D - 3

Entrance Examinations – 2024
Ph.D. Health Sciences
(Optometry and Vision Sciences)

Duration : 2 hours Max. Marks : 70

Hall Ticket No.

Instructions

1. Write your Hall Ticket No. in the OMR Answer Sheet given to you. Also, write your Hall Ticket No. in the space provided above.

2. This Question paper consists of two parts : **Part – A** and **Part – B** with 35 Questions in each **Part.** OMR Answer sheet will be provided separately.

3. Each question carries **One mark** and there is **no negative marking.**

4. Answers are to be marked on the OMR Answer Sheet following the instructions provided thereon.

5. Non-programmable calculators are allowed.

6. Please handover the **OMR Answer Sheet** at the end of the examination to the Invigilator. You may take the Question Paper after the examinations is over.

7. No additional sheet will be provided. Rough work can be done in the Question paper itself.

8. The question paper contains Eighteen (18) pages inclusive of cover page.

D-3

PART – A

1. What is the median test score for the following scores: 95, 85, 80, 100, and 90?

   A. 87
   B. 90
   C. 93
   D. 85

2. What type of measurable scale is eye colour?

   A. Nominal
   B. Ordinal
   C. Interval
   D. Ratio

3. Which of the following graphs should be used to represent a frequency distribution?

   A. Line graph
   B. Bar graph
   C. Histogram
   D. Scatter plot

4. What type of data is 'level of socio-economic status?

   A. Nominal
   B. Ordinal
   C. Interval
   D. Continuous

5. What is the mode age for the following data set: 35, 45, 45, 50, 20, and 30?

   A. 35
   B. 45
   C. 50
   D. 30

6. What is the difference between a parameter and a statistic?

   A. A parameter is a population characteristic, whereas a statistic is a sample characteristic.
   B. A parameter is a sample characteristic, whereas a statistic is a population characteristic.
   C. Parameter and statistic mean the same thing.
   D. Parameter and statistic are not related.

7. What type of variable is 'intraocular pressure'?

   A. Nominal variable
   B. Ordinal variable
   C. Interval variable
   D. Ratio variable

8. Which method ensures the reliability of a new questionnaire assessing QoL (Quality of Life) studies related to ocular disorders?

   A. Content validity
   B. Test-retest reliability
   C. Internal consistency
   D. Predictive validity

9. According to the Locard Exchange Principle, which factor is most crucial for a researcher to measure the accurate diagnosis of microbial contamination in ophthalmic lab settings?

   A. Frequency of sampling
   B. Variety of sampling locations
   C. Type of diagnostic tests used
   D. All of the above

10. The Noble Prize in Physiology and Medicine-2023 for discoveries concerning nucleoside base modifications that enabled the development of effective mRNA vaccines against COVID-19 was the award given to?

    A. David Julius and Ardem Patapoutian
    B. Harvey J Alter and Katalin Kariko
    C. Drew Weissman and David Julius
    D. Katalin Kariko and Drew Weissman

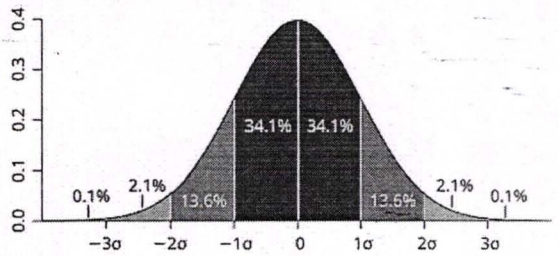
11. What is the primary purpose of the Declaration of Helsinki?

    A. To regulate medical treatments
    B. To outline ethical principles for medical research involving human subjects
    C. To establish guidelines for pharmaceutical pricing
    D. To provide a framework for hospital management

12. A researcher wants to study the progression of diabetic retinopathy in patients over 10 years; which research designs would be most suitable?

