

Part 1 FRCOphth Sample MCQs



1. Anatomy and Embryology

With regard to the inner nuclear layer of the retina, which statement is LEAST likely to be correct?

- A. Amacrine cells have their cell bodies along the border with the inner plexiform layer
- B. Bipolar cell bodies occupy the border with the outer plexiform layer
- C. It contains the nuclei of the Müller's cells
- D. The cell bodies of the horizontal cells lie mainly along the border of the inner nuclear layer and the outer plexiform layer

Correct Response: B

With regard to the extraocular muscles, which statement is LEAST likely to be correct?

- A. All the rectus muscles arise from the annulus of Zinn
- B. The ciliary ganglion lies between the lateral rectus and the optic nerve
- C. The inferior oblique muscle passes between the globe and the inferior rectus
- D. The medial rectus inserts at an average of 5.5mm from the corneal limbus

Correct Response: C

With regard to the human lens, which statement is MOST likely to be correct?

- A. The lens absorbs most light outside the visible spectrum, especially in the ultraviolet range
- B. The lens epithelial cells have neither nuclei nor mitochondria
- C. The lens is made up of approximately 60% soluble proteins
- D. The posterior epithelium is the source of new cells for the lens

Correct Response: A

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With regard to the blood supply to the visual pathway, which statement is LEAST likely to be correct?

- A. The anterior choroidal artery supplies the optic tract
- B. The calcarine artery is a branch of the posterior cerebral artery
- C. The lateral striate artery supplies the optic radiations
- D. The posterior communicating artery connects the posterior cerebral artery and the middle cerebral artery

Correct Response: D

With regard to the anatomy of the eyelids, which statement is MOST likely to be correct?

- A. Muller's muscle arises from the inferior part of the aponeurosis of levator palpebrae superioris muscle
- B. The infraorbital branch of the maxillary nerve supplies the entire lower eyelid
- C. The lateral palpebral artery is derived from the ophthalmic artery
- D. The lymphatic drainage from the lateral canthus is to the submandibular nodes

Correct Response: A

With regard to the optic nerve, which statement is MOST likely to be correct?

- A. It is completely myelinated at the time of full term birth
- B. It is ensheathed by epineurium, perineurium and endoneurium
- C. Schwann cells within the optic nerve are responsible for maintaining myelination
- D. The sub-arachnoid space is much narrower in the intracanalicular part than the orbital part

Correct Response: D

The external (dorsal) nasal nerve is a branch of which of these nerves?

- A. Infraorbital nerve
- B. Maxillary division of the trigeminal nerve
- C. Ophthalmic division of the trigeminal nerve
- D. Supra trochlear nerve

Correct Response: C

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With regard to the anatomy of the lacrimal sac, which statement is MOST likely to be correct?

- A. It is lateral to the angular vein
- B. It is only related to the medial palpebral ligament posteriorly
- C. It lies adjacent to the superior meatus of the nose
- D. It lies in the lacrimal fossa

Correct Response: D

Which ONE of these foraminae is found in the middle cranial fossa?

- A. Caecum
- B. Jugular
- C. Lacerum
- D. Magnum

Correct Response: C

With regard to the sclera, which statement is LEAST likely to be correct?

- A. It consists of regularly spaced collagen fibres
- B. It fuses posteriorly with the dural sheath of the optic nerve
- C. It is pierced by the vortex veins posterior to the equator
- D. It is thinnest behind the insertions of the rectus muscles

Correct Response: A

With regard to the development of periocular structures, which statement is MOST likely to be correct?

- A. The lacrimal gland is derived from ectoderm
- B. The lacrimal sac develops from surface mesoderm
- C. The orbicularis oculi is formed from the first pharyngeal arch
- D. The puncta open into the eyelid after the eyelids have opened

Correct Response: A

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2. Physiology

With regard to the chemical reactions occurring during phototransduction, which statement BEST describes the sequence which leads to an electrical response?

- A. Closure of cation channels as a result of hydrolysis of cAMP by phosphodiesterase
- B. Closure of cation channels as a result of hydrolysis of cGMP by phosphodiesterase
- C. Opening of cation channels as a result of hydrolysis of cAMP by phosphodiesterase
- D. Opening of cation channels as a result of hydrolysis of cGMP by phosphodiesterase

Correct Response: B

With regard to the human lens, which statement is LEAST likely to be correct?

