

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE & ENGINEERING
DEPARTMENT OF OPTOMETRY

JUN 2025

BACHELOR OF SCIENCE HONOURS DEGREE IN OPTOMETRY
(OPTC407): ENVIRONMENTAL AND OCCUPATIONAL OPTOMETRY
Duration. 3 HOURS

TOTAL MARKS: 100

CANDIDATE NUMBER:

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INSTRUCTIONS:

Write your registration number in the space provided above and submit both the answer booklet and the question paper at the end of the examination where applicable.

This paper consists of two sections. Answer all questions on the question paper.

SECTION A. Attempt all questions. Indicate if the statements are true or false

1. To avoid road traffic accidents, a driver must meet the following eye requirement:
 - A. Normal vision and visual fields (True) (False)
 - B. Good retinal adaptation (True) (False)
 - C. Good stereopsis (True) (False)
 - D. Good driving skills (True) (False)

2. For day time driving, the following are recommended:
 - A. Sunglass lenses that transmits less than 67% of the incident light can be used. (True) (False)
 - B. Yellow, green and brownish lenses impair color vision significantly due to selective shift in the spectral transmittance of the lens (True) (False)
 - C. Lenses with antireflective coating (True) (False)
 - D. Polarizing lenses reduce reflection from wet road (True) (False)

3. For night driving, the following are recommended:
 - A. Only the lightest amount of tint should be used in lenses (True) (False)
 - B. Poor illumination at night and use of tint can further reduced illumination which makes driving safe (True) (False)
 - C. Antireflection coating on the lens with lightest tint maximize the transmission of absorptive lens. (True) (False)
 - D. Option C is false (True) (False)

4. Indicate true or false:

- A. Photometric unit of luminance is cd/m^2 (candela per square meter) (True) (False)
- B. Photometric unit of illuminance is lux (True) (False)
- C. Photometric unit of luminous intensity is trolands (True) (False)
- D. Photometric unit of luminous flux is lumen (True) (False)

5. The following are common effects of UV radiation on ocular tissue

- A. Photophthalmia (True) (False)
- B. Photo conjunctivitis (True) (False)
- C. Pterygia (True) (False)
- D. Photocoagulation (True) (False)

6. Indicate the true or false statements

- A. Inverse square law of photometry applies when illumination increases with distance of the light from the surface is reduced (True) (False)
- B. Inverse square law applies to perpendicular surfaces to the source of light. (True) (False)
- C. The closer the light source is to an object the better the object can be seen (True) (False)
- D. If the surface is angled, then the cosine law does not apply. (True) (False)

7. The following statements describe an ideal VDU workstation design for seating?

- A. Chair with an un-adjustable back and height (True) (False)
- B. Adequate lumbar support (True) (False)
- C. Provision of a foot support if required (True) (False)
- D. Space for postural change with no obstacles under desk. (True) (False)

8. The following statements describe an ideal VDU workstation design for posture?

- A. Forearms approximately horizontal. (True) (False)
- B. Minimal extension, flexion, or deviation of wrist (True) (False)
- C. Screen height and angle adjustable to comfortable head position (True) (False)
- D. All of the above (True) (False)

9. An ideal VDU work station should have the following lighting guidelines (True) (False)
- A. Screen should be free from glare and reflections (True) (False)
 - B. The station should not be in an area where there is maximum contrast between the screen and the background. (True) (False)
 - C. The should be adjustable coverings for windows (True) (False)
 - D. Workstation illuminance should be in the range of 300 to 500 lux. (True) (False)

10. The following are commonly requested occupational color vision tests: (True) (False)
- A. Farnsworth D-15 Test. (True) (False)
 - B. City University Color Vision Test (True) (False)
 - C. Ishihara color vision test. (True) (False)
 - D. TNO color vision test (True) (False)

11. The following are common sources of chemical hazards: (True) (False)
- A. Fertilizers (True) (False)
 - B. Drain cleaners (True) (False)
 - C. Cement (True) (False)
 - D. Potassium hydroxide (True) (False)

12. The following are not examples of effects of Infrared radiation on ocular tissue. (True) (False)
- A. Depigmentation (True) (False)
 - B. Opacification (True) (False)
 - C. Migraine (True) (False)
 - D. Photosensitive epilepsy (True) (False)