    A. Cross-sectional study
    B. Case-control study
    C. Longitudinal cohort study
    D. Experimental study

13. From the normal distribution curve below, what does the peak of the curve represent?



    A. The standard deviation (SD)
    B. The mean (μ) of the distribution
    C. The median value
    D. The mode of the distribution

14. What is the purpose of using a control group in experimental research?

    A. To ensure the sample is representative
    B. To establish a baseline for comparison
    C. To enhance the validity of qualitative data
    D. To increase the sample size

15. A researcher selectively published data that supported their hypothesis: smoking increases psychological pleasure while ignoring evidence that contradicted it. This practice is called:

    A. Data fabrication
    B. Selective reporting
    C. Data falsification
    D. Redundant publication

D-3

16. Who is credited for coining the term 'research' and creating the scientific method, which set the framework for current research practices?

    A. Francis Bacon
    B. René Descartes
    C. Aristotle
    D. Galileo Galilei

17. Based on members shared characteristics, dividing the population into smaller groups and then choosing a random sample from each group to put them together to form a sample is called

    A. Convenience sampling
    B. Random sampling
    C. Stratified sampling
    D. Systematic sampling

18. Find the mode of the frequency table below:

Marks (y)	**F**
$0 < y \leq 20$	2
$20 < y \leq 40$	1 3
$40 < y \leq 60$	2 5
$60 < y \leq 80$	5 5
$80 < y \leq$ 100	3 4

    A. $20 < y \leq 40$
    B. $40 < y \leq 60$
    C. $60 < y \leq 80$
    D. $80 < y \leq 100$

19. NK has scored 85, 93, 92, and 84 on the first four mathematics tests of the term. Which of the following scores should NK get on the last test to finish with an average of 90%?

    A. 90
    B. 92
    C. 94
    D. 96

20. For a data set 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, and 144. Which one of the following indicates the range for this data set?

    A. 42.5
    B. 12.5
    C. 78
    D. 143

21. A data set has a mean of 12 and a standard deviation 2. Each value is multiplied by four. What is the new mean and variance?

    A. 32 and 2
    B. 48 and 64
    C. 32 and 4
    D. 48 and 60

22. A school basketball coach recorded the number of games played (x) and points scored (y) for seven basketball players given in the table below.

Player	**Games (x)**	**Points (y)**
Prabhakar	3	9
Murali	4	10
Nag	4	20
Shiva	4	16
Sham	5	20
Surya	6	29
Mahadev	10	43
Total	**36**	**147**

Which of the following determines the strength of correlation (r) between the number of games played and the number of points scored?

A. 0.957
B. 0.750
C. 0.450
D. 0.250

23. As a car's tyres become worn, it uses more fuel to travel the same distance. The table below shows the tyres' age and the number of kilometres (km) the car travelled on one litre of diesel.

Age (years)	1	2	3	4	5	6
Km l^{-1}	20	18.5	17.4	15.6	14.8	13.2

Which one of the following indicates the estimated distance in km the car would have travelled on 1 litre of diesel when the tyres were 3.5 years old?

A. 21.3
B. 16.6
C. 18.5
D. 17.4

24. A fair 20-sided dice with faces numbered 1 to 20 is rolled. The event M is defined as "the number obtained is a multiple of 3". How many times would you expect to get a multiple of 3?

A. 20
B. 30
C. 40
D. 50

25. The car's colours passing the University's gate one morning are given below in the table.

Colour	**Frequency**
Red	26
Black	18
White	20
Green	12
Yellow	3
Blue	16
Others	15
Total	110

What is an improved estimate of the probability of the next car to pass the University gate being red?

