



STUDY GUIDE IN OPHTHALMOLOGY

(2nd Edition)

For 2nd, 3rd and 4th Professional MBBS Students

Khyber Girls Medical College

Peshawar



CONTENTS

- ❖ **Vision and mission of KGMC**
- ❖ **Vision and mission of KMU**
- ❖ **Preface**
- ❖ **Curriculum Committee of KGMC**
- ❖ **Ophthalmology Syllabus of PMC**
- ❖ **Eye faculty at KGMC**
- ❖ **Ophthalmology Module at KGMC & specific Learning Outcomes / Objectives**
- ❖ **General learning Outcomes / Objectives of the course**
- ❖ **Teaching and learning strategies**
- ❖ **Evaluation / assessment methods**
- ❖ **Learning resources.**



Vision and Mission of KGMC

VISION

Khyber Girls Medical College will promote health care leaders that are critical thinkers, ethical, research oriented, culturally and professionally competent

MISSION

To develop competent health care leaders by ensuring appropriate policies, procedures which reflect ethical, cultural, community oriented and evidence based practices to achieve best possible health outcomes for society at large.



Vision and Mission of KMU

VISION

Khyber Medical University will be the Global leader in health sciences, academics and research for efficient and compassionate health care

MISSION

Khyber Medical University aims to promote professional competence through learning and innovation for providing comprehensive quality health care to the nation.

PREFACE

It gives me great pleasure in writing the second edition of this Ophthalmology “Study Guide”. This was necessary as in this one year we have moved from traditional curriculum to modular curriculum. In this new curriculum the topics are changed into themes. Each theme may have a number of topics.

In our Ophthalmology module, there is one theme for 2nd year students, two for 3rd year and twelve for 4th year. Moreover, each topic has a table of specifications showing its contents, learning outcomes, teaching strategy and assessment methods. Special sessions are devoted to tutorials and skills development of students.

This study guide will help students at every step of their learning. They are likened to a tutor sitting on the student’s shoulder available 24 hours a day to advise the students. What he/she should be doing at any stage in their study. Basically study guides have three roles in facilitating learning:

- a. Assisting in the management of student learning
- b. Providing a focus for student activities to the learning
- c. Providing information on the subject or topic of study

The guide is designed to encourage students to interact with the subject through questions, student activities and self assessment exercises as rightly pointed out by Harden, Laidlaw and Hesketh in 2009.

In the preparation of this guide, I was supported by Dr. Yousaf Jamal Mahsood, Assistant Professor Glaucoma and Syed Sajjad Hussain our Computer Operator/PA of the Department. However, I would not have come this far had it not been for the endless support of my family, my wife, in particular for supplying me with adequate tea and snacks at all the right times and putting up with my work ethic in just four days.

I hope my students of 2nd, 3rd and 4th Professional MBBS will make the most of this guide. If some deficiency is left in the study guide, please feel free to contact me on my email tariqbabar5@gmail.com

Prof. Dr. Tariq Farooq Babar
Date: December 24, 2020

Curriculum Committee of KGMC

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>Chair</u> Prof. Dr. Zahid Aman Dean KGMC</p> <p><u>Co-Chair</u> Dr. Sabiha Aziz Associate Dean KGMC</p> <p><u>Clinical Sciences</u> Prof. Dr. Noor Wazir Deptt: of Medicine, KGMC, HMC</p> <p>Dr. Bushra Rauf Deptt: of Gynae, KGMC/HMC</p> <p>Prof. Dr. Sofia Iqbal Deptt: of Ophthalmology, KGMC/HMC</p> <p>Dr. Said Amin Deptt: of Medicine, KGMC/HMC</p> <p>Prof. Dr. Gharib Nawaz Deptt: of ENT, KGMC/HMC</p> <p>Dr. Jamshed Alaqum Deptt: of Surgery, KGMC/HMC</p> <p>Dr. Ambreen Ahmed Deptt: of Pediatrics, KGMC/HMC</p> <p>Dr. Ain ul Hadi Deptt: of surgery, KGMC/HMC</p> <p>Dr. Jawad Rahim Deptt: of Medicine, KGMC/HMC</p> <p><u>Behaviour Sciences</u> Dr. Amir Abbas Deptt: of Psychiatry, KGMC/HMC</p> | <p><u>Medical Education</u> Dr. Naheed Mahsood Deptt: of Medical Education, KGMC</p> <p>Dr. Naveed Afzal Khan Deptt: of Medicine Education, KGMC</p> <p>Dr. Onaiza Nasim Deptt: of Medicine Education, KGMC</p> <p><u>Basic Sciences</u> Dr. Amin ul Haq Deptt: of Biochemistry, KGMC</p> <p>Dr. Khalid Javed Deptt: of Pathology, KGMC</p> <p>Dr. Raheela Amin Deptt: of Community Medicine, KGMC</p> <p>Dr. Shams Sulaiman Deptt: of Pharmacology, KGMC</p> <p>Dr. Shahab ud Din Deptt: of Anatomy, KGMC</p> <p>Dr. Naheed Sadiq Deptt: of Forensic Medicine, KGMC</p> <p>Dr. Zahir Shah Deptt: of Physiology, KGMC</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Ophthalmology Syllabus of PMC

