtainable scores: 30

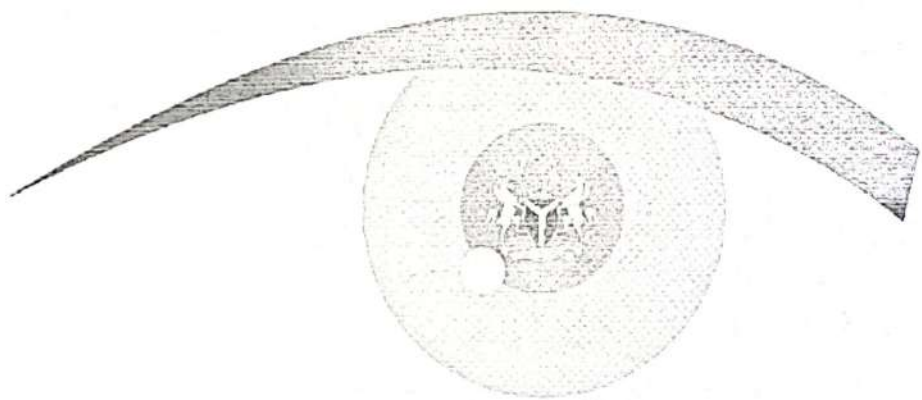
6. State the laws of reflection and refraction. Demonstrate with the aid of diagrams (6marks)
7. Describe the types of the basic lens materials, their optical properties, advantages and disadvantages (12marks)
8. Define the terms base curve and cross curve as applied to a toroidal surface. Specify a toroidal surface in terms of its base curve and cross curve. Define the term Toric Lens (4marks)
9. Give the formular for Magnification. Give two examples of positive and negative magnification (4marks)
10. State the thin lens formular (4marks)

ANSWERS



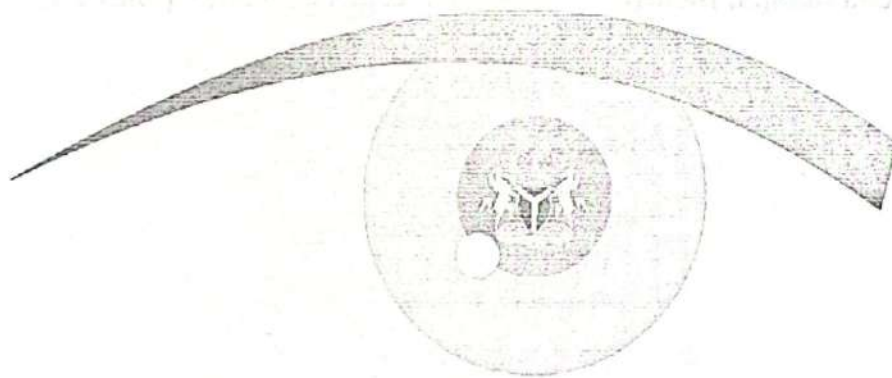
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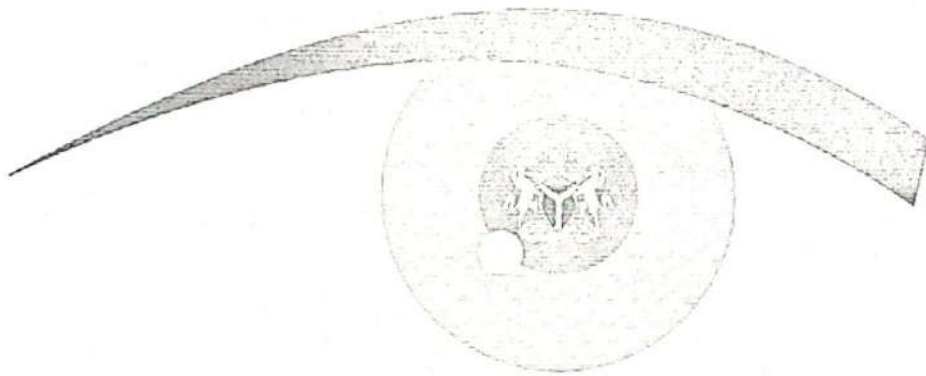
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SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:.....

**TYPES OF LENSES, LENS CLASSIFICATION
AND REFRACTION MATERIALS*****Obtainable scores: 25***

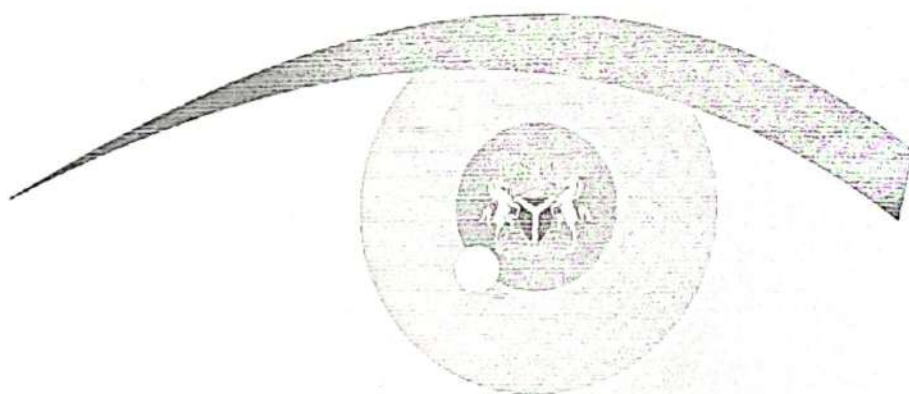
11. Identification of types of lenses and their physical attributes **(5marks)**
12. Classify lens types according to materials and power of the lens (identify each type in the laboratory) **(8marks)**
13. What are the common refracting materials available? Give reasons why they are used as refracting materials **(6marks)**
14. Define lens blanks. Identify the different types of blanks **(6marks)**

ANSWERS



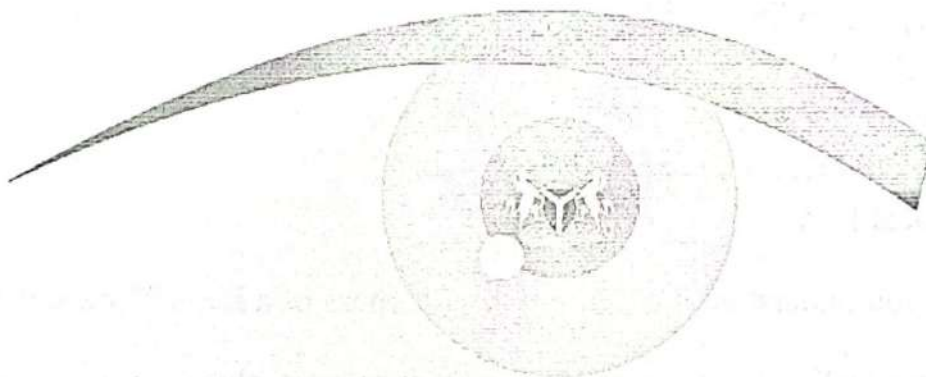
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SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:.....

**LENS CLASSIFICATION AND NEUTRALIZATION,
MINIMUM LENS THICKNESS*****Obtainable scores: 45***

15. Classify single vision lenses and bifocal lenses. Identify each type in the laboratory (9marks)

16. What do you understand as Hand Neutralization. Neutralized the following lens type (Using a manual Lensmeter) (21marks)

- Single vision lenses
- Single Plano cylinder lens
- Single spherocylindrical lens
- Plano bifocal lens
- Spherical power bifocal lens
- Spherocylindrical power bifocal lens
- Multifocal lens

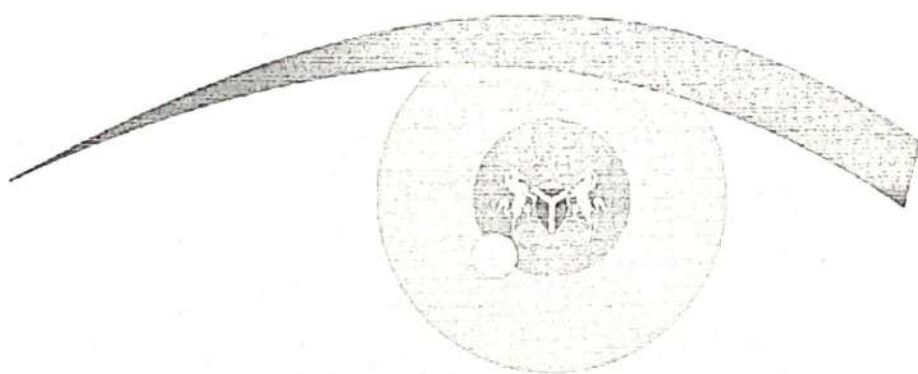
17. What do you understand by "Minimum thickness of a Lens"? (4marks)

18. Diagrammatically show the minimum thickness of plus lens and a minus lens (4marks)

19. What instrument is used in measuring the Minimum thickness of a Lens? Identify the instrument in the laboratory (2marks)