A. 0.236
B. 35.5
C. 0.228
D. 25.5

26. Which statistical test would you use to compare the visual acuity outcomes of two cataract surgery techniques?

A. Paired t-test
B. Independent t-test
C. Chi-square test
D. ANOVA

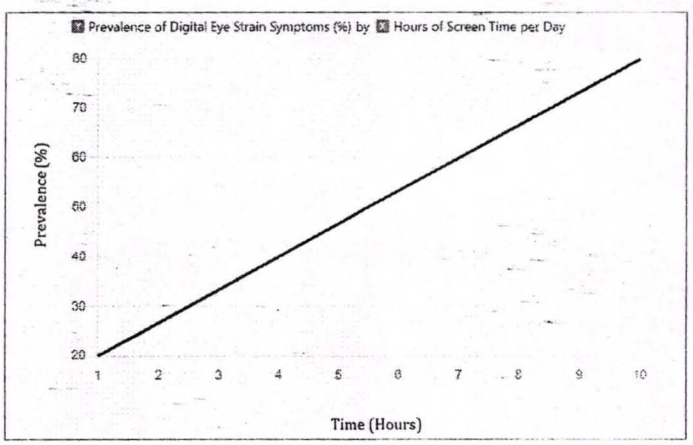
27. What is the main advantage of a double-blind study in optometry research?

A. It is less expensive
B. It eliminates all types of bias
C. It reduces the placebo effect and researcher bias
D. It ensures participant retention

28. Which term describes the consistency of measurements obtained with a visual acuity chart over repeated tests?

A. Validity
B. Reliability
C. Sensitivity
D. Specificity

29. The graph below shows the relationship between hours of screen time per day and the prevalence of digital eye strain symptoms in a sample population. Based on the data, what can be inferred about the impact of prolonged screen time on digital eye strain?



A. There is no significant relationship between screen time and digital eye strain.
B. Digital eye strain symptoms decrease with increasing screen time.
C. Digital eye strain symptoms increase with increasing screen time.
D. Digital eye strain symptoms remain constant regardless of screen time.

30. Which measures were most commonly implemented in ophthalmic clinics to reduce the risk of COVID-19 transmission?

A. Discontinuation of all elective surgeries
B. Use of telemedicine for consultations
C. Increased use of topical antibiotics
D. Reduction in the number of diagnostic tests performed

31. Which agency is responsible for regulating and maintaining standards of education and services for Optometry in India?

A. Medical Council of India
B. National Commission for Allied and Healthcare Professions
C. Indian Optometry Association
D. Paramedical Council of India

32. Which of the following sources is generally considered the most reliable for obtaining accurate scientific information?

A. Personal blogs
B. Popular news website
C. Social media posts
D. Peer-reviewed journals

33. A researcher is conducting a clinical trial to test a new medication for treating glaucoma. The trial involves diverse participants, including elderly patients and those from low-income backgrounds. The researcher ensures that all participants provide informed consent and are fully aware of the potential risks and benefits of the trial. However, during the trial, one participant experienced severe adverse effects that were not anticipated. The researcher decides to continue the trial without informing the ethics committee about the adverse effects, believing that the benefits of the medication outweigh the risks and that the issue can be managed within the trial. Which one of the terms below indicates the above infliction?

A. Respect for autonomy
B. Beneficence
C. Justice
D. Non-maleficence

D-3

34. Which of the following citations is correctly formatted in APA style?

I. Flaxman, S. R., Bourne, R. R., Resnikoff, S., Ackland, P., Braithwaite, T., Cicinelli, M. V.,... & Zheng, Y (2017). Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. The Lancet Global Health, 5(12), e1221-e1234.

II. Flaxman, S. R., Bourne, R. R., Resnikoff, S., Ackland, P., Braithwaite, T., Cicinelli, M. V., et al. Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. The Lancet Global Health. 2017; 5(12): e1221-e1234.

III. Flaxman, S. R., Bourne, R. R., Resnikoff, S., Ackland, P., Braithwaite, T., Cicinelli, M.V., & Zheng, Y. (2017). Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. The Lancet Global Health; 5(12): e1221-e1234.

IV. Flaxman S.R., Bourne R.R., Resnikoff S., Ackland P., Braithwaite T., Cicinelli M.V., &Zheng Y. Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. The Lancet Global Health. 2017; 5(12): e1221-e1234.