A. COURSE CONTENT

| s. no. | Topics | Contents |
|--------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a | Basics | Anatomy and functions of the eyeball/adnexa and orbit. |
| b | Orbit | orbital cellulitis, proptosis. |
| c | Lids | Blepharitis, stye, chalazion, trichiasis, entropion, ectropion, ptosis, and common tumours. |
| d | Conjunctiva | Infective and allergic conjunctivitis, pterygium |
| e | Cornea | Keratits / corneal ulcers- risk factors, complications and its management |
| f | Sclera | Episcleritis and scleritis. |
| g | Pupil | Pupillary reflexes and their common abnormalities. |
| h | Lacrimal Apparatus | Composition and functions of tear film, dry eye, excessive watering (epiphora), dacryocystitis (acute & chronic). |
| i | Therapeutics | Drugs used in common ophthalmic conditions. |
| j | Vitamin A | Ocular manifestations of vitamin A deficiency and its management. |
| k | Uveal Tract | Uveitis, and its differential diagnosis from other causes of red Eye. |
| l | Lens | Classification of cataract, congenital cataract (lamellar, signs and symptoms and management), rubella syndrome, acquired cataract (senile, traumatic, drug induced), cataract due to systemic diseases (clinical picture and management including visual rehabilitation). |
| | Topic | Contents |
| m | Glaucoma | Physiology of aqueous humour formation and its circulation. measurement of IOP, definition and classification of glaucoma, primary open angle and closed angle glaucoma, secondary glaucoma due to hyper-mature cataract and uveitis. principles of medical and surgical management of glaucoma. |
| n | Vitreo-Retina | Posterior vitreous/haemorrhage, detachment, primary retinal |

| | | |
|---|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | detachment (common presentation and principles of management), diabetic retinopathy, hypertensive retinopathy, retinitis pigmentosa, retinoblastoma. |
| o | Optic Nerve | papilloedema, optic neuritis (papillitis and retrobulbar neuritis), optic atrophy. |
| p | Visual Pathway | Introduction to visual field defects in the lesions of chiasma and visual pathway. |
| q | Injuries | Extraocular foreign bodies, closed globe injuries, open globe injuries with or without retained intra ocular foreign bodies, burns and chemical injuries, sympathetic ophthalmitis. |
| r | Squint and Amblyopia | Definition, classification and principles of management. |
| s | Errors of Refraction | Introduction to optical system of normal eye, emetropia, myopia, hypermetropia, astigmatism, presbyopia, aphakia, pseudophakia, anisometropia, and amblyopia. |
| t | Systemics Disease | Diabetes, thyroid diseases, vitamin deficiencies |
| u | Common causes | Definition and standards of vision/blindness. |

B- Aims & Objectives

The student should be well versed with the basics of:-

- ❖ Ocular history taking
- ❖ Examination
- ❖ Preparation of patients for eye surgery and common eye procedures.

LEVELS

(a) History Taking

1. Defects in vision
2. Pain in and around the eye
3. Discharging eye
4. Abnormal appearance of the eye and orbit
5. Colour vision

6. Diplopia

(b) Examination

1. Visual acuity, for distance and near
2. Use of a pinhole
3. Examination of adnexa and anterior segment of the eye.
4. Eversion of the upper eye lid
5. Lacrimal regurgitation test
6. Detection of the deviated eye
7. Ocular movements
8. Pupillary reflexes (afferent pupillary defects)
9. Measurement of intra-ocular pressure.
 - Palpation assessment
 - Schiotz tonometer
10. Distant direct ophthalmoscopy for identification of defects in the ocular media
11. Direct ophthalmoscopy with emphasis on disc and its abnormalities, swollen disc, cup disc and pale disc/retinal lesions.
12. Confrontation test for field of vision

(c) Familiarization with

- ❖ Retinoscopy,
- ❖ Indirect ophthalmoscopy
- ❖ Slit Lamp and its uses
- ❖ Visual fields
- ❖ Use of lasers in ophthalmology

(d) Procedure

Student should know

- Irrigation of eye
- Instillation of eye drops
- Staining for corneal ulcer
- Removal of superficial foreign bodies
- Rational use of topical anaesthesia

(e) Preparation for operation and post operative management

(f) Understanding medical ethics and to maintain the confidentiality of the patient

C. STANDARD / COMPETENCE TO BE ACHIEVED

Assessment of Level of Competence

a. To Diagnose, treat and prevent certain common eye conditions

- ❖ Blepharitis
- ❖ Stye and chalazion
- ❖ Dacryocystitis
- ❖ Conjunctivitis
- ❖ Trachoma
- ❖ Ocular trauma (corneal foreign body/abrasion)
- ❖ Ocular allergies

b. To diagnose certain eye diseases, initiate first aid treatment and refer them in time e.g.

- ❖ Corneal ulcer
- ❖ Uveitis
- ❖ Acute congestive glaucoma
- ❖ Open or closed globe injuries
- ❖ Red eye

c. To enable them to diagnose other eye conditions and refer them to secondary or tertiary eye care centres for further management

- ❖ Cataract
- ❖ Squint and amblyopia
- ❖ Refractive errors
- ❖ Tumours (white pupil)
- ❖ Serious ocular trauma
- ❖ Painful or painless loss of vision

d. To understand the importance of prevention in ocular diseases

Deficiency diseases resulting in ocular problems

Early detection of glaucoma

Diabetic retinopathy

By the end of the training student should be a caring and compassionate, general purpose, doctor who is competent to deal with the common health problems related to eye diseases.

e. Understand the relationship between eye and systemic diseases

f. To visit community for eye health care problems including eye camps

FACULTY
Department of Ophthalmology
Hayatabad Medical Complex, Peshawar

Department of Ophthalmology

| | |
|--------------------------------|------------------------------------|
| Prof Dr. Tariq Faoorq Babar | Professor & Head of the Department |
| Prof. Dr. Sofia Iqbal | Professor |
| Prof. Dr. Sanaullah Jan | Professor |
| Dr. M. Naeem Khan | Professor |
| Dr. Muhammad Tariq Khan | Associate Professor |
| Dr. Umar Khan | Associate Professor |
| Dr. Mushtaq Ahmad | Associate Professor |
| Dr. Nazullah | Associate Professor |
| Dr. Afzal Qadir | Assistant Professor |
| Dr. Muhammad Zia-ud-Din Khalil | Assistant Professor |
| Dr. Yousaf Jamal Mahsood | Assistant Professor |
| Dr. Samina Karim | Assistant Professor |
| Dr. Tariq Shahnam | SPR |