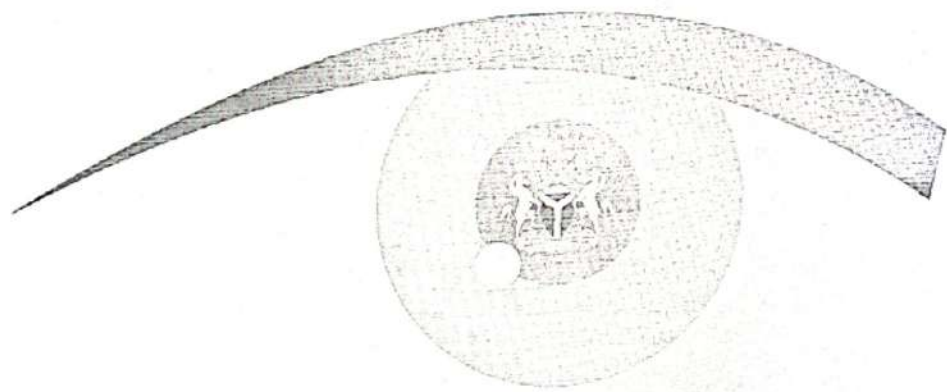
20. Measure the minimum thickness of five different types of lenses and record your value (5marks)

ANSWERS



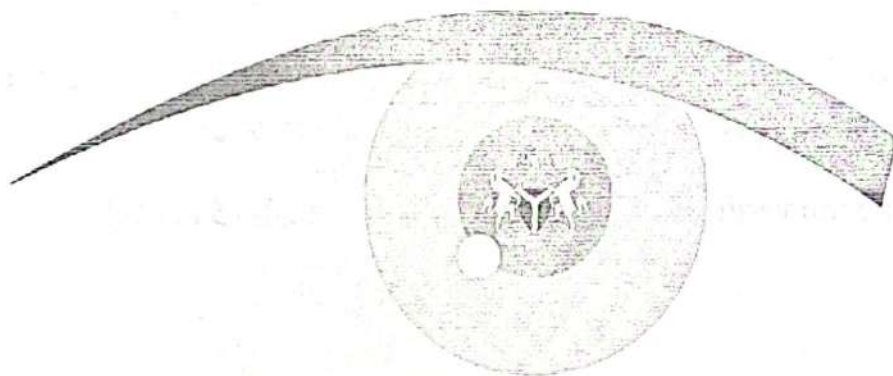
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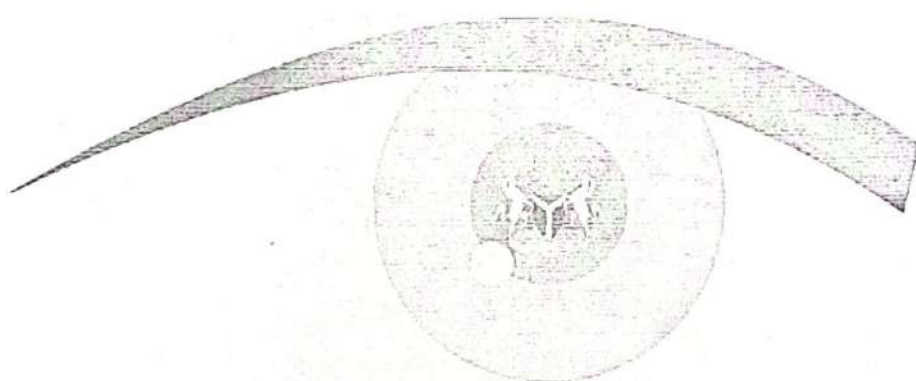
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SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:.....

**INTERPUPILLARY DISTANCE MEASUREMENTS AND
VERTICAL HEIGHT MEASUREMENTS*****Obtainable scores: 25***

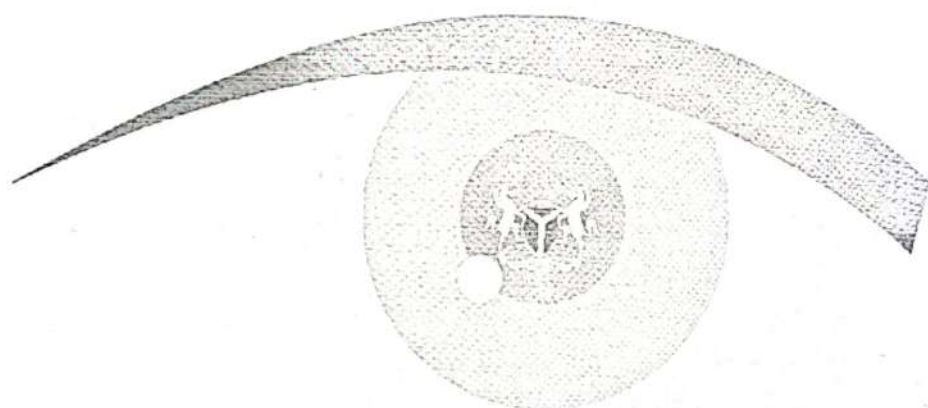
21. List the instruments that can be used in determining IPD of patients giving the advantages and disadvantages of each. Identify the ones in your laboratory **(5marks)**
22. Measure and record the IPD of your fellow students (at least 5 students) and record your values **(5marks)**
23. Assume that your classmate is a strabismic patient, measure and record the IPD **(2marks)**
24. Define vertical height and determine the vertical height for a bifocal, trifocal, progressive prescription and record your findings **(8marks)**
25. Determine the vertical height for a fixed multifocals **(5marks)**

ANSWERS

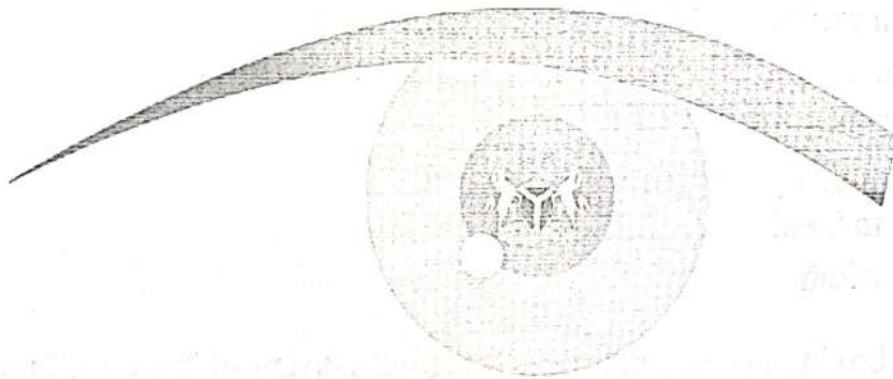


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SUPERVISOR'S NAME:		Obtainable Scores: 30
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FACIAL MEASUREMENTS, FRAME MEASUREMENTS USING THE BOXING SYSTEM

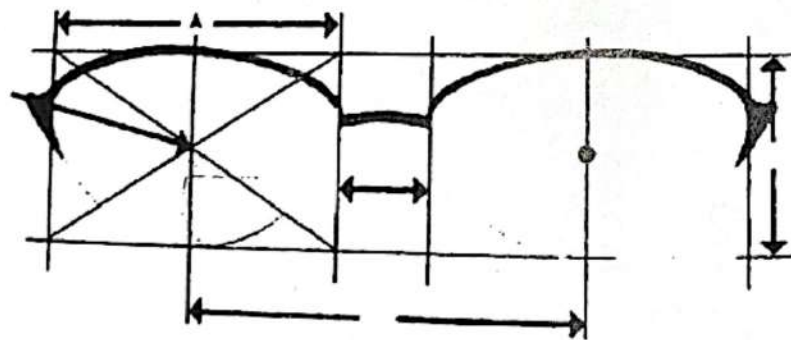
Obtainable scores: 36

26. Conduct the facial measurements of your fellow students with and without frame and record the following (20marks)

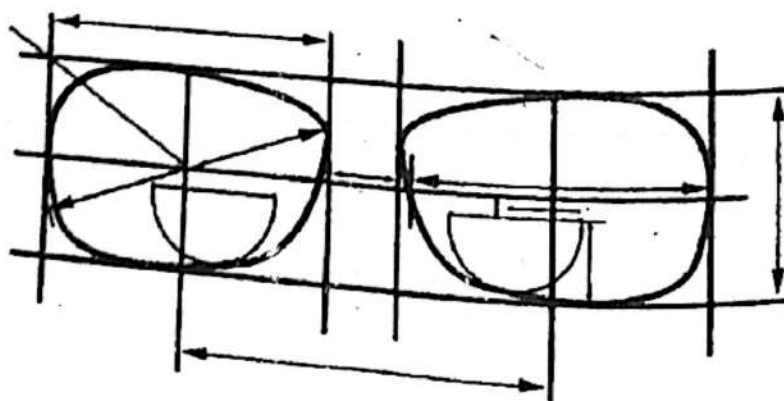
- i. The interpupillary distance
- ii. Monocular pupillary distance
- iii. Crest height
- iv. Bridge projection
- v. Apical radius
- vi. Distance between rims at 10mm and 15mm below crest
- vii. Frontal angle
- viii. Splay angle
- ix. Front to bend
- x. Head width

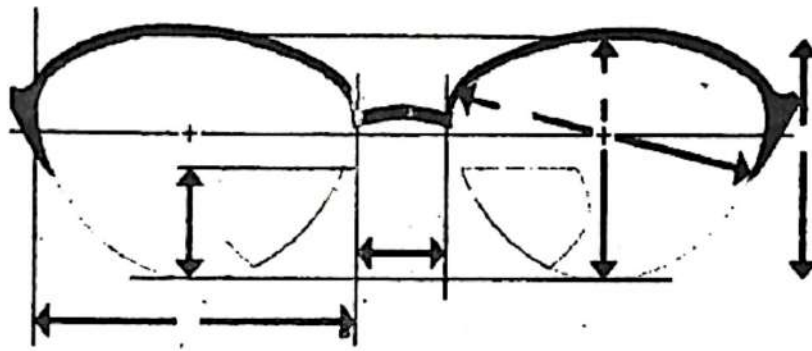
27. Using the boxing system, measures the front portion of three different types of frames and record (6marks)