A. IV and III
B. III only
C. I only
D. I and II

35. Which of the following is NOT statistical software?

A. SPSS
B. R
C. MATLAB
D. MS-Office-365

PART B

36. Which of the following has not been used in artificial tears?

A. Hydroxypropyl methylcellulose
B. Polyacrylic acid
C. Polyvinyl alcohol
D. Fluorometholone alcohol

37. Which one of the following is not an autoimmune aetiology of limbal stem cell deficiency?

A. Stevens-Johnson Syndrome
B. Toxic epidermal necrolysis
C. Peters anomaly
D. Ocular cicatricial pemphigoid

38. Which one of the following is not a strategy for avoiding allergens in case of allergic eye diseases?

A. Staying indoors during high pollen
B. Using air conditioners and air filters
C. Keeping windows closed
D. Hot fomentation

39. Which one of the following is not a diagnostic technique used in the case of ocular surface disease?

A. Psychometric instruments
B. Impression Cytology
C. Confocal microscopy
D. Optical coherence tomography

40. Which one of the following is not obstructive non-cicatricial meibomian gland disease?

A. Erythema multiforme
B. Seborrheic dermatitis
C. Acne rosacea
D. Psoriasis

41. Which type of temple curves around the ear following the crotch of the ear where the ear and head meet, extending to the level of the earlobe?

    A. Library
    B. Skull
    C. Riding bow
    D. Convertible

42. A spectacle frame is marked as 1/10 12k GF. In this example, what does 12k GF mean?

    A. Has 10% gold by weight
    B. Has a 12k solid gold bridge
    C. Is 50% gold by weight
    D. Is 10% gold by volume

43. A person with a 70 mm distance PD, wearing a prescription of +6.50D for distance, +2.50D addition and working distance of 20 cm. The spectacle lenses are 25 mm from the centre of rotation of the eye to the back of the lens. What would the segment inset per lens be?

    A. 45 mm
    B. 35 mm
    C. 25 mm
    D. 4.5 mm

44. A finished, single-vision lens will be placed in a frame with the following dimensions: A = 52 mm; DBL = 18 mm; ED = 57 mm; PD = 62 mm. What would the minimum blank size be?

    A. 57 mm
    B. 62 mm
    C. 52 mm
    D. 67 mm

45. The lens clock shows a value of +6.00 D based on an assumed index of 1.530. What is the radius of curvature of the lens surface?

    A. 0.0883 m
    B. 0.0153 m
    C. 0.0600 m
    D. 0.179 m

D-3

46. A ±1.00 D Jackson crossed cylinder is placed before a −2.50 sphere lens. You read this lens combination in a lensometer. What power would you expect to find?

    A. −3.50 − 2.00 × something
    B. −2.50 − 2.00 × something
    C. −2.00 − 1.00 × something
    D. −1.50 − 2.00 × something

47. Which one of the following is not a tear-mediated defenses mechanism in contact lens wearers?

    A. Post-lens tear film volume
    B. Lens material
    C. Tear film chemical Absorption
    D. Biofilm

48. Which of the following indicates the definition of low vision from the visual acuity point of view as per the WHO consultation meeting in Bangkok in 1993 is as follows:

    A. A person with low vision is someone who, after medical, surgical and/or optical intervention, has a corrected visual acuity in the better eye of < 6/12 down to and including hand movements
    B. A person with low vision is someone who, after medical, surgical and/or optical intervention, has a corrected visual acuity in the better eye of < 6/18 down to and including light perception
    C. A person with low vision is someone who, after medical, surgical and/or optical intervention, has a corrected visual acuity in the better eye of < 6/18 down to and including no light perception
    D. A person with low vision is someone who, after medical, surgical and/or optical intervention, has a corrected visual acuity in the better eye of < 6/12 down to and including light perception

49. 2030 In Sight is the eye care sector's strategic plan for the decade – 2020-2030. The strategies for the eye care sector include the following keywords except:

    A. Elevate
    B. Integrate
    C. Collaborate
    D. Activate

50. Effective Refractive Error Coverage means (eREC) means:

    A. The proportion of people who have received refractive error services (i.e., spectacles, contact lenses or surgery) and have a resultant good quality outcome (presenting visual acuity 6/12 or better) relative to the number of

people in need of refractive error services having presenting visual acuity <6/12 due to refractive error