Faculty members
Department of Ophthalmology
Hayatabad Medical Complex, Peshawar

Faculty

| | |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <u>General Ophthalmology</u> Prof. Dr. Tariq Farooq Babar Dr. Nazullah Dr. Umer Khan Dr. M. Zia-ud-Din Khalil | <u>Vitreo Retina Specialist</u> Prof. Dr. Sanaullah Jan Dr. Umer Khan Dr. M. Tariq Khan Dr. Mushtaq Ahmed |
| <u>Glaucoma Specialist</u> Dr. Yousaf Jamal Mahsood | <u>Paediatric Ophthalmology</u> Prof. Dr. M. Naeem Khan Dr. Afzal Qadir |
| <u>Diagnostic Ophthalmology</u> Dr. Samina Karim | <u>Orbit & Oculoplasty Specialist</u> Prof. Dr. Tariq Farooq Babar Prof. Dr. Sofia Iqbal Dr. Nazullah |

Ophthalmology Module at KGMC and specific learning objectives/ outcomes

At KGMC, the ophthalmology lectures in the Modular system are as follows.

A. 2nd year MBBS

| Module | Theme | S.No | Topic | Learning Objective / Outcomes | Teacher | Assessment methods |
|---------------------|----------|------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------|
| Neurosciences -2 | Diplopia | 1 | Blindness | <u>Cognitive</u> Approach to a patient with unilateral & bilateral blindness <u>Psychomotor</u> Perform diplopia test under supervision Perform visual acuity testing at distance and near independently Perform pinhole testing <u>Affective</u> Adopt empathy in patients with unilateral or bilateral blindness | Dr. Samina Karim | MCQs SAQs OSCE |

| | | | | | | |
|--|------------------------------|---|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|
| | | | | <p>Correlate the clinical presentation of watery eye with anatomical structures</p> <p>Correlate the clinical features with a disease entity. Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction</p> <p>Assess the time of probing</p> <p>Describe the causes, clinical presentation and treatment modalities Differentiate between acute and chronic dacryocystitis</p> <p>Explain clinical features of a dry eye</p> <p><u>Psychomotor</u> Perform lacrimal regurgitation test independently Perform Schirmer test</p> <p><u>Affective</u> Adopt to have small group discussion in patients with a watery eye</p> | | <p>SAQs</p> <p>OSCE</p> |
| | Cell injury ageing and death | 4 | <u>Cataract</u> | <p><u>Cognitive</u></p> <p>Define cataract</p> <p>Describe the types of</p> | Dr. M. Zia ud Din Khalil | <p>MCQs</p> <p>SAQs</p> |

| | | | | | | |
|--------------------------|--|---|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------|
| | | | | <p>cataract</p> <p>Describe the pathogenesis & complications of cataracts</p> <p>Describe the management of cataract</p> <p><u>Psychomotor</u> Perform distant direct ophthalmoscopy without supervision</p> <p><u>Affective</u> Participate in small group discussion in patients with cataracts.</p> | | OSCE |
| Infection & inflammation | | 5 | <u>Acute and chronic dacryocystitis</u> | <p><u>Cognitive</u> Differentiate between acute & chronic dacryocystitis</p> <p><u>Psychomotor</u> Perform lacrimal regurgitation test</p> <p><u>Affective</u> Comply with patients having dacryocystitis</p> | Prof. Dr. Tariq Farooq Babar | <p>MCQs</p> <p>SAQs</p> <p>OSCE</p> |
| | | 6 | <u>Episcleritis</u> | <p><u>Cognitive</u> Explain episcleritis & scleritis</p> | Dr. Umer Khan | <p>MCQs</p> <p>SAQs</p> |
| | | 7 | <u>Infective conjunctivitis</u> | <p><u>Cognitive</u></p> <p>Define infective conjunctivitis</p> <p>Enumerate causative organisms</p> <p>Discuss its management</p> | Dr. Afzal Qadir | <p>MCQs</p> <p>SAQs</p> <p>OSCE</p> |

| | | | | | | |
|--|--|--|--|---------------------------------------------------------------------------------|--|--|
| | | | | <u>Psychomotor</u> Perform conjunctival swab for culture & sensitivity | | |
|--|--|--|--|---------------------------------------------------------------------------------|--|--|

4th year MBBS

| Module | Theme | S.No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-----------------------|-------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|
| | Basic concepts in Eye | 1 | Anatomy and functions of eyeball / adnexa & orbit | <p><u>Cognitive</u></p> <p>Discuss the anatomy of eyelids and lacrimal system</p> <p>Describe the structural anatomy of orbit</p> | Dr. Samina Karim | MCQs SAQs |
| | | 2 | Anatomy of extra ocular muscles, motor & sensory components | <p>Analyze the physiology of eyelids & lacrimal drainage mechanism</p> <p>Discuss the anatomical, motor & sensory considerations of extraocular muscles</p> | | |
| | | 3 | Psychophysical tests & ultrasonography | <p>Illustrate psychophysical tests</p> <p>Describe the uses of ultrasonography in eye</p> | | |
| | | 4 | FFA, OCT & Visual fields | <p><u>Psychomotor</u></p> <p>Perform extra ocular movements independently.</p> <p><u>Cognitive</u></p> <p>Enumerate the role and uses of FFA, OCT & visual fields (Bjerrum, Goldmann & Humphrey)</p> | | |
| | | 5 | Aqueous production, aqueous outflow, intraocular pressure, optic nerve head & glaucoma | <p><u>Cognitive</u></p> <p>Discuss aqueous production, aqueous outflow & intraocular pressure.</p> <p>Explain optic nerve head & classify glaucoma</p> | Dr. Nazullah | MCQs SAQs |

| | | | | | | |
|--|--|---|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| | | | classification | <u>Psychomotor</u> Perform fundus examination under supervision | | OSCE |
| | | 6 | Drugs used in ophthalmic conditions & standard of vision & blindness | List the common drugs used in ophthalmology & their uses Define standard of vision & blindness | Dr. M. Zia ud Din Khalil | MCQs SAQs |
| | | 7 | Pupillary reflexes | <u>Psychomotor</u> Perform instillation of eye drops Discuss different pupillary reflexes and its common abnormalities <u>Psychomotor</u> Perform pupil examination | Dr. M. Zia ud Din Khalil | MCQs SAQs OSCE |