28. Label the frame measurements demonstrate below (7marks)

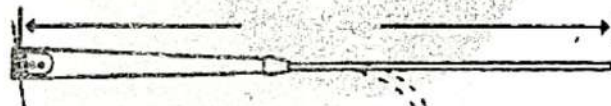
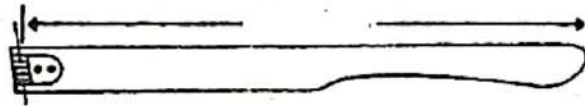


BOXING SYSTEM



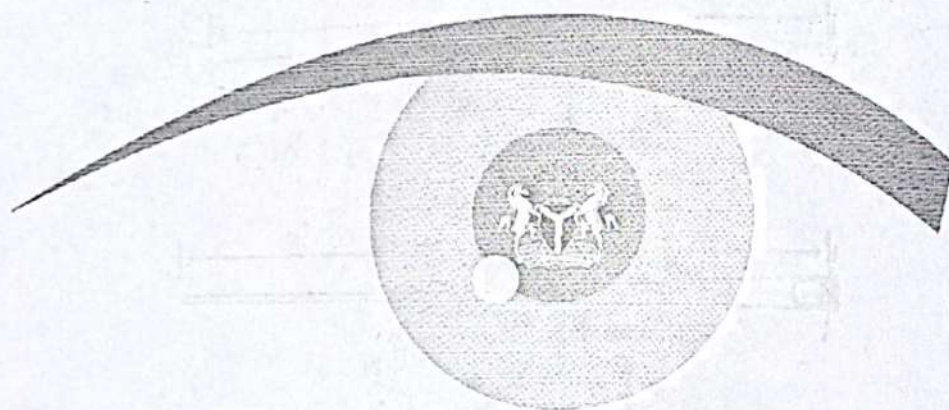


29. Label the diagrams below (3 marks)



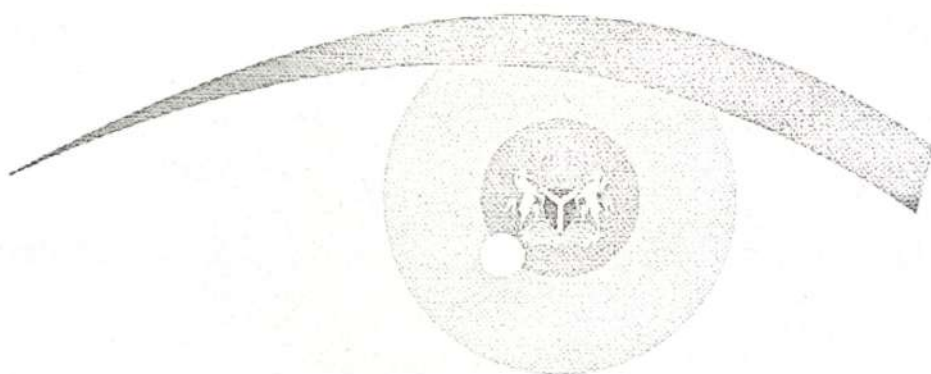
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ANSWERS



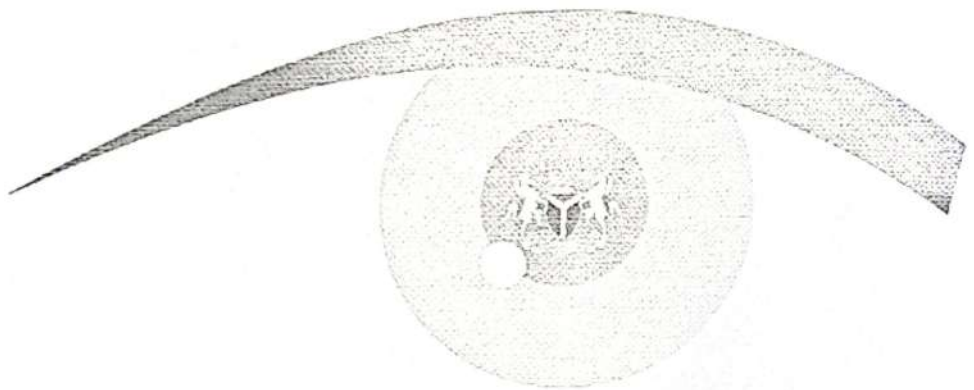
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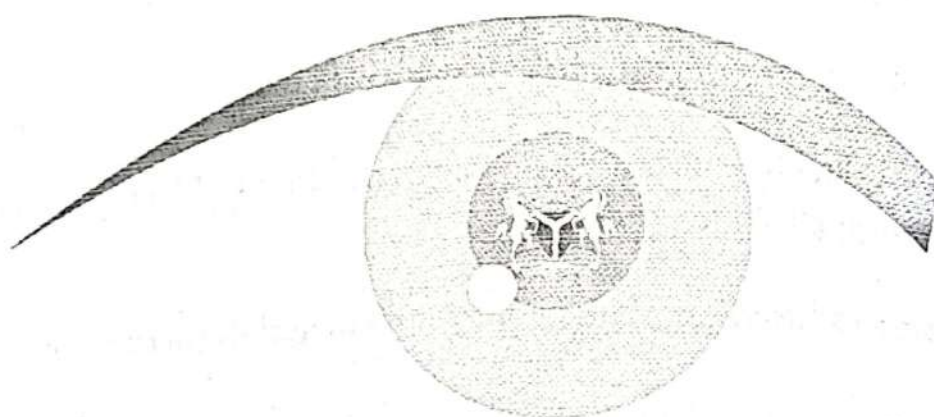
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DATE:	SIGNATURE:	Student's Score:.....

**FRAME MATERIALS, IDENTIFICATION OF FRAME TYPES, FRAME
ADJUSTMENT AND REPAIRS**

Obtainable scores: :

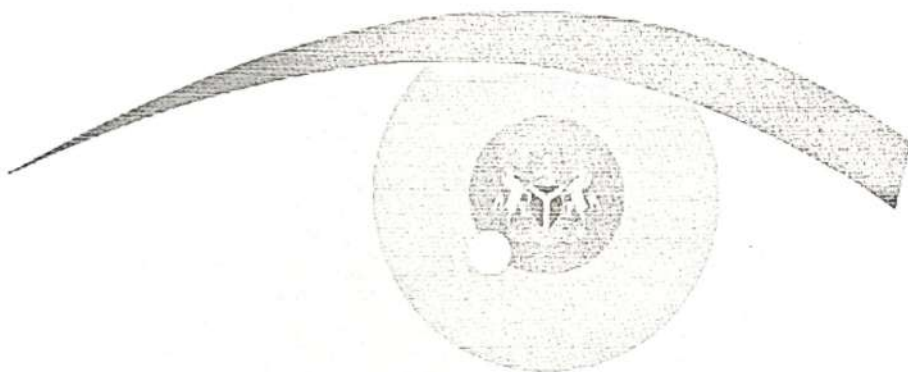
30. Identify different frame materials in the laboratory (5marks)
31. Identify and explain the following frames in the laboratory; full frame, drilled rimless frame, rimless frame, combination frame, half eye frame, sport frame, safet frame (14marks)
32. Identify and explain the following frame temple types in the laboratory; library temple, skull temple, riding bow, comfort cable temple (8marks)
33. Measure and record the temple size of the various types identified (4marks)
34. What are the characteristics of a good pediatric frame? Identify frames in the laboratory with such attributes (4marks)
35. Demonstrate lens insertion in different frame materials (plastics and metals) (7marks)
- i. Cellulose acetate
 - ii. Nylon frame
 - iii. Carbon fiber
 - iv. Polyamide (like TR 90)
 - v. Optyl
 - vi. Polycarbonate
 - vii. Metal frames
36. Identify tools used in repairs, adaptation and adjustment of spectacle frames. List the tools and their specific functions (8marks)

ANSWERS



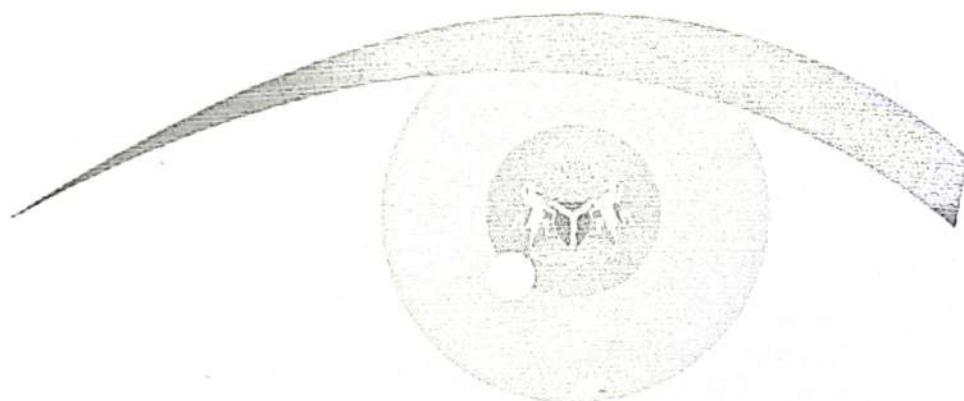
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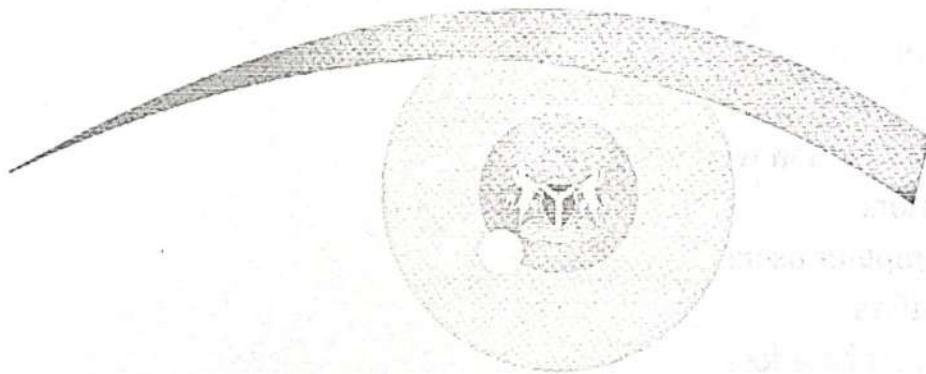
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SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:.....