- A. Major intrinsic protein of lens fibre-26 (aquaporin O) organises the packing of crystallins in lens fibre cells
- B. Secondary lens fibre cells lose their cytoplasmic organelles during differentiation
- C. Secondary lens fibre cells lose their nuclei during differentiation
- D. The lens capsule is a basement membrane

Correct Response: A

Which description of burst cells in the RIGHT horizontal gaze centre in the pons is MOST likely to be correct?

- A. They initiate a pursuit eye movement to the left side
- B. They initiate a pursuit eye movement to the right side
- C. They initiate a saccadic eye movement to the left side
- D. They initiate a saccadic eye movement to the right side

Correct Response: D

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With regard to retinal bipolar cells, which statement is LEAST likely to be correct?

- A. Acetylcholine is the major neurotransmitter that conveys excitatory signals from amacrine cells to bipolar cells
- B. Bipolar cells form synapses with rods or cones but not both
- C. GABA is a neurotransmitter that conveys excitatory signals from horizontal cells to bipolar cells
- D. Glutamate is the major neurotransmitter between photoreceptor cells and bipolar cells

Correct Response: A

With regard to the normal electroretinogram (ERG), which statement is MOST likely to be correct?

- A. A negative a wave produced by Muller cells and a positive b wave produced by photoreceptors
- B. A negative a wave produced by photoreceptors and a positive b wave produced by Muller cells
- C. A positive a wave produced by Muller cells and a negative b wave produced by photoreceptors
- D. A positive a wave produced by photoreceptors and a negative b wave produced by Muller cells

Correct Response: B

Which of these equations correctly links intraocular pressure (IOP), force applied to the cornea (F), tear meniscus force (M), corneal rigidity (N) and the area of cornea applanated (A) when using the Goldmann tonometer?

- A. $IOP = (F + M + N) / A$
- B. $IOP = (F + M - N) / A$
- C. $IOP = (F - M - N) / A$
- D. $IOP = (F - M + N) / A$

Correct Response: B

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With regard to the lacrimal gland and its secretions, which statement is MOST likely to be correct?

- A. Basal secretion occurs via an Na^+/K^+ ATPase pump
- B. Mucin is a significant component of the secretion
- C. Secretion is upregulated by sympathetic neural stimulation
- D. The lacrimal gland has a basal secretion of $100 \mu\text{l}/\text{minute}$

Correct Response: A

Which ONE of these combinations of muscles constitutes a yoke pair?

- A. Right superior rectus and left inferior oblique
- B. Right superior rectus and left superior oblique
- C. Right superior rectus and right inferior oblique
- D. Right superior rectus and right superior oblique

Correct Response: A

Which ONE of these hormones is secreted from the anterior pituitary gland?

- A. Adrenocorticotrophic Hormone
- B. Oxytocin
- C. Somatostatin
- D. Vasopressin

Correct Response: A

Which ONE of these statements BEST describes Sherrington's law?

- A. Each movement of the eye from the primary position to any other position involves a rotation around a single axis lying in the equatorial plane
- B. To each position of the line of sight belongs a definite orientation of the horizontal and vertical retinal meridians relative to the coordinates of space
- C. Whenever an agonist receives an impulse to contract, an equivalent inhibitory impulse is sent to its antagonist, which relaxes and lengthens
- D. Whenever an impulse to initiate an eye movement is sent out, corresponding muscles of each eye receive equal innervations to contract or relax

Correct Response: C

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3. Pathology

Which ONE of these is an early pathological feature of diabetic retinopathy?

- A. Capillary basement membrane thinning
- B. Increased retinal blood flow
- C. Loss of capillary pericytes
- D. Retinal capillary closure

Correct Response: C

With regard to basal cell carcinomas, which statement is MOST likely to be correct?

- A. In the eyelid they may arise from the gland of Moll
- B. Neglected medial canthal lesions are at risk of orbit extension
- C. Regional lymph node metastases are more common than for sebaceous gland carcinoma
- D. The margins of the sclerosing subtype can be easily defined by palpation

Correct Response: B

Xeroderma pigmentosum is associated with which ONE of these?

- A. Decreased liver function
- B. Failure of DNA repair
- C. Ocular albinism
- D. Tyrosinase deficiency

Correct Response: B

With regard to pathological changes in cells and tissues, which statement is MOST likely to be correct?