B. The proportion of people who have received refractive error services (i.e., spectacles, contact lenses or surgery) and have a resultant good quality outcome (presenting visual acuity 6/18 or better) relative to the number of people in need of refractive error services having presenting visual acuity <6/18 due to refractive error
C. The proportion of people who have received refractive error services (i.e., spectacles, contact lenses or surgery) and have a resultant good quality outcome (best corrected visual acuity 6/12 or better) relative to the number of people in need of refractive error services having presenting visual acuity <6/12 due to refractive error
D. The proportion of people who have received refractive error services (i.e., spectacles, contact lenses or surgery) and have a resultant good quality outcome (presenting visual acuity 6/9 or better) relative to the number of people in need of refractive error services having presenting visual acuity <6/9 due to refractive error

51. The Global Initiative for the Elimination of Avoidable Blindness by the year 2020 was more commonly called:

A. GET 2020
B. Vision 2020: The Right to Life
C. Post-MDG 2020
D. Vision 2020: The Right to Sight

52. Which study design is most appropriate for investigating the long-term effects of blue light exposure on retinal health?

A. Cross-sectional study
B. Case-control study
C. Cohort study
D. Experimental study

53. Which imaging technique is commonly used to visualise the retinal layers in detail?

A. Fundus photography
B. Optical coherence tomography
C. Fluorescein angiography
D. Ultrasound biomicroscopy

54. Which layer of the cells are primary light sensors in the retina?

A. Ganglionic cells layer
B. Photoreceptors -RPE layer
C. Outer Plexiform layer
D. Muller cells

55. In the context of visual psychophysics, what is a "false alarm"?

A. Correctly identifying the presence of a stimulus
B. Falsely identifying the presence of a stimulus
C. Correctly identifying the absence of a stimulus
D. Falsely identifying the absence of a stimulus

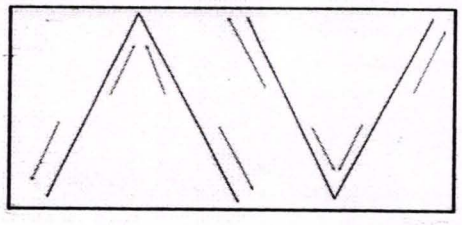
56. An object is placed 30 cm from a concave lens with a focal length of -30 cm. Calculate the image distance and magnification.

A. -15 cm, +0.5
B. -15 cm, -0.5
C. -30 cm, +1
D. -30 cm, -1

57. Which vitamin is essential for maintaining retinal health and preventing night blindness?

A. Vitamin C
B. Vitamin D
C. Vitamin A
D. Vitamin E

58. Identify the Pattern of Strabismus from the below diagram. Which Muscles are involved in this pattern?



A. V and A pattern Strabismus- Superior rectus and Inferior rectus
B. V pattern Heterotropia- Inferior Oblique and Superior Oblique
C. A pattern Hypertropia-Superior Oblique and Inferior Oblique
D. A and V pattern Strabismus- Medial Rectus and Lateral Rectus

59. What is the first step in conducting an epidemiological study on the prevalence of myopia in a population?

A. Data analysis
B. Literature review
C. Defining the population
D. Collecting data

60. If a patient has a Snellen acuity of 20/40, what is their visual acuity in cycles per degree (cpd)?

A. 20 cpd
B. 15 cpd
C. 40 cpd
D. 10 cpd

61. A bus driver with red-green colour blindness approaches a traffic light signal. How might they perceive the colours of the traffic light?

A. They can distinguish all colours accurately but have trouble with brightness
B. They might see the red and green lights as similar shades of yellow or brown but can distinguish the position of the lights to understand their meaning
C. They can only see the red light clearly and confuse the green and yellow lights
D. They can see the green light but perceive the red and yellow lights as the same colour

62. A person has a visual acuity of 20/200 in their better eye with the best possible correction. According to the World Health Organization (WHO) classification, which visual impairment category does this person fall under?