LENS ENHANCEMENT AND SPECTACLE PRESCRIPTIONS VERIFICATION

Obtainable scores: 40

37. What do you understand by lens enhancement? Mention the different types of lens enhancements that you know (7marks)

38. State the procedure for tinting a single vision and bifocal lenses. Advise on the use of type of tints for specific application, tint five lenses differently and at different densities (10marks)

39. Indicate the tint type for the following professions (7marks)

- i. Pilot
- ii. Night - time driver
- iii. Construction worker
- iv. Sailors
- v. Computer users
- vi. Golfers
- vii. Snows boarders

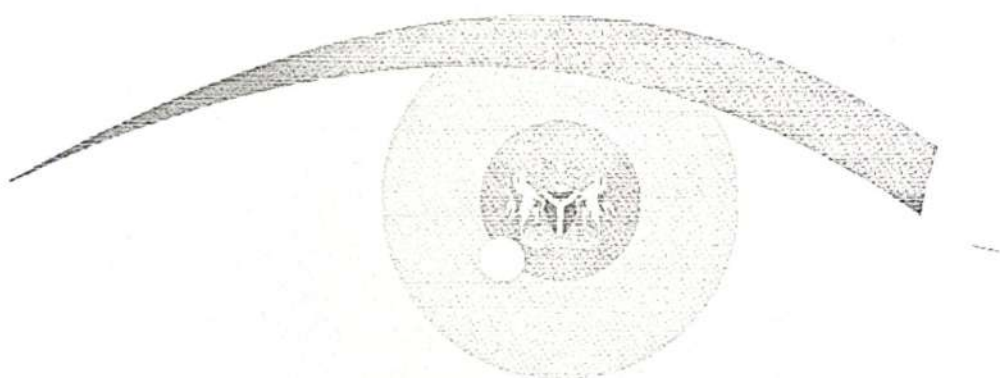
40. State the procedure of verifying a fixed spectacle before dispensing under the following (6marks)

- i. That glasses (spectacle) have been produced to a given prescription
- ii. That all aspects of the spectacles frame or mount are correct
- iii. That lenses have been correctly positioned in a spectacle frame or mount
(Spherical spherocyl, multifocal and special orders lenses)

41. Study 10 pieces of different types of lenses that will be provided for you and record the following in a tabular form (10marks)

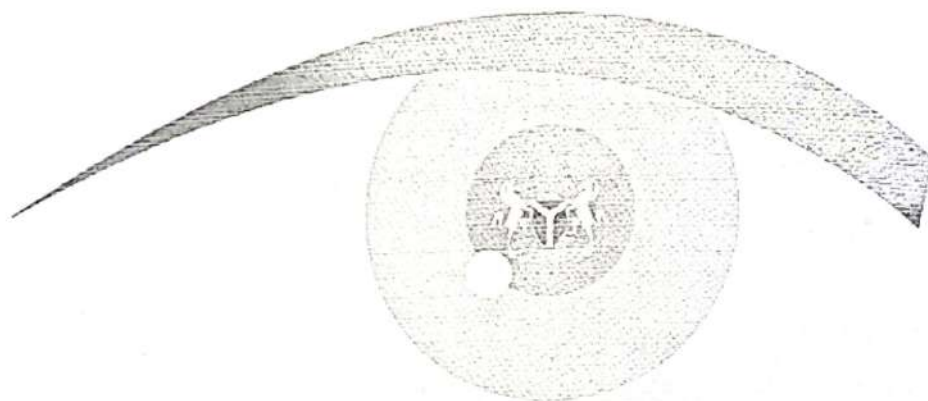
- i. Color
- ii. Material
- iii. Magnification
- iv. Minification characteristics

ANSWERS



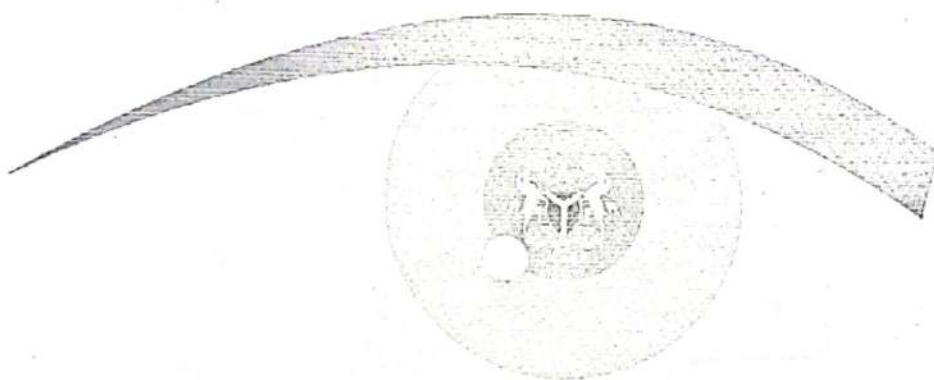
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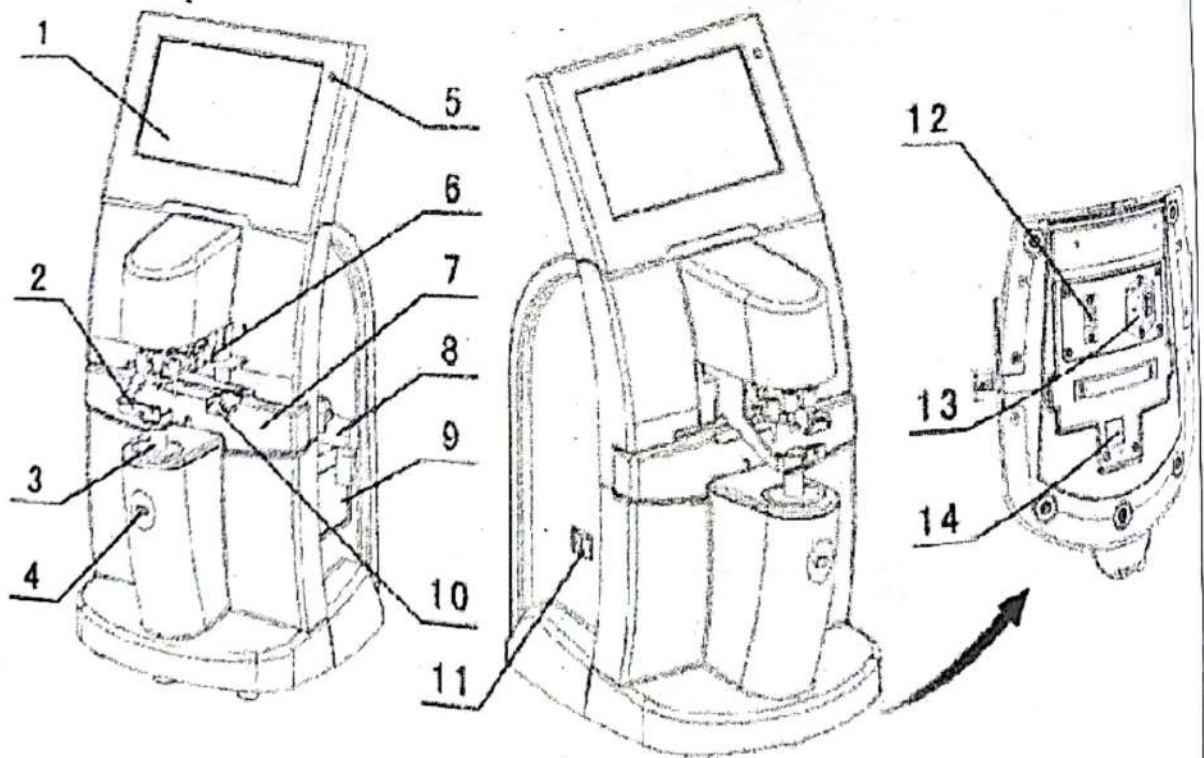


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<i>SUPERVISOR'S NAME:</i>		<i>Obtainable Scores: 30</i>
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42. What is Lensometry? Label the different parts of manual and automatic Lensmeter shown below (30marks)