| Module | Theme | S.No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|------------------------------------------------------|-------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| | Lid bumps & itchy eyes | 1 | Lid bumps and infections | <u>Cognitive</u> Discuss the differential diagnosis of lid bumps and itchy eye Describe infections of the eyelid, chalazion, stye and blepharitis | Prof. Dr. Sofia Iqbal | MCQs SAQs |
| | | 2 | Tumours of eyelids | <u>Cognitive</u> Describe eyelid tumors and their management. <u>Affective</u> Participate in discussion with patients having eyelid tumors | Prof. Dr. Sofia Iqbal | MCQs SAQs |
| | Lid margin/ lashes disorders droopy ptotic lid | 1 | Lid margin disorder | <u>Cognitive</u> Illustrate the differential diagnosis of lid margin / lashes disorders Explain trichiasis, entropion, ectropion and ptosis | Prof. Dr. Sofia Iqbal | MCQs SAQs |

| | | | | | | |
|--|--|--|--|-------------------------------------------------------------------|--|------|
| | | | | <u>Psychomotor</u> Perform eyelid examination independently | | OSCE |
|--|--|--|--|-------------------------------------------------------------------|--|------|

| Module | Theme | S.No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-----------------------------------|-------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------|
| | Protruded / bulgy / proptotic eye | 1 | Overview of proptotic eye | <u>Cognitive</u> Explain the differential diagnosis of a protruded / bulgy / proptotic eye Discuss clinical features and investigations of a patient with proptosis <u>Psychomotor</u> Perform orbital examination under supervision Perform & measure axial proptosis with a ruler <u>Affective</u> Engage in small group discussion in patients with proptosis | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |
| | | 2 | Thyroid eye disease | <u>Cognitive</u> Describe the clinical features and management of a patient with thyroid eye disease <u>Psychomotor</u> Perform extra ocular movements independently in patients with thyroid eye disease <u>Affective</u> Listen to patients with proptosis with respect | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |
| | | 3 | Orbital cellulitis | <u>Cognitive</u> Discuss the clinical features and management of preseptal and orbital cellulitis Differentiate preseptal from orbital cellulitis <u>Psychomotor:</u> Perform visual acuity of a patient with orbital cellulitis Perform pupillary examination independently <u>Affective</u> Comply with patients having orbital cellulitis | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |

| Module | Theme | S.No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|---------|-------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------|
| | Red Eye | 1 | Overview of red eye & conjunctival inflammation & trachoma | <u>Cognitive</u> Differentiate various causes of a red eye Enumerate clinical features of conjunctival inflammation Explain differences between a papilla and follicle Describe features of trachoma & its treatment <u>Psychomotor</u> Perform conjunctival swab under super vision <u>Affective</u> Participate in small group discussion in patients with conjunctivitis and trachoma | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |
| | | 2 | Bacterial conjunctivitis and ophthalmia neonatorum | <u>Cognitive</u> Discuss the different types and management of bacterial conjunctivitis Define ophthalmia neonatorum and its management plan <u>Psychomotor</u> Assist in taking conjunctival swab for culture & sensitivity <u>Affective</u> Answer with empathy in patients with bacterial conjunctivitis | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |
| | | 3 | Allergic conjunctivitis | <u>Cognitive</u> Define allergic conjunctivitis, its clinical features & management <u>Psychomotor</u> Perform conjunctival scraping in patients with allergic conjunctivitis <u>Affective</u> Commit to show empathy in a patient with allergic | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |

| Module | Theme | S.No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-------|-------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|
| | | | | conjunctivitis | | |
| | | 4 | Fungal & viral conjunctival inflammation | <u>Cognitive</u> Explain the clinical features of fungal conjunctivitis & its management Describe an account of viral conjunctivitis and its treatment <u>Psychomotor</u> Perform conjunctival swab for fungal keratitis <u>Affective</u> Comply with patients having fungal keratitis | Dr. Afzal Qadir | MCQs SAQs OSCE |
| | | 5 | Corneal inflammation | <u>Cognitive</u> Describe corneal inflammation and its sequelae and its management | Dr. Umer Khan | MCQs SAQs |
| | | 6 | Bacterial keratitis | <u>Cognitive</u> Discuss clinical features and management of bacterial keratitis <u>Psychomotor</u> Perform conjunctival swab for bacteria | Dr. Umer Khan | MCQs SAQs OSCE |
| | | 7 | Fungal, viral and acanthamoebic Keratitis | <u>Cognitive</u> Differentiate fungal, viral and acanthamoebic keratitis Discuss their management plan Enumerate various investigations for each category | Dr. Umer Khan | MCQs SAQs |
| | | 8 | Episcleritis and scleritis | <u>Cognitive</u> Differentiate between episcleritis and scleritis Discuss various types and its management | Dr. Umer Khan | MCQs SAQs |
| | | 9 | Uveitis | <u>Cognitive</u> Define uveitis and its classification Describe history and work up for a patient with uveitis | Dr. Tariq Marwat | MCQs SAQs |
| | | 10 | Anterior and posterior uveitis | <u>Cognitive</u> Discuss the clinical features of anterior and posterior uveitis | Dr. Tariq Marwat | MCQs SAQs |

| | | | | | | |
|--|--|--|--|-------------------------------------------------------------------------------------------------------|--|--|
| | | | | Classify a management plan. <u>Affective</u> Participate in discussion in patients with uveitis | | |
|--|--|--|--|-------------------------------------------------------------------------------------------------------|--|--|

