

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**FACULTY OF SCIENCE AND ENGINEERING**

**DEPARTMENT OF OPTOMETRY**

**BACHELOR OF SCIENCE HONOURS DEGREE IN OPTOMETRY**

**CANDIDATE NUMBER:**

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JUN 2025

**OPTC 408: ADVANCES IN OPTOMETRY**

**DURATION: 3 HOURS**

**(100 MARKS)**

**INSTRUCTIONS**

Attempt ALL questions. Answer Section A on the question paper and Section B in the booklet.

**SECTION A. Attempt ALL Questions in this Section (1 Mark each)**

**Instructions: Choose the best answer for each question.**

1. What is the primary purpose of a Slit Lamp Biomicroscope?
  - a) Measure intraocular pressure
  - b) Visualize retinal layers
  - c) Examine anterior eye structures (cornea, lens, iris) in high magnification
  - d) Assess visual field defects
  
2. Which instrument is used to measure intraocular pressure (IOP)?
  - a) Keratometer
  - b) Ophthalmoscope
  - c) Tonometer
  - d) Pachymeter
  
3. Fluorescein Angiography (FA) is primarily used to evaluate?
  - a) Corneal abrasions
  - b) Retinal and choroidal vasculature
  - c) Lens opacities
  - d) Optic nerve function

4. Direct Ophthalmoscopy allows visualization of?
- a) Anterior chamber angle
  - b) Optic disc and macula (monocular view)
  - c) Peripheral retina
  - d) Corneal thickness
5. Which test assesses the drainage angle of the anterior chamber?
- a) Perimetry
  - b) Gonioscopy
  - c) Keratometry
  - d) A-scan ultrasound
6. Optical Coherence Tomography (OCT) is analogous to?
- a) X-ray imaging
  - b) Ultrasound B-scan
  - c) microscopic histology
  - d) Radiography
7. The Amsler Grid test detects abnormalities in:
- a) Color vision
  - b) Central visual field (e.g., macular degeneration)
  - c) Pupillary reflexes
  - d) Intraocular pressure
8. Schirmer's Test measures:
- a) Tear film stability
  - b) Tear production (aqueous deficiency)
  - c) Corneal sensitivity
  - d) Lacrimal drainage
9. Which instrument measures corneal curvature?
- a) Pachymeter
  - b) Keratometer
  - c) Aberrometer
  - d) Retinoscope

10. Electroretinography (ERG) evaluates:

- a) Optic nerve function
- b) Retinal electrical activity
- c) Visual cortex response
- d) Extraocular muscle function

11. Confocal Microscopy of the cornea is used to?

- a) Measure endothelial cell density
- b) Assess tear film breakup time
- c) Detect microbial keratitis
- d) Evaluate lens opacity

12. The primary use of a B-scan ultrasound is?

- a) Measuring axial length
- b) Imaging intraocular structures when media is opaque (e.g., dense cataract)
- c) Assessing corneal topography
- d) Diagnosing glaucoma

13. Which test quantifies color vision deficiency?

- a) Snellen chart
- b) Ishihara plates
- c) Amsler grid
- d) Goldman perimetry

14. Corneal Topography maps?

- a) Retinal thickness
- b) Anterior chamber depth
- c) Corneal surface shape and power
- d) Lens density

15. Indocyanine Green Angiography (ICGA) is superior to FA for imaging:

- a) Retinal arteries
- b) Choroidal vasculature
- c) Corneal nerves
- d) Optic disc

16. Pachymetry measures:

- a) Pupil diameter
- b) Corneal thickness
- c) Anterior chamber depth
- d) Lens thickness

17. Which instrument objectively determines refractive error?

- a) Phoropter
- b) Autorefractor
- c) Slit lamp
- d) Keratometer

18. Visual Field Testing (Perimetry) is essential for diagnosing?

- a) Cataracts
- b) Glaucoma
- c) Conjunctivitis
- d) Strabismus

19. The Seidel Test detects?

- a) Dry eye
- b) Corneal abrasions
- c) Aqueous humor leakage (e.g., post-trauma)
- d) Retinal detachment

20. Specular Microscopy evaluates?

- a) Retinal pigment epithelium
- b) Corneal endothelial cells
- c) Lens capsule integrity
- d) Vitreous humor

21. What is the key principle behind Wavefront-Guided Refractive Surgery (e.g., LASIK/PRK)?

- a) Correcting only sphere and cylinder
- b) Creating a standardized ablation profile based on average eyes
- c) Measuring and correcting unique higher-order aberrations in addition to sphere and cylinder
- d) Only treating presbyopia

22. Which OCT advancement allows for imaging of blood flow in the choroid?

- a) Time-Domain OCT (TD-OCT)
- b) Enhanced Depth Imaging OCT (EDI-OCT)
- c) Swept-Source OCT (SS-OCT)
- d) Anterior Segment OCT (AS-OCT)

23. Atropine therapy for myopia control typically uses what concentration for its best balance of efficacy and side effects based on recent studies?