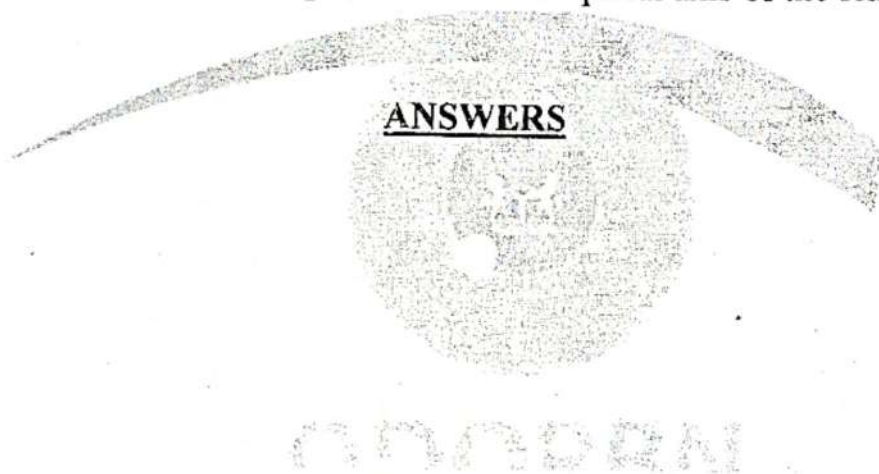


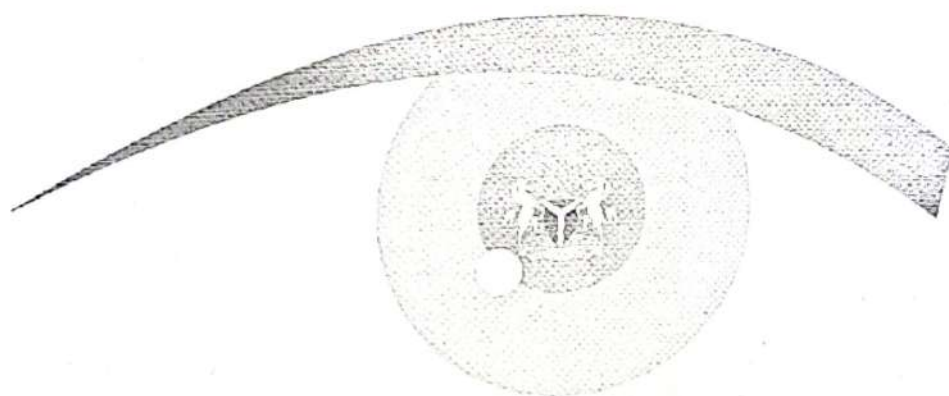
43. How can you care and adjust manual and automatic Lensmeter (4marks)

44. Neutralize the following lens types using Lensmeter (14marks)

- i. Single vision lens
- ii. Single vision Plano cylinder lens
- iii. Single vision sphero-cylinder lens
- iv. Plano bifocal lens
- v. Spherical power bifocal lenses
- vi. Spherocylindrical power bifocal lens
- vii. Multifocal lens

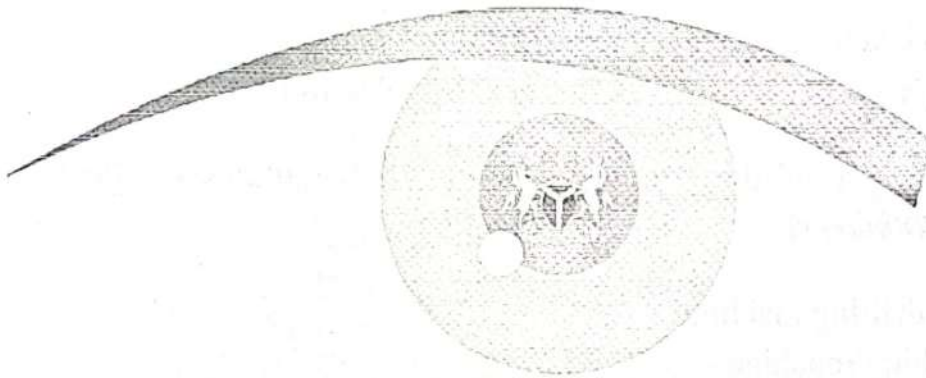
45. Also locate and mark the optical centre and optical axis of the lenses neutralized (2marks)





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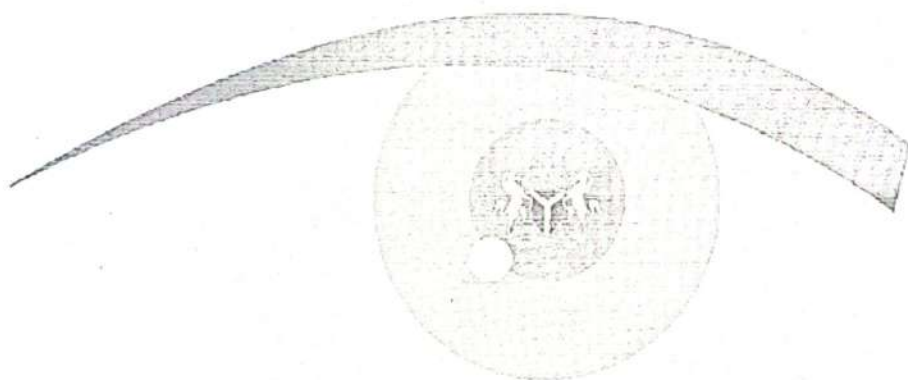
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**LENS CLOCK, LENS CALIPER, HOLE DRILLING MACHINE,
GROOVING, POLISHING MACHINE AND FRAME WARMER**

Obtainable scores: 35

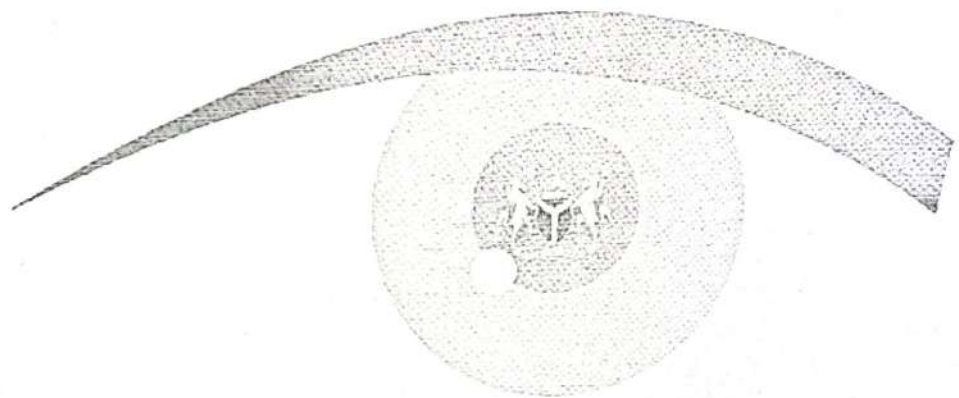
46. State the parts, uses and maintenance of a lens clock (7marks)
47. Using lens clock, measure the power of the front and back surfaces of 5 different types of lenses and calculate the lens power. Use table to record your findings (10marks)
48. What do you understand by a lens caliper? Identify the parts and state how is it calibrated (4marks)
49. Give the sketch of a lens caliper. Using lens caliper, measure the edge and center thickness of five different types of lenses. Use table to record your findings (6marks)
50. State the part of the following ophthalmic equipment, their functions and maintenance (8marks)
- i. Hole drilling machine
 - ii. Polishing machine
 - iii. Grooving machine
 - iv. Frame warmer