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-----------------------------------------------------------------------|--------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------|
| | E) Pigmented and non pigmented lesions and nodules of conjunctiva. | 1 | An overview of pigmented and non pigmented lesions and nodules of conjunctiva | <u>Cognitive</u> Differentiate between different causes of pigmented and non-pigmented lesions and nodules of conjunctiva Describe conjunctival degeneration and its management <u>Psychomotor</u> To assist in various steps of pterygium surgery <u>Affective</u> Adopt empathy in patients with conjunctival lesions & nodules | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |
| | | 2 | Tumours of Conunctiva | <u>Cognitive</u> Discuss various types of benign, pre-malignant & malignant tumours of conjunctiva <u>Psychomotor</u> Perform upper eyelid eversion independently <u>Affective</u> Participate in classroom discussion in patients with tumors of conjunctiva | Prof. Dr. Tariq Farooq Babar | MCQs SAQs OSCE |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-----------------------|--------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|
| | G) Eye injury /trauma | 1 | An overview of eye trauma | <u>Cognitive</u> Differentiate eye trauma from other causes Define the epidemiology and mechanisms of ocular trauma | Dr. Tariq Marwat | MCQs SAQs |
| | | 2 | Closed globe injury | <u>Cognitive</u> Describe clinical features of closed globe injury | Dr. Tariq Marwat | MCQs SAQs |
| | | 3 | Open Globe injury / IOFB/ Sympathetic Ophthalmitis | <u>Cognitive</u> Explain open globe injury with and without intraocular foreign body Define sympathetic ophthalmitis, its clinical features and treatment plan | Dr. Tariq Marwat | MCQs SAQs |
| | | 4 | Eye lid, orbital radiation, thermal & chemical injuries | <u>Cognitive</u> Enumerate eyelid, orbital and thermal features of ocular trauma Define chemical injuries, classification & treatment <u>Affective</u> Comply in patients having eye trauma | Dr. Nazullah | MCQs SAQs |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|--------------------|--------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|
| | H/ Night blindness | 1 | Night blindness Retinitis Pigmentosa and Vitamin "A" | Differentiate different causes of night blindness Discuss clinical features, types and management of patients with retinitis pigmentosa Describe the effects of Vitamins on eye and Vitamin "A" deficiency. | Prof. Dr. Sanaullah Jan | MCQs SAQs |

| | | | | | | |
|--|------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|
| | i) Sudden painless loss of visual acuity | 1 | Overview of sudden painless visual loss central retinal vein occlusion (CRVO) and Central retinal artery occlusion (CRAO) | Differentiate different causes of sudden painless loss of vision Discuss risk factors, clinical features and treatment of CRVO. Describe clinical features of CRAO | Prof. Dr. Sanaullah Jan | MCQs SAQs |
| | | 2 | Retinal detachment | <u>Cognitive</u> Define retinal detachment and its different types Describe the clinical features and management of rhegmatogenous retinal detachment <u>Psychomotor</u> Perform direct Ophthalmoscopy | Prof. Dr. Sanaullah Jan | MCQs SAQs OSCE |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|---------------------------------|--------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|
| | J) Gradual painless visual loss | 1 | An overview of gradual painless visual loss, vitreous hemorrhage vitreous detachment and diabetic eye disease | <u>Cognitive</u> Differentiate between different causes of gradual painless visual loss. Discuss vitreous hemorrhage and posterior vitreous detachment Describe the pathogenesis clinical features, investigations and management of diabetic eye disease | Prof. Dr. Sanaullah Jan | MCQs SAQs |
| | | 2 | Retinoblastoma & choroidal melanoma | <u>Cognitive</u> Enlist the pathophysiology and clinical features and management of | Prof. Dr. Sanaullah Jan | MCQs SAQs |

| | | | | | | |
|--|--|---|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| | | | | retinoblastoma Enumerate the clinical presentation & management plan of a patient with choroidal melanoma | | |
| | | 3 | Optic neuropathies | <u>Cognitive</u> Differentiate various types of hereditary, nutritional and toxic optic neuropathies | Dr. Mushtaq Ahmed | MCQs SAQs |
| | | 4 | Papilloedema | <u>Cognitive</u> Describe the pathogenesis, its clinical features and management | Dr. Mushtaq Ahmed | MCQs SAQs |
| | | 5 | Age related cataract | <u>Cognitive</u> Discuss various types, clinical features of a patient with age related cataract Describe the various investigations and treatment of a patient with age related cataract <u>Psychomotor</u> Perform distant direct ophthalmoscopy independently | Dr. M. Zia ud Din Khalil | MCQs SAQs OSCE |
| | | 6 | Cataract surgery and hypertensive retinopathy | <u>Cognitive</u> Describe the types and indications for cataract surgery Enlist various complications of cataract surgery Enumerate retinal findings of hypertensive retinopathy. <u>Psychomotor</u> Perform blood pressure checkup for a patient with hypertensive retinopathy and cataract surgery. | Dr. M. Zia ud Din Khalil | MCQs SAQs OSCE |