13. The following statements are true or false (True) (False)
- A. 100% of workplace related injuries are preventable (True) (False)
 - B. Occupational eye problems depend on nature of work (True) (False)
 - C. Occupational ocular problems depend on working environment. (True) (False)
 - D. None of the above (True) (False)

14. Examples of non-contact sports that can cause ocular injury include: (True) (False)
- A. Rugby (True) (False)
 - B. Running (True) (False)
 - C. Tennis (True) (False)
 - D. Swimming (True) (False)

15. The following are not examples of occupational eye disorders:

- | | |
|--------------------------|----------------|
| A. Harmful exposures | (True) (False) |
| B. Eyestrain and fatigue | (True) (False) |
| C. Glaucoma | (True) (False) |
| D. Traumatic injuries | (True) (False) |

16. About the impact of head and eye movements at work place

- | | |
|---|----------------|
| A. Discomfort and visual fatigue cannot result from head movements and observations at the extremes of gaze | (True) (False) |
| B. Eye movements that are greater than 15 degrees are usually accompanied by head movements | (True) (False) |
| C. A moving object is more difficult to see than a static object | (True) (False) |
| D. Disability glare is common with specular surfaces | (True) (False) |

17. The main priority for occupation optometry is to:

- | | |
|---|----------------|
| A. To dismiss workers who have ocular disorders | (True) (False) |
| B. To promote safe work environment. | (True) (False) |
| C. To prevent work related injuries | (True) (False) |
| D. Reduce performance of workers on the job | (True) (False) |

18. The following are methods of vision screening:

- | | |
|-------------------------------------|----------------|
| A. MTC- Modified clinical technique | (True) (False) |
| B. Instrument screening | (True) (False) |
| C. Computer programs | (True) (False) |
| D. None of the above | (True) (False) |

19. The following a possible way that an optometrist can minimize risk at work for patients:

- | | |
|---|----------------|
| A. Giving advise | (True) (False) |
| B. Supplying appropriate spectacles | (True) (False) |
| C. Prescribing protective eye wear | (True) (False) |
| D. Reporting work place hazards to the police | (True) (False) |

20. The first 3 options below are examples of mechanical injuries

- A. Contusion (True) (False)
- B. Blunt trauma (True) (False)
- C. Perforation or sharp trauma (True) (False)
- D. Ferrous foreign bodies should be removed as quickly as possible to remove siderosis (formation of rust in ocular tissue due to oxidation of iron contained in the foreign body) (True) (False)

21. Which of these guidelines describe a good material for an eye PPE

- A. Light weight but resistant to strong impact (True) (False)
- B. Made of impact resistant plastics preferably polycarbonate (True) (False)
- C. Glass lenses should be avoided (True) (False)
- D. Only options A and B are true (True) (False)

22. Why is it important for snow skiers to wear protective eye goggles with UV filters?

- A. Because they look cool in them (True) (False)
- B. Because they are exposed to 15% increased UVR for every km of altitude above sea level (True) (False)
- C. Because they are exposed to UVR which can cause photo keratitis. (True) (False)
- D. To avoid snow blindness (True) (False)

23. Filters and performance sun wear perform the following functions:

- A. Properly selected filters reduce glare and improve contrast (True) (False)
- B. Neutral grey tints transmit all wavelengths of visible spectrum almost equally. (True) (False)
- C. Plastic photochromic lenses are suitable for some non -contact sports like running and cycling. (True) (False)
- D. Glass photochromic lenses are used (True) (False)

24. The following advantages of contact lenses make them a more preferred choice of refractive correction in highly dynamic sports:

- A. Reduced Field of view aberrations (True) (False)
- B. Reduced Optical distortions (True) (False)
- C. Frame discomfort (True) (False)
- D. No lens fogging (True) (False)

SECTION B

Use the following words to fill in the blanks in the table below: (4 MARKS)
Ammonia, cement, magnesium hydroxide, Drain cleaners, Potassium hydroxide

Alkali	Common sources
.....1	Fertilizers
Lye2
Lime3
.....4	Sparklers

END OF PAPER