- A. Atrophy is a decrease in cell size or number
- B. Differentiation is the extent to which tumour cells resemble each other
- C. Hypertrophy is an increase in cell number
- D. Metaplasia is loss of uniformity of individual cells as well as their architectural orientation

Correct Response: A

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With regard to the pathogenesis of tumours, which statement is MOST likely to be correct?

- A. Choroidal melanoma is the most common tumour to result from inactivation of the retinoblastoma (Rb) tumour suppressor gene
- B. Chromosomal translocations have been identified in some malignant lymphomas
- C. In situ carcinomas have invaded through basement membranes but have not metastasized
- D. Most oncogenes inhibit apoptosis

Correct Response: B

Which of these routine culture media is MOST appropriate for the culture of Neisseria gonorrhoea?

- A. Blood agar
- B. Chocolate agar
- C. Lowenstein Jensen medium
- D. MacConkey's agar

Correct Response: B

With regard to toll receptors, which statement is LEAST likely to be correct?

- A. Each cell type expresses a different toll receptor
- B. Lymphocytes involved in adaptive immunity express toll receptors
- C. They are major mediators of innate immunity
- D. They are present on all cells

Correct Response: A

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With regard to cutaneous squamous cell carcinoma, which statement is MOST likely to be correct?

- A. It can spread to local lymph nodes
- B. It has an amyloid rich stroma
- C. It is the commonest malignant tumour of the eyelid in Europe
- D. It typically has a pallisaded histological appearance

Correct Response: A

Which ONE of these is NOT one of the cellular mechanisms for ageing and death?

- A. Cross-linking of DNA
- B. Free radical generation
- C. Telomere lengthening
- D. Time-dependent activation of ageing and death genes

Correct Response: C

Autoimmune disease may be caused by a defect in which ONE of these?

- A. Immune complex formation
- B. MHC Class II antigens
- C. Topoisomerase
- D. T regulatory cells

Correct Response: D

4. Pharmacology

Which ONE of these drugs is MOST likely to cause an optic neuropathy?

- A. Chloroquine
- B. Ethambutol
- C. Thioridazine
- D. Vigabatrin

Correct Response: B

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With regard to the action of botulinum toxin on cholinergic transmission, which statement is MOST likely to be correct?

- A. It acts as a competitive acetylcholine receptor antagonist
- B. It acts as a depolarising neuromuscular blocking agent
- C. It acts as a non-depolarising neuromuscular blocking agent
- D. It acts as an inhibitor of acetylcholine release from the presynaptic membrane

Correct Response: D

With regard to the mechanism of action of penicillin, which statement is MOST likely to be correct?

- A. It binds to cell membrane phospholipids, increasing membrane permeability
- B. It binds to the 50S subunit of bacterial ribosomes to block peptidyl transferase
- C. It inhibits DNA gyrase to interfere with DNA synthesis
- D. It inhibits peptide cross-linking of the polysaccharide chains of peptidoglycan

Correct Response: D

With regard to the action of dexamethasone, which statement is MOST likely to be correct?

- A. It increases production of leukotrienes
- B. It increases production of phospholipase A2
- C. It increases synthesis of lipocortin
- D. It increases the release of arachidonic acid

Correct Response: C

A patient has developed a Horner's syndrome due to dissection of the right carotid artery. Cocaine drops are applied to each eye. Which ONE of these statements is CORRECT?

- A. The right pupil dilates because of denervation hypersensitivity
- B. The right pupil dilates because of stimulated release of noradrenaline
- C. The right pupil does not dilate because of blockage of alpha receptors
- D. The right pupil does not dilate because of lack of noradrenaline in the synaptic cleft

Correct Response: D

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5. Genetics

With regard to the mechanism by which pyridostigmine can reduce the symptoms of muscle fatigue in myasthenia gravis, which statement is MOST likely to be correct?

- A. It blocks reuptake of acetylcholine by the pre-synaptic membrane
- B. It inhibits the breakdown of acetylcholine
- C. It stimulates the release of acetylcholine from pre-synaptic vesicles into the synapse
- D. It stimulates upregulation of muscarinic receptors in the post-synaptic membrane

Correct Response: B

With regard to X-linked inheritance, which statement is MOST likely to be correct?

- A. Daughters of a carrier female have a 100% risk of being carriers
- B. Daughters of an affected male have a 50% risk of being carriers
- C. Sons of an affected male have a 50% risk of being affected
- D. Sons of an affected male will not be affected

Correct Response: D

6. Optics

Which ONE of these instruments utilises the optical principal of total internal reflection?