| | | | | | | |
|--|--|---|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|
| | | 7 | Primary open angle glaucoma (POAG) and ocular hypertension | <u>Cognitive</u> Describe the clinical features and treatment of a patient with POAG and ocular hypertension <u>Psychomotor</u> Perform palpation tonometry | Dr. Nazullah | MCQs SAQs OSCE |
| | | 8 | Optic nerve, optic chiasma and optic tract and visual pathways | <u>Cognitive</u> Discuss the neuro- anatomy and neuro physiology of vision – optic nerve, optic chiasma and optic tracts Explain visual pathways and visual field defects <u>Psychomotor</u> Illustrate and draw normal optic disc and retina | Dr. Mushtaq Ahmed | MCQs SAQs OSCE |
| | | 9 | Corneal ectasia dystrophy and degeneration | <u>Cognitive</u> Describe corneal ectasia dystrophy and degeneration | Dr. Omer Khan | MCQs SAQs |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|
| | K) Painful visual loss | 1 | An overview of patients with painful visual loss and acute angle closure glaucoma | <u>Cognitive</u> Differentiate between various causes of painful visual loss. Describe the clinical features and management of acute angle closure glaucoma | Dr. Nazullah | MCQs SAQs |
| | | 2 | Optic neuritis | <u>Cognitive</u> Enumerate the clinical features, investigations and treatment of optic neuritis. | Dr. Mushtaq Ahmed | MCQs SAQs |
| | | 3 | NVG, LIG, endophthalmitis and panophthalmitis | Define NVG, LIG, endophthalmitis and panophthalmitis Discuss their management plan | Dr. Yousaf Jamal Mahsood | MCQs SAQs |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-----------------|--------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|
| | I) Crossed eyes | 1 | Overview of crossed eyes, squint | <u>Cognitive</u> Differentiate different causes of crossed eyes Explain clinical evaluation for squint Discuss management plan for a patient with squint <u>Psychomotor</u> Perform cover and uncover test | Prof. Dr. M. Naeem Khan | MCQs SAQs OSCE |
| | | 2 | Amblyopia | <u>Cognitive</u> Describe amblyopia, its importance and management <u>Psychomotor</u> Perform visual acuity for distance and near and with a pinhole | Prof. Dr. M. Naeem Khan | MCQs SAQs OSCE |
| | | 3 | Concomitant squint | <u>Cognitive</u> Discuss the clinical features and management of concomitant squint | Prof. Dr. M. Naeem Khan | MCQs SAQs |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|-------------|--------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|
| | M) Diplopia | 1 | Overview of diplopia and incomitant squint | Differentiate different causes of diplopia Describe clinical features of incomitant or paralytic squint | Prof. Dr. M. Naeem Khan | MCQs SAQs |
| | | 2 | Myasthenia gravis and migraine | Discuss clinical features & treatment of myasthenia Explain migraine headaches | Dr. Afzal Qadir | MCQs SAQs |

| Module | Theme | S. No. | Topic | Learning Objective / Outcomes | Teacher/ | Assessment methods |
|--------|------------------------|--------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|
| | n) Childhood blindness | 1 | Overview of childhood blindness and congenital glaucoma | <u>Cognitive</u> Define blindness Differentiate causes of children blindness Describe pathophysiology, clinical features and management of congenital glaucoma | Dr. Yousaf Jamal Mahsood | MCQs SAQs |
| | | 2 | Treatment of Glaucoma | <u>Cognitive</u> Discuss different lasers used for treatment of glaucoma Explain the salient features of surgical treatment of glaucoma | Dr. Yousaf Jamal Mahsood | MCQs SAQs |
| | | 3 | White pupil | Differentiate between different causes of white pupil Enumerate the main features of its management | Dr. Afzal Qadir | MCQs SAQs |
| | | 4 | Congenital cataract | Discuss the main types and features of congenial cataract Describe its management plan | Dr. Afzal Qadir | MCQs SAQs |

GENERAL LEARNING OUTCOMES/ OBJECTIVES OF THE COURSE

A) To equip students with essential knowledge, skills and attitudes to enable them:-

- 1) Identify ophthalmic diseases including emergencies, provide primary eye care, refer to appropriate centre and to provide follow-up to the patients.
- 2) Perform essential minor surgical procedures.
- 3) Communicate effectively with the patient, the family and the community regarding eye diseases and its related issues.
- 4) Understand medical ethics and its application pertaining to ophthalmology and maintain the confidentiality of the patient.
- 5) To understand the prevalence and prevention of the common public health problems related to ophthalmology in the community.
- 6) Understand the principles of medical research including fundamentals of information technology.

B) Tutorial / small group discussions

Besides large group format lectures, the student go through small group discussions in the form of tutorials which are as under:-

Competencies to be achieved

A History

- Chief complaint
- Present illness
- Past ocular history
- Ocular medications
- General medical and surgical history
- Systemic medications
- Allergies
- Social history
- Family history

B clinical examination

- Visual acuity – distance & near
- Lid
- Lacrimal sac
- Conjunctiva
- Cornea
- Anterior chamber
- Iris
- Lens
- Fundus

C) Psychomotor Skills to be achieved

- a. Visual acuity { Distance
Near
- b. Pinhole test
- c. Examination of adnexa and anterior segment of the eye with a torch / slit lamp examination
- d. Use of fluorescein and schirmer strip
- e. Eversion of upper eyelid
- f. Lacrimal regurgitation test
- g. Extra ocular movements
- h. Detection of the deviated eye (cover uncover test)
- i. Test for pupillary reflexes
- j. Measurement of intra ocular pressure
Palpation assessment / digital tonometry
Schiotz tonometer
- k. Direct ophthalmoscopy
- l. Indirect ophthalmoscopy
- m. Retinoscopy with plane mirror
- n. Confrontation test
- o. Use of trial lens box

d) Procedures:

- a. Irrigation of eye
- b. Instillation of eye drops
- c. Staining of corneal ulcer
- d. Removal of superficial foreign bodies
- e. Rational use of topical anaesthesia
- f. Removal of sutures
- g. Lacrimal probing
- h. Punctal dilation
- i. Irrigation of lacrimal passages (syringing)

E) Familiarization with

- a. B-Scan
- b. Biometry
- c. Fundus fluorescein Angiography
- d. Optical Coherence Tomography (OCT)
- e. Slit-lamp
- f. Corneal pachmetry
- g. Fundus camera

F) Student should have basic knowledge of

- a. Pterygium surgery
- b. Incision and curettage of chalazion
- c. Cataract surgery
- d. Dacryocystorhinostomy
- e. Corneo-scleral repair
- f. Lid repair
- g. Squint surgery
- h. Trabeculectomy / peripheral iridectomy
- i. Enucleation
- j. Evisceration
- k. Exenteration
- l. Retinal detachment surgery

TEACHING AND LEARNING STRATEGIES

The following teaching / learning methodologies are utilized for students learning