A. Mild visual impairment
B. Moderate visual impairment
C. Severe visual impairment
D. Blindness

63. If a person reads a book 30 cm away, what adjustment does the crystalline lens in the eye make to focus clearly?

A. The lens becomes thicker
B. The lens becomes thinner
C. The lens remains unchanged
D. The lens becomes flatter

64. In a clinical trial testing a new treatment for age-related macular degeneration (AMD), N=200 patients are randomly assigned to either the treatment or control groups. After one year, 70% of the treatment group improved visual acuity, compared to 50% in the control group. If the p-value for this difference is 0.02, what is the correct interpretation?

    A. There is a 2% chance that the observed difference is due to random variation
    B. The treatment is 2% more effective than the control
    C. There is a 2% chance that the treatment is effective
    D. There is strong evidence that the treatment is effective at improving visual acuity

65. A researcher conducts an experiment to test the effect of ambient lighting on reading speed. The reading speeds (words per minute) under dim and bright lighting conditions are recorded for n=30 participants. The mean reading speed under dim lighting is 150 wpm with a standard deviation of 20 wpm; under bright lighting, the mean is 170 wpm with a standard deviation of 15 wpm. Assuming a normal distribution, what is the 95% confidence interval for the difference in mean reading speeds between the two lighting conditions?

    A. (15.3, 24.7)
    B. (10.5, 29.5)
    C. (13.2, 26.8)
    D. (12.4, 27.6)

66. A researcher is studying the relationship between stimulus intensity and perceived brightness using Steven's Power Law, which states P=kIn. If the perceived brightness (P) is 40 units for an intensity (I) of 10 cd/m² and the exponent (n) is found to be 0.5, what is the constant (k)?

    A. 2
    B. 4
    C. 6
    D. 8

67. In a psychophysics experiment, participants are asked to identify the smallest difference in brightness they can detect between two lights. If the just noticeable difference (JND) is 2 lumens when the baseline intensity is 20 lumens, what is the Weber fraction?

    A. 0.1
    B. 0.05
    C. 0.2
    D. 0.4

68. In a retinoscopy experiment to determine refractive error, a psychometric curve is plotted to show the probability of a "with movement" response at various lens powers. If the point at which the curve reaches 50% probability corresponds to a lens power of -2.00 D, what does this indicate about the patient's refractive error?

    A. The patient has 0.00 D refractive error (emmetropia)
    B. The patient has -2.00 D of myopia
    C. The patient has +2.00 D of hyperopia
    D. The patient has astigmatism

69. If a prism with 8.00D is used to correct an exotropia, what is the total angular correction in degrees? ($1.00\Delta D = 0.57^{0}$)

    A. 3.76 degrees
    B. 4.56 degrees
    C. 6.84 degrees
    D. 8.56 degrees

70. Compared with daily wear, contact lenses worn on an extended wear (EW) basis increase the likelihood of corneal infection by:

    A. 1.5 to 2.5 times
    B. 3 to 8 times
    C. 10 to 24 times
    D. 40 times

------End------

University of Hyderabad

Entrance Examinatiosns 2024

Ph.D. Admissions - January 2025 session

Ph.D. Health Sciences - Optometry and Vision Sciences

Sl No	Key	Sl No	Key	Sl No	Key	Sl No	Key
1	B	21	B	41	C	61	B
2	A	22	A	42	C	62	D
3	C	23	B	43	D	63	A
4	B	24	B	44	D	64	D
5	B	25	C	45	A	65	C
6	A	26	B	46	D	66	B
7	D	27	C	47	D	67	A
8	B	28	B	48	B	68	B
9	D	29	C	49	C	69	B
10	D	30	B	50	A	70	C
11	B	31	B	51	D		
12	C	32	D	52	C		
13	B	33	D	53	B		
14	B	34	C	54	B		
15	B	35	D	55	A		
16	A	36	D	56	B		
17	C	37	C	57	C		
18	C	38	D	58	D		
19	D	39	D	59	C		
20	D	40	A	60	D		