- a) 1.0%
- b) 0.5%
- c) 0.1%
- d) 0.01%

24. What does "Optical Biometry" (e.g., IOLMaster, Lenstar) measure for IOL power calculation?

- a) Only corneal curvature (Keratometry)
- b) Only axial length
- c) Axial length, corneal curvature, and anterior chamber depth (often non-contact)
- d) Only intraocular pressure

25. Which term describes the integration of eye-tracking technology into VR/AR headsets for potential applications in vision therapy and diagnostics?

- a) Tele-optometry
- b) Adaptive Optics
- c) Immersive Binocular Vision Assessment/Therapy
- d) Electroretinography (ERG)

26. Which test is applicable in contact lens practice?

- a) Measure corneal thickness
- b) Assess the electrical response of the retina to light stimulation
- c) Determination of tear film breakup time
- d) Image the optic nerve head

27. Which advancement in glaucoma management involves a minimally invasive device implanted 'during' cataract surgery to enhance aqueous outflow?

- a) Trabeculectomy
- b) Tube Shunt
- c) iStent inject / Hydrus Micro stent (MIGS - Minimally Invasive Glaucoma Surgery)
- d) Selective Laser Trabeculoplasty (SLT)

28. How do Defocus Incorporated Multiple Segments (DIMS) spectacle lenses work for myopia control?

- a) By constantly changing power
- b) By using peripheral plus add and clear central vision
- c) By creating alternating zones of clear vision and myopic defocus across the lens
- d) By filtering blue light

29. Which imaging modality is considered the gold standard for assessing the health of the optic nerve head and retinal nerve fiber layer (RNFL) in glaucoma?

- a) Color Fundus Photography
- b) Fluorescein Angiography (FA)
- c) Optical Coherence Tomography (OCT)
- d) Ultrasound Biomicroscopy (UBM)

30. What is a key benefit of Electronic Health Records (EHRs) in modern optometric practice?

- a) Eliminating the need for technicians
- b) Guaranteeing higher reimbursement rates
- c) Improving patient safety, coordination of care, and practice efficiency
- d) Replacing the need for diagnostic equipment

31. The fundamental cause of a refractive error is:

- A. Abnormal retinal function
- B. Abnormal corneal curvature
- C. Mismatch between the optical power of the eye and its axial length
- D. Weakness of the ciliary muscle

32. A patient has clear distance vision but needs glasses (+1.50 D lenses) to read comfortably. The refractive error is:

- A. Simple myopia
- B. Simple hyperopia
- C. Compound myopic astigmatism
- D. Presbyopia

33. In a myopic eye, the far point is:

- A. At infinity
- B. Behind the retina
- C. In front of the retina
- D. Closer than infinity, in front of the eye

34. Axial myopia primarily results from?
- A. Excessive curvature of the cornea
  - B. Increased refractive index of the lens
  - C. An abnormally long eyeball
  - D. Spasm of the ciliary muscle
35. Regular astigmatism is most commonly caused by?
- A. Irregular corneal scarring
  - B. A non-spherical (toroidal) corneal surface
  - C. Cataract formation
  - D. Retinal distortion
36. The correct lens to prescribe for a hypermetrope to improve distance vision is?
- A. A minus (diverging) lens
  - B. A plus (converging) lens
  - C. A cylindrical lens
  - D. No lens is needed
37. A spectacle prescription reads: OD: -3.00 DS / -1.50 DC x 180°. This indicates?
- A. Simple hyperopic astigmatism in the right eye
  - B. Compound myopic astigmatism in the right eye
  - C. Mixed astigmatism in the right eye
  - D. Simple myopia in the right eye
38. A symptom MOST characteristic of uncorrected astigmatism is?
- A. Complete blurring of both near and distance vision
  - B. Eyestrain and headaches, especially after near work
  - C. Difficulty seeing distant objects clearly, with near vision unaffected
  - D. The need to hold reading material very close
39. In retinoscopy, a "with" movement is observed in an emmetropic eye when?
- A. No working lens is in place
  - B. A plus working lens is used
  - C. A minus working lens is used
  - D. The eye is accommodating

40. Which refractive error typically shows a distorted or "scissor" reflex during retinoscopy?
- A. Simple myopia
  - B. Simple hyperopia
  - C. Regular astigmatism
  - D. Irregular astigmatism



**Section B Answer ALL questions**

Question 1. Differentiate between emmetropia and ametropia, and show the examples of ametropia in a reduced eye. (6 Marks)

Question 2. Explain the relationship between hypermetropia and accommodation. (6 Marks)

Question 3. Name the clinical characteristics or manifestation of convergence insufficiency. Briefly describe its management. (6 Marks)

Question 4. Name seven (7) techniques used for visualization of ocular surface tissues. Briefly mention the advantages of each. (6 Marks)

Question 5. What is the primary clinical test to assess corneal epithelial integrity? (6 Marks)

Question 6. How do you differentiate between a simple corneal abrasion and a sight-threatening corneal ulcer? (6 Marks)

Question 7. Name two critical slit lamp techniques for evaluating corneal pathology. (6 Marks)

Question 8. What corneal topography pattern is classically associated with keratoconus? (6 Marks)

Question 9. Why is measuring central corneal thickness (pachymetry) essential before glaucoma assessment or refractive surgery? (6 Marks)

Question 10. What key details must be recorded when documenting corneal findings? (6 Marks)

**END OF PAPER**