- Interactive lectures in the form of large group format (LGF)
- Small group discussion (SGD)
- Case based discussion (CBD)
- Clinical rotation
- Skills session
- Task oriented learning (TOL)
- Self directed learning (SDL)
- Tutorial, CPCs, & seminars
- Clinical rotations

COMPETENCIES LEVEL

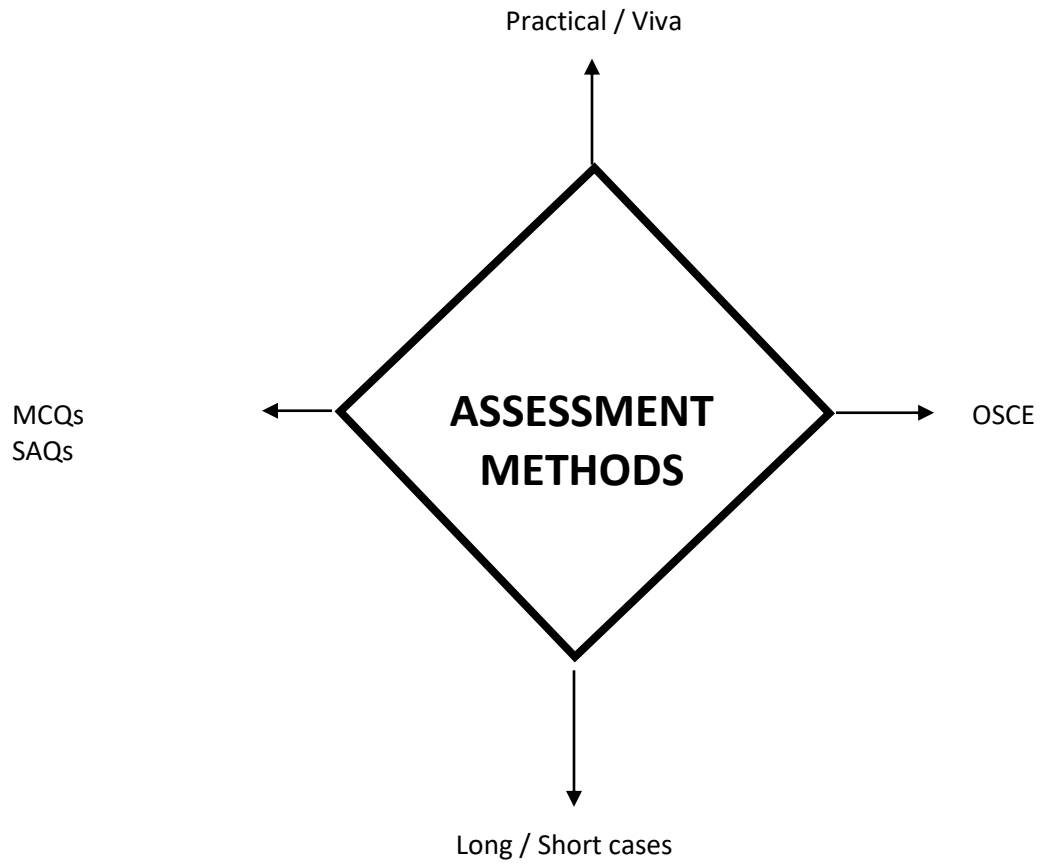
The student's competencies level is determined from

- a. Cognitive domain
 - b. Psychomotor skills
 - c. Affective domain
- a. The cognitive domain involves knowledge and the development of intellectual skills. There are six major categories of cognitive domain, starting from the simplest to the most complex.
- Knowledge
 - Comprehension
 - Application
 - Analysis
 - Synthesis
 - Evaluation

These are graded from C1, to C6

- b). Psychomotor skills includes physical movement , co-ordination and the use of motor skill areas. These skills are graded from P1 to P4 which are
- Observation
 - Assistance
 - Performing the skill under supervision
 - Performing the skill independently
- c). Affective domain involves our feelings, emotions and attitudes. This domain is graded from A1 to A5 and includes
- Receiving
 - Responds
 - Valuing
 - Organization
 - Characterization

EVALUATION AND ASSESSMENT METHODS



A)

1. MCQs

One best choice MCQs are used to assess objectives covered in the module. These MCQs has a statement or clinical scenario followed by five options (all answers correct). Student select “one appropriate response from the given options. Correct answer carries one mark, and incorrect “Zero mark” . There is no negative marking.

2. SAQs

In “SAQ” also called Short Answer Questions, there is a statement or scenario. This is followed by three to five short answer questions. The student is required to answer appropriately avoiding unnecessary details. Each question has its own marks.

3. OSCE

In OSCE or “Objectively Structured Clinical Examination” there are 12—15 stations.

Each student will be assessed on the same content and have same time usually 5—7 minutes to complete the task. Each student will be assessed through a variety of clinical tasks, which may include eye history taking, physical examination, skills, and application of skills and knowledge. Some stations are interactive, observed / unobserved and rest stations. In interactive station students are assessed by internal or external examiners through structured viva or tasks.

In unobserved stations there will be a coloured photograph of a case or OCT, Visual field or a video clip. The student is supposed to assess the case and answer the given underlying questions on the prescribed answer sheet.

At rest stations there is no task given. This time should be properly utilized by the student to organize his / her thoughts for the next station.

Internal assessment

The internal or summative assessment is carried at the end of the module in the form of MCQs, SAQs and OSCE.

There are 45 MCQs of “one best choice” variety and 12 SAQs with a scenario followed by three to five short questions. In OSCE 12 stations are provided, with seven interactive, five unobserved stations and two to four rest stations. Of the overall assessment 10, marks are reserved for the internal assessment.