ANSWERS



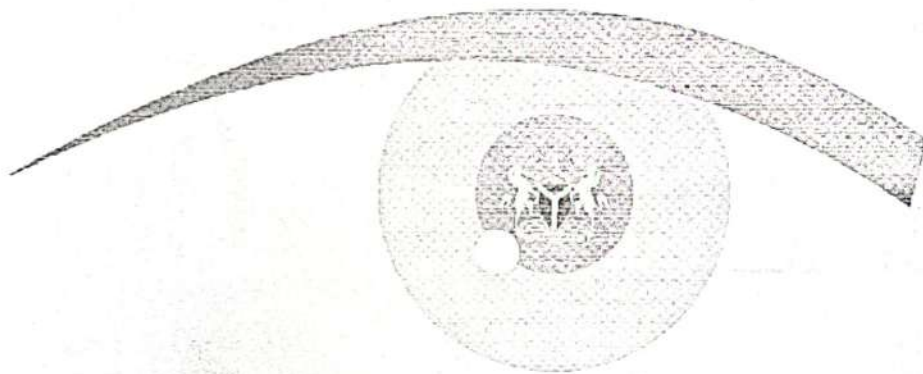
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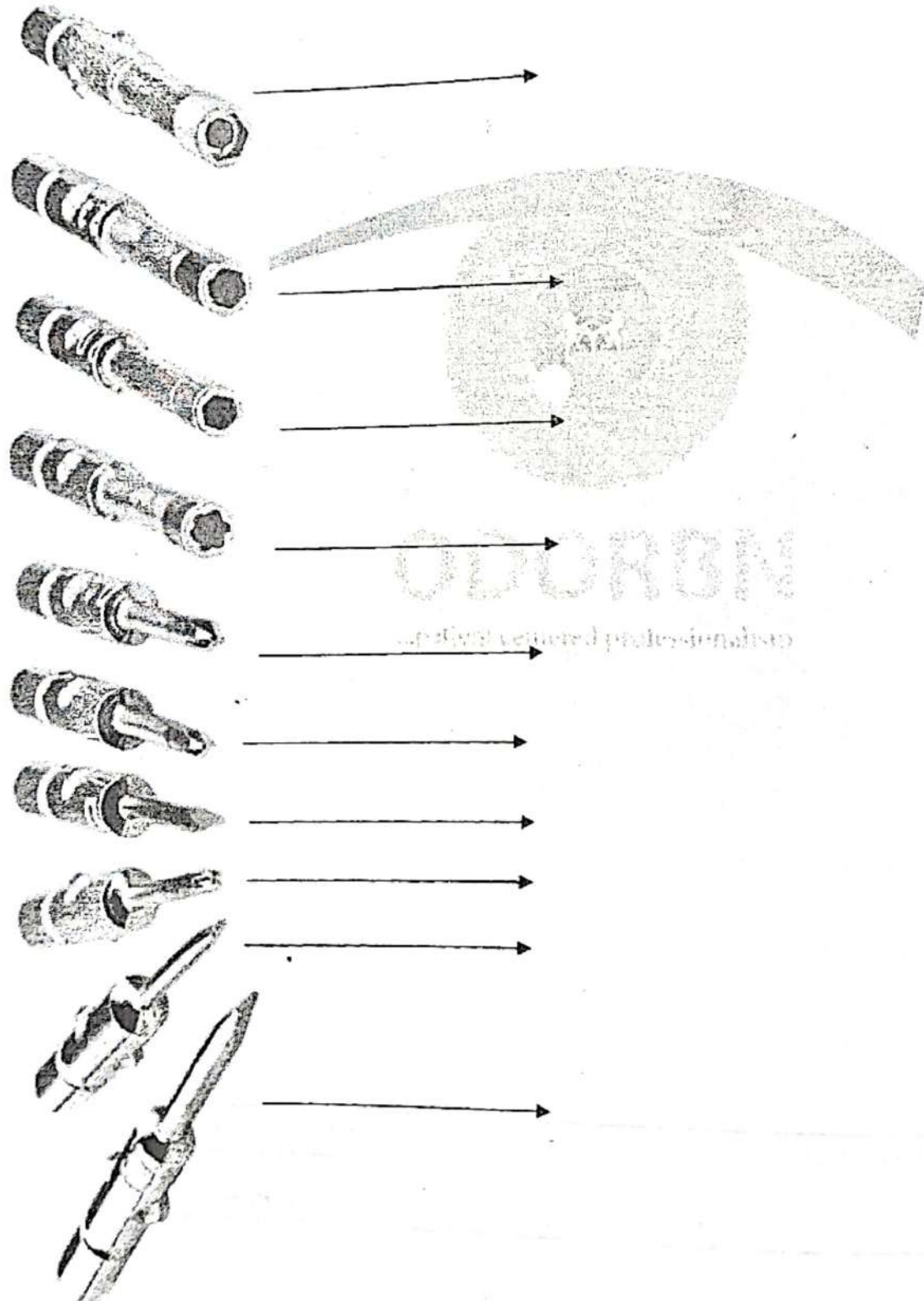
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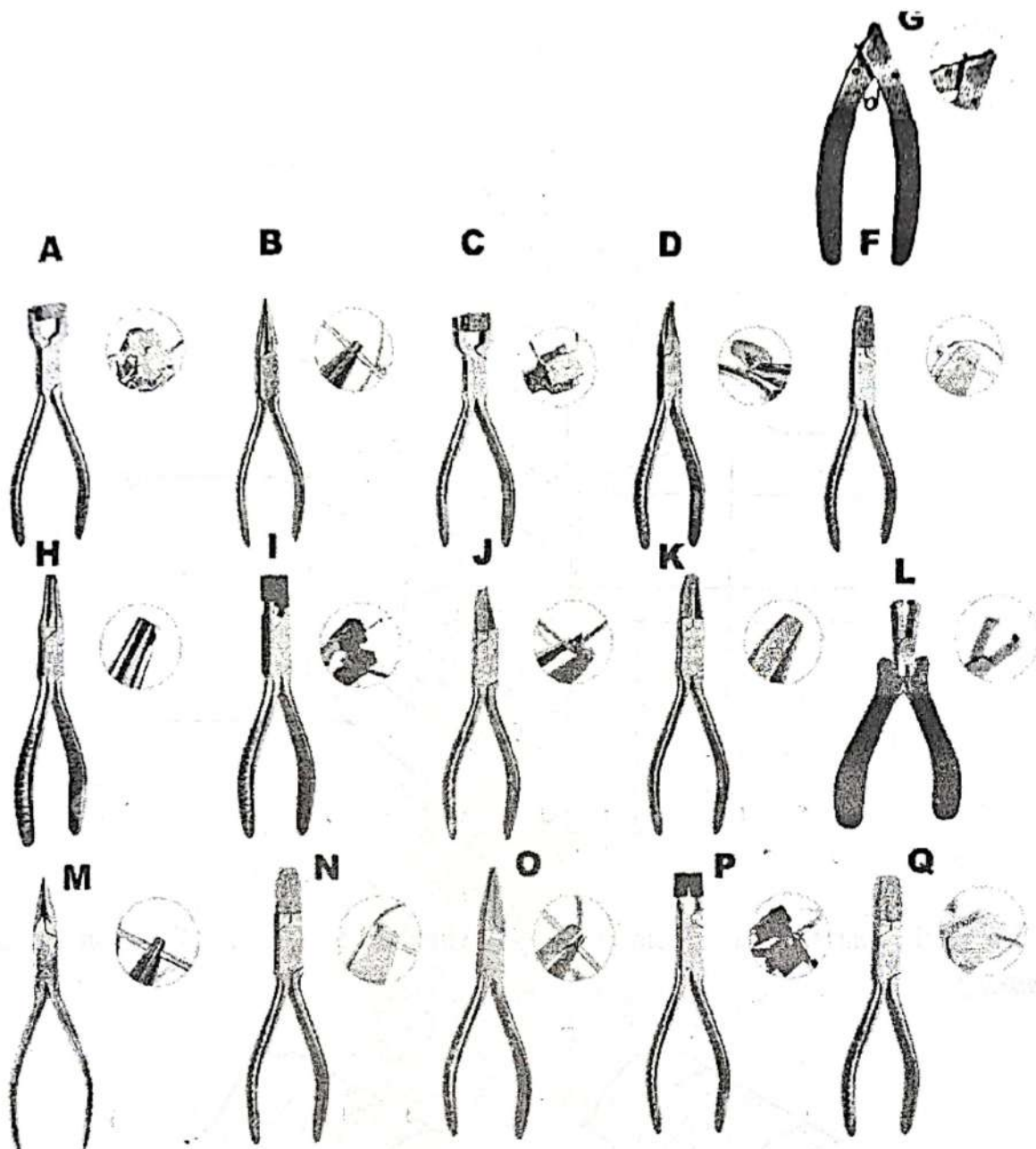
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DATE:	SIGNATURE:	Student's Score:.....

OPHTHALMIC PLIER, SCREW DRIVER, AUTOMATIC EDGING MACHINE AND IT ACCESSORIES

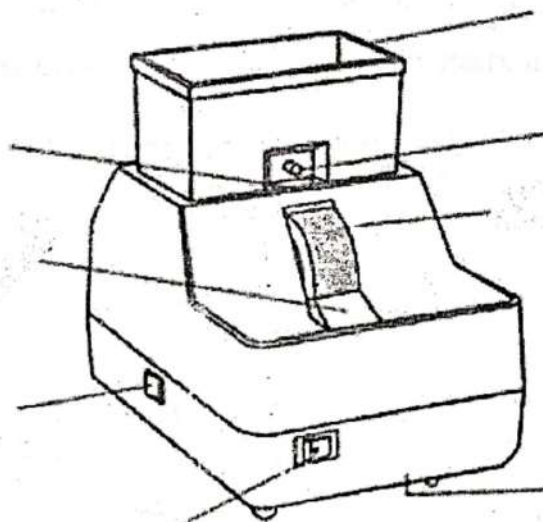
Obtainable scores: 68

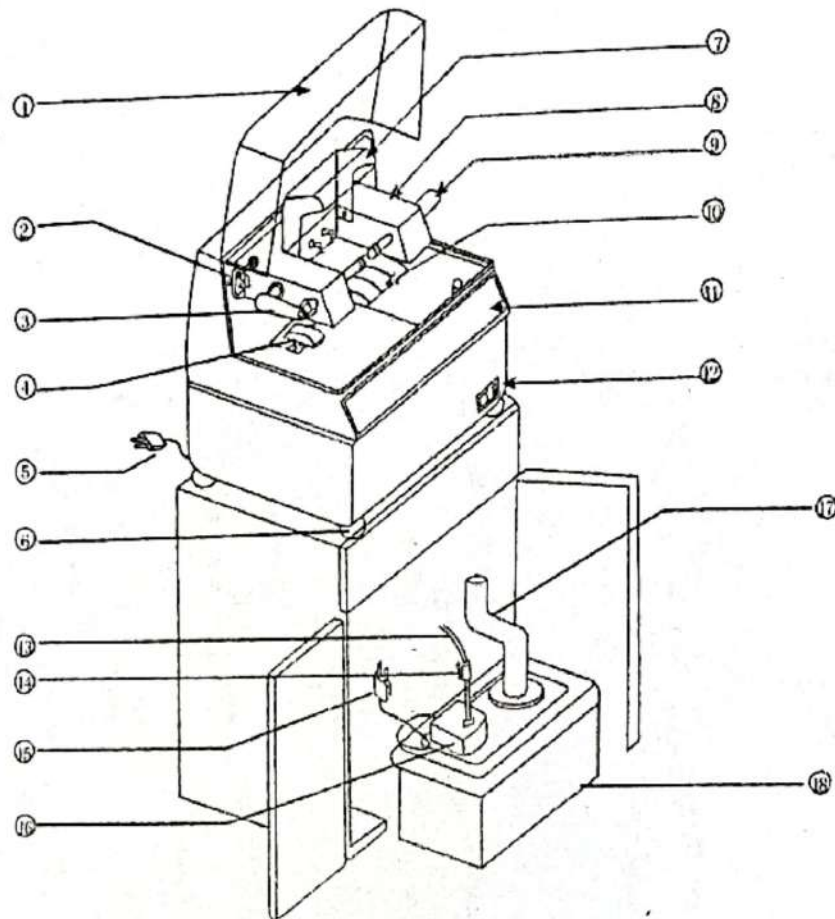
51. Identify the following pliers and screw drivers listed below (26marks)