- A. Endolaser fibreoptic probe
- B. Focimeter
- C. Koeppel gonioscope
- D. Prism bar

Correct Response: A

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In hypermetropic anisometropia, aniseikonia can be reduced by which ONE of these methods?

- A. Decreasing the distance between the spectacle lens and cornea
- B. Increasing the front curvature of the spectacle lens without changing the lens power
- C. Reducing the thickness of the spectacle lens without changing the lens power
- D. Using high refractive index glass

Correct Response: A

With regard to Purkinje-Sanson Images (catoptric), which statement is MOST likely to be correct?

- A. All of the images are virtual
- B. One image is inverted
- C. The dimmest image is reflected from the anterior lens surface
- D. The image from the front of the cornea is in front of the image from the back of the cornea

Correct Response: B

With regard to the compound microscope, which statement is MOST likely to be correct?

- A. It can be used as a low vision aid
- B. Rays leaving the system are convergent
- C. The eye-piece lens must be stronger than the objective lens
- D. The first image is real

Correct Response: D

With regard to the use of a Porro prism, which statement is MOST likely to be correct?

- A. It is stuck onto glasses to correct strabismus
- B. It is to double the image in some instruments
- C. It is to obtain a magnified image in some instruments
- D. It is to shorten the length of some instruments

Correct Response: D

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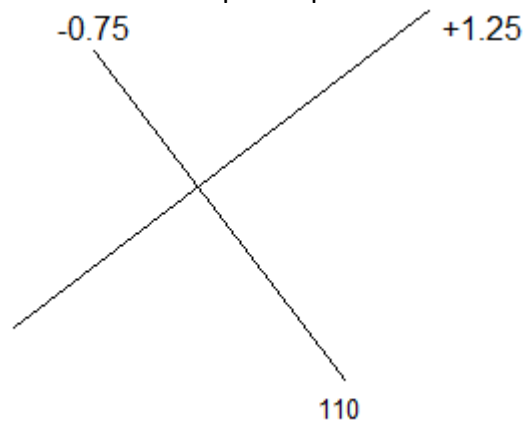
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Which IOL power formula requires a measured anterior chamber depth (ACD)?

- A. Haigis
- B. Hoffer Q
- C. Holliday 1
- D. SRK-T

Correct Response: A

Which of these is the correct prescription format of this power cross?



- A. -0.75/+2.00@20
- B. -0.75/+2.00@110
- C. -0.75/+1.25@110
- D. -0.75/+1.25@20

Correct Response: B

With regard to spherical aberration, which statement is MOST likely to be correct?

- A. A concave lens causes light passing through the periphery of the lens to be refracted more than when passing through its centre
- B. It is least in a plano-convex lens when the plane surface faces the object
- C. It is reduced in the eye by the decreasing radius of curvature towards the periphery of the cornea
- D. It may be reduced by decreasing the aperture in front of the lens

Correct Response: D

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With regard to the calculation of the power of the lens to be implanted during cataract surgery, which statement is MOST likely to be true?

- A. Axial length values as measured by ultrasound are slightly higher than when optical (partial coherence interferometry) techniques are used
- B. Excess pressure applied to the cornea during A-scan axial length measurement may lead to unintended postoperative myopia
- C. Keratometry values are not influenced by recent contact lens wear
- D. To achieve the same refraction, the power of an anterior chamber lens needs to be approximately two dioptres greater than the power of a posterior chamber lens

Correct Response: B

7. Investigations

All individuals presenting to a local eye department with soft macular drusen were enrolled in a study and information gathered on their diet, smoking habits and alcohol consumption in the previous year. For comparison a group of patients with nuclear cataract were also asked about their diet, smoking habits and alcohol consumption. Which of the following study designs BEST describes this study.

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

Correct Response: A

Which of these values represents the logMAR equivalent of a visual acuity of 6/6?

- A. 0.0
- B. 0.1
- C. 0.66
- D. 1.0

Correct Response: A

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With regard to investigations for the diagnosis of thyrotoxicosis, which statement is MOST likely to be correct?

- A. Microsomal antibodies are rarely elevated
- B. The T3 is a less sensitive measure than T4
- C. The TSH level is low
- D. Thyroglobulin autoantibodies are lower than normal

Correct Response: C