EXAMPLES OF SAQs, MCQs & OSCE

SAQs

Q.No. 1 A 65 years female presents with foreign body sensation in the right eye for three months. Clinically the whole lower lid is inverted and eye lashes are touching the cornea.

| | Marks |
|-------------------------------------------|--------------|
| • What is your diagnosis? | 1 |
| • What are its different types? | 2 |
| • Name its three important complications? | 3 |
| • How you treat this patient? | 4 |

2

Key (answers to SAQ)

Q. No.1 (Ans)

| | Marks |
|----------------------------------|-------|
| i) Rt Involutional entropion | 1 |
| ii) Involutional entropion | 2 |
| Cicatricial entropion | |
| Mechanical entropion | |
| Congenital entropion | |
| iii) Corneal punctate kerpopathy | 3 |
| Corneal vascularization | |
| Corneal ulcer / Pannus | |
| iv) Conservative | 4 |
| • Lubricants | |
| • Lid everting sutures | |
| Surgical | |
| • Weis / Quikert procedure | |
| • Jones plication | |
| • Lateral tarsal strip | |

3

Q. No.2 A 70 years male presents with watering of Lt eye for the last two months. The Lt eye looks congested. The Lt lower lid is turned out and lower punctum being not in contact with globe?

| | Marks |
|--------------------------------------|--------------|
| • What is your diagnosis? | 1 |
| • List its four different types? | 2 |
| • Enumerate its three complications? | 3 |
| • How you treat this patient? | 4 |

Key (answers to SAQ)

Q. No.2 (Ans)

| | Marks |
|-----------------------------------------------------------------------------|-------|
| i) Involutional ectropion | 1 |
| ii) Involutional ectropion | 2 |
| Mechanical ectropion | |
| Cicatricial ectropion | |
| Paralytic ectropion | |
| Congenital ectropion | |
| iii) | |
| • Keratinization | 3 |
| • Recurrent infections | |
| • Cosmetic blemish | |
| iv) Conservative | 4 |
| • Lubricants | |
| • Treatment of underlying cause (steroids and acyclovir in Bell's palsy) | |
| • Surgical | |
| Medical canthal laxity | |
| Medical canthoplasty or tightening procedure | |
| • Generalized lower lid laxity | |
| • Lazy T or Laser | 5 |
| • Kunt Szamamosky procedure or lateral tarsal strip | |

MCQs

- 1) A 16 years boy presented with trauma while playing cricket. Clinical examination revealed visual acuity of 6/6 in both eyes. Extraocular movements were limited superiorly in the right eye with vertical diplopia. The single most important test for evaluation of damage in blow out fracture of the orbit would be?
- a) B – Scan
 - b) CT – Scan orbit
 - c) Diplopia test
 - d) Force duction test
 - e) Hess test

10

Correct ans: b

- 2) A mother brings her three months baby with capillary hemangioma of Rt upper lid. The most effective treatment for this condition is?
- a) Intralesional Avastin injection
 - b) Intralesional steroid injection
 - c) Laser ablation
 - d) Oral propranolol therapy
 - e) Surgical excision

12

Correct ans: d

OSCE

Task

Anterior segment examination of the eye with a Torch

Domain
OSCE Pattern

Psychomotor
Pilot station

Perform anterior segment examination of the eye with a torch

25

Instructions to the examiner

A Student will perform anterior segment examination of the eye with a torch

Examiner

Give marks as in the marking key provided

26

Instructions to the student

- The task should be completed in 5 minutes
- Display your identity card
- Do not bring mobile phone during exam

Task

Your task is to perform anterior segment examination of the eye with a torch

Marking Key

| S.No | Components | Component score | Award score |
|------|----------------------------------------------|-----------------|-------------|
| 1. | Meet, greet and consent | 1.0 | |
| 2. | Inspection | 1.0 | |
| 3. | Eyelids and margin | 1.0 | |
| 4. | Conjunctiva- palpebral, bulbar and forniceal | 1.0 | |
| 5. | Sclera | 0.5 | |
| 6. | Cornea | 1.0 | |
| 7. | Depth of anterior chamber | 0.5 | |
| 8. | Iris | 1.0 | |
| 9. | Pupil size and reflexes | 1.5 | |
| 10. | Lacrimal regurgitation test | 1.5 | |

Task

Pupillary examination

Domain
OSCE Pattern

Psychomotor
Pilot station

30

Instructions to the examiner

A Student will perform pupillary examination

Examiner

Give him marks as in marking key provided

31

Instructions to the student

- The task should be completed in 5 minutes
- Display your identity card
- Do not bring mobile phone during exam

Task

Your task is to perform pupillary examination

Marking Key

| S.No | Components | Component score | Award score |
|------|-----------------------------------------|-----------------|-------------|
| 1. | Meet, greet and consent | 0.5 | |
| 2. | Inspection of eye, neck, chest and hand | 1 | |
| 3. | Pupil size, shape centration | 1 | |
| 4. | Heterochromia | 0.5 | |
| 5. | Pupillary – reflexes | | |
| | a) Light response | 2 | |
| | b) Consensual response | 2 | |
| 6. | Accommodation response | 2 | |
| 7. | Swinging flashlight test | 1 | |

Learning resources

Although PMC has not recommended any specific book for Ophthalmology, we recommend the following books of Ophthalmology for the students of KGMC.

Basic Books

| S. No | Book Name | Author | Edition |
|--------------|------------------------------------------|-----------------------------------|--------------------------|
| 1 | Clinical Ophthalmology Text and Atlas | Shafi M. Jatoi | 6 th Edition |
| 2 | Parson's Diseases of the Eye | Ramanjit Sihota Radhika Tandon | 22 nd edition |
| 3 | Comprehensive Ophthalmology | A.K Khurana | 5 th edition |

Reference books

| | | | |
|---|----------------------------------|--------------------|-------------------------|
| 1 | Kanski's Clinical Ophthalmology | Brad Bowling | 8 th Edition |
| 2 | Oxford handbook of Ophthalmology | Philips and Murray | 3 rd Edition |

For Clinical methods visit Chua Website (www.mrcophth.com)

THANKS

“Study hard, for the well is deep, and our brains are shallow”

(Richard Baxter)

“Successful people are not gifted. They just work hard, then succeed on purpose”

(Liam Porritt”