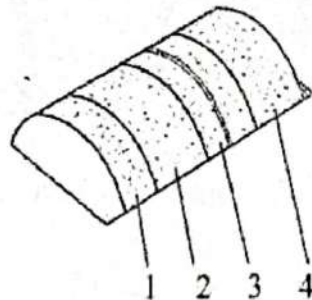


52. Identify the types of edging machine in the diagram below and label the different part (26marks)

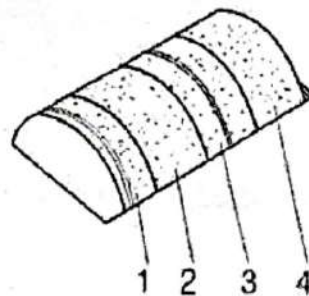




53. Label the parts of an automatic edger wheel and state the function of each (8marks)



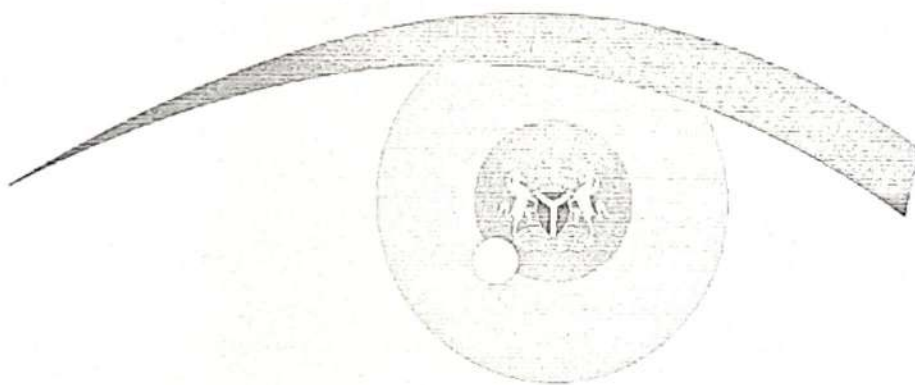
Wheels of LE-300/310/400



Wheels of LE-320/420

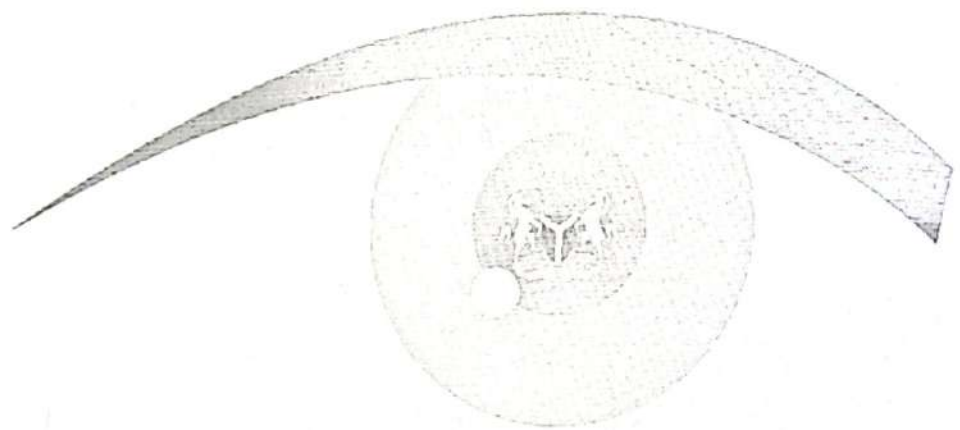
54. Explain the procedure for decentration using lens blocker machine (8marks)

ANSWER



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SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:

OPTICAL CROSS, Rx WRITING AND TRANSPOSITION

Obtainable scores: 50

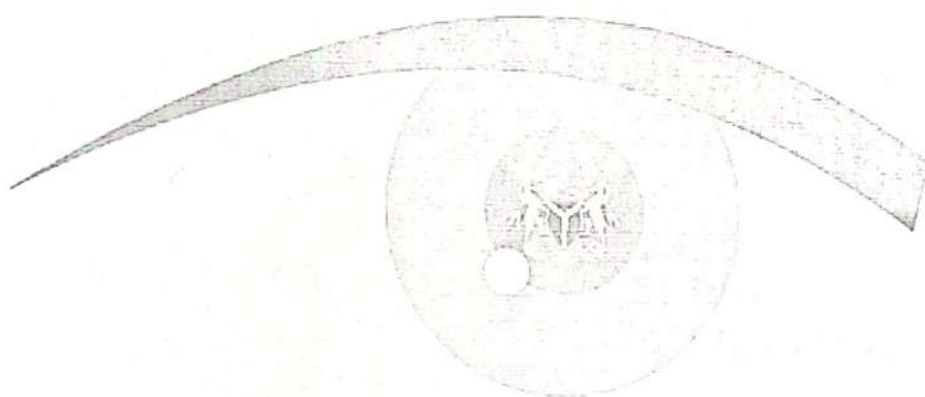
55. Construct optical cross representations of the following lensometry readings and write out the prescription (20marks)

SPH CYL AXIS	OPTICAL CROSS	Rx
+1.00/-0.75 X 45		
-4.00/-3.00 X 125		
+8.00/-4.00 X 180		
-2.50/-2.00 X 130		
+7.50/-1.50 X 10		
-2.00/-0.50 X 90		
-0.50/-1.75 X 105		
+5.00/-5.00 X 005		
-1.25/-0.50 X 110		
Plano/-3.50 X 85		

56. Fill the blank spaces (30marks)

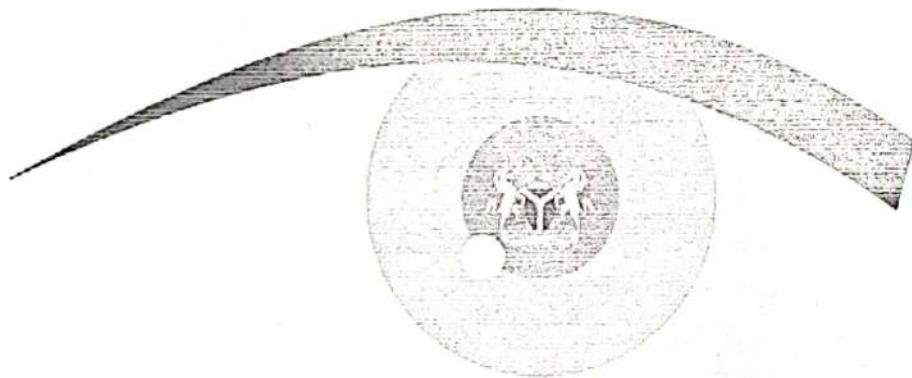
FOCIMETER READING	LENS Rx	TRANSPOSED Rx	LENS TYPE
-1.00/-2.00 X 90			
	+2.00/+3.00X 25		
+4.00/+1.00 X 20			
+3.00/+2.00 X 50			
	+3.00/+4.00X180		
-3.25/+1.25 X 95			
	-2.00/-1.75 X 45		
-0.25/-2.25 X 80			
	+1.50/-3.50X 150		
-2.50/-6.00 X 005			

ANSWERS



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<i>SUPERVISOR'S NAME:</i>		<i>Obtainable Scores: 30</i>
<i>DATE:</i>	<i>SIGNATURE:</i>	<i>Student's Score:.....</i>

DECENTRATION AND PRENTICE RULE

Obtainable scores: 35

57. Using boxing system of frame measurement, determine the following (12marks)

i. Frame difference using the values below

A(mm)	B(mm)	FRAME DIFFERENCE
52	40	
48	30	
65	50	
75	62	

ii. Frame pd using the following values below

A(mm)	DBL (mm)	FPD
48	20	
50	20	
52	18	
60	24	

iii. Determine its direction from the following findings

FPD(mm)	PPD(mm)	DECENTRATION (mm)
64	68	
70	64	
60	68	
75	67	

58. Give the frame measurements of five frames. Comment on their "frame difference" (5marks)

59. Solve the following problems (10marks)

Eye size (mm)	DBL (mm)	PPD (mm)	Decentration
52	18	70	
48	22	72	
42	24	64	
50	21	65	
50	18	69	
46	26	68	
48	20	68	
52	20	64	
49	21	70	
48	24	74	

60. Using prism formula, state the Prentice rule for prism calculation (4marks)
61. What is the prismatic effect induced and direction of the base if a patient has the following readings (4marks)

RX OD -2.00/-1.00 X 090

OS -2.00/-1.00 X 180

Frame pd = 80mm

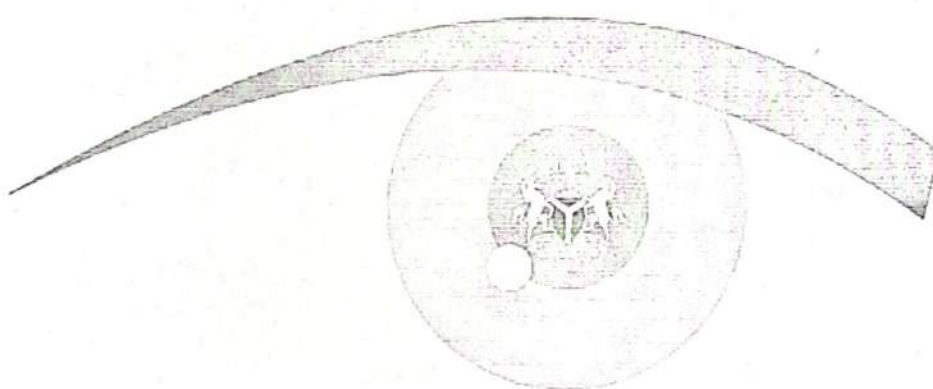
Patient pd = 60mm

ANSWERS



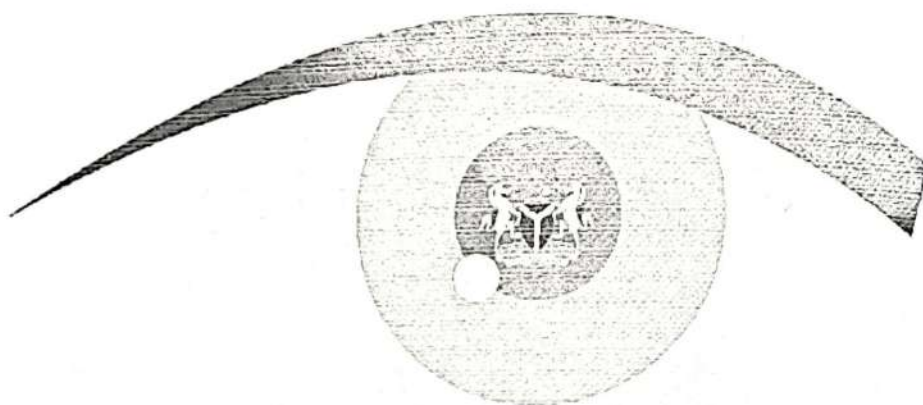
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Optical Centered Prescription



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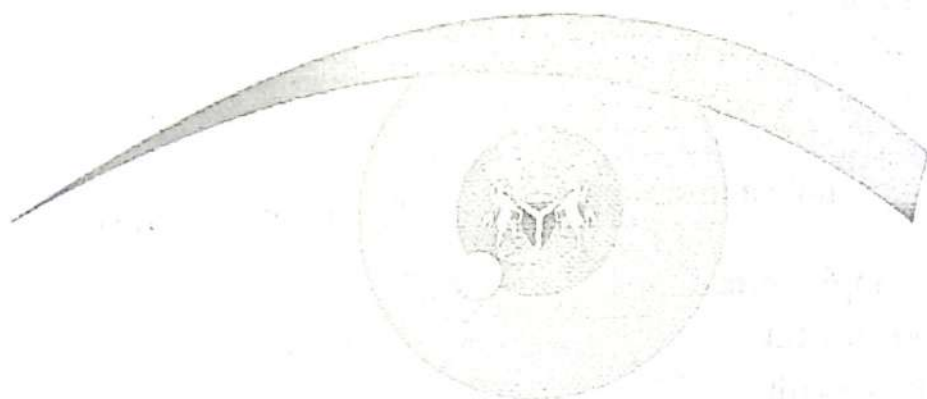
SUPERVISOR'S NAME:		Obtainable Scores: 30
DATE:	SIGNATURE:	Student's Score:.....

**MINIMUM BLANK SIZE, ADVANCED FRAME ADJUSTMENT,
PRESCRIPTION FORM**

Obtainable scores: 40

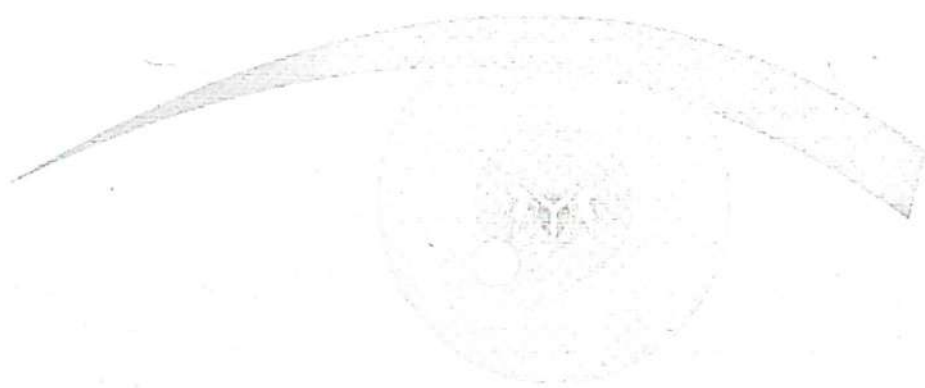
62. What do you understand by "minimum blank size" (4marks)
63. Determine and record the minimum blank size of five frames given to you (5marks)
64. Demonstrate the following (8marks)
- Four point touch
 - Skewed bridge
 - X-ing (Propeller effect)
 - Co-planar (out of)
65. Demonstrate temple adjustment in the following ways (6marks)
- Open temple spread
 - Pantoscopic tilt
 - Retroscopic tilt
66. Show flat surface touch, fold angle and angle temple end frame adjustment (6marks)
67. Design a standard prescription form to be used in the eye clinic where you work (5marks)
70. Place a patient's frame to be fitted into a proper alignment. Outline the steps you used (6marks)

ANSWERS



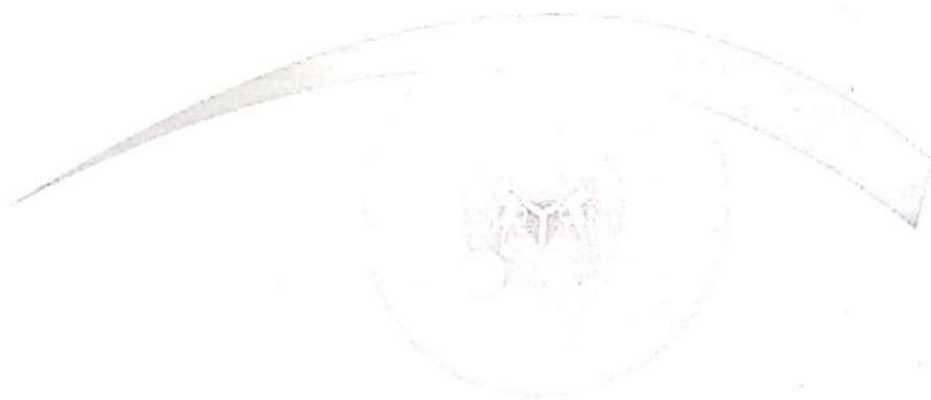
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<i>SUPERVISOR'S NAME:</i>		<i>Obtainable Scores: 30</i>
<i>DATE:</i>	<i>SIGNATURE:</i>	<i>Student's Score:.....</i>

SCORE SHEET

		OBTAINABLE SCORES	STUDENT'S SCORE
WEEK 1	GEOMETRICAL BEHAVIOUR OF LIGHT, RAY DIAGRAM, MIRROR & LENS IMAGE FORMATION AND PRISM	30	
WEEK 2	SPECULAR REFLECTION AND REFRACTION, LENS MATERIALS, LENS CURVATURE AND MAGNIFICATION	30	
WEEK 3	TYPES OF LENSES, LENS CLASSIFICATION AND REFRACTION MATERIALS	25	
WEEK 4	LENS CLASSIFICATION AND NEUTRALIZATION, MINIMUM LENS THICKNESS	45	
WEEK 5	INTERPUPILLARY DISTANCE MEASUREMENTS AND VERTICAL HEIGHT MEASUREMENTS	25	
WEEK 6	FACIAL MEASUREMENTS, FRAME MEASUREMENTS USING THE BOXING SYSTEM	36	
WEEK 7	FRAME MATERIALS, IDENTIFICATION OF FRAME TYPES, FRAME ADJUSTMENT AND REPAIRS	50	
WEEK 8	LENS ENHANCEMENT AND SPECTACLE PRESCRIPTIONS VERIFICATION	40	
WEEK 9	LENSOMETRY	50	
WEEK 10	LENS CLOCK, LENS CALIPER, HOLE DRILLING MACHINE, GROOVING, POLISHING MACHINE AND FRAME WARMER	35	
WEEK 11	OPHTHALMIC PLIER, SCREW DRIVER, AUTOMATIC EDGING MACHINE AND IT ACCESSORIES	68	
WEEK 12	OPTICAL CROSS, Rx WRITING AND TRANSPOSITION	50	
WEEK 13	DECENTRATION AND PRENTICE RULE	35	
WEEK 14	MINIMUM BLANK SIZE, ADVANCE FRAME ADJUSTMENT, PRESCRIPTION FORM	40	
TOTAL		559	

$$\frac{\boxed{}}{559} \times 100\%$$

Signature & Date



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ISBN: 978-978-699-026-2