

Program	Institute
Master of Optometry (M. Optom)	Manipal College of Health Professions (MCHP), Manipal

Department Test (DT) 2022 Details

- Test Duration: 60 minutes
- Total Questions: 60 MCQs
 - Basic Sciences (5 Qs), Visual optics (5 Qs), Optometric Instrumentation & Clinical Examination (10 Qs), Optometric & Dispensing Optics (5 Qs), Contact Lens (8 Qs), Binocular Vision & pediatric Optometry (7 Qs), Ocular Diseases (10 Qs) & Low Vision (5 Qs)
- Max Marks: 60
- Marking Scheme: **No Negative marking**
- Schedule & Mode: Refer www.manipal.edu/dt for updates

BASIC SCIENCES

Ocular anatomy, Neuro anatomy, Ocular physiology, biochemistry, microbiology and pathology, Anatomy & Physiology of Anterior eye and Adnexa- Conjunctiva, Sclera & Limbus, Orbit, Ocular Adnexa & Lacrimal system, Cornea, Anterior Chamber & Aqueous Humor, Uvea : Iris, Ciliary body & Choroid, Crystalline Lens, Anatomy & Physiology of Posterior eye- Posterior Chamber & Vitreous Humor, Retina, Protective mechanisms and coats of the eye ball, Blood Supply to the eye ball, Eye movement pathways, Extraocular Muscles, Cranial Nerves, Visual pathway: Central & cerebral lesions, Ocular Embryology, Cornea: Biochemical composition of all layers, Corneal metabolism – nutrient uptake, metabolic pathways, barrier functions, Lens: Biochemical composition, glucose utilization- sorbitol pathways, Glutathione and ascorbic acid transport Cataract formation: aging changes, sugar cataract, cataract and ascorbic acid, Retina: Pigment epithelium-structure-composition photoreceptor cells, rhodopsin, lipids renewal, choroidal metabolism and function, Vitamin A- retinal function and metabolism Retinal neurochemistry & Biochemical correlates of retinal diseases

VISUAL OPTICS

Review of Geometrical Optics: Vergence and power, Conjugacy, Object space and image space, Sign convention, Spherical refracting surface, Spherical Mirror, Catoptric power, Thick lens, Magnification, Aberration and application-Spherical and chromatic, Strum's Conoid, Eye as an imaging instrument, Resolving power, Optics of Ocular Structures, Cornea, Aqueous, Crystalline lens & Vitreous, Schematic eye and reduced eye, Measurement of Optical constants of eye, Corneal curvature and thickness, Keratometry, Axis and angle of eye, Purkinje images, Visual acuity, Spatial and temporal resolution, Psychophysical aspects of Visual acuity chart, construction and testing, Contrast sensitivity, Refractive anomalies and their causes, Aetiology of refractive anomalies, Populating distribution of anomalies, Growth of eye in relation to refractive error, Refractive Conditions Aetiology, Optical condition types, Clinical features and management, Emmetropia and Ammetropia, Hypermetropia, Myopia, Astigmatism, Anisometropia and Aniseikonia, Aphakia and Pseudophakia Biometry, Accommodation & Presbyopia, Far and near point of accommodation, Range and amplitude of accommodation, Mechanism of accommodation, Variation of accommodation with age, Anomalies of accommodation, Presbyopia Hypermetropia and accommodation, Convergence Type, Measurement and Anomalies Relationship between accommodation and convergence-AC/A ratio, Objective Refraction (Static & Dynamic), Streak retinoscopy, Principle, Procedure, Difficulties and interpretation of findings, Transposition and spherical equivalent, Dynamic retinoscopy various methods, Radical retinoscopy and near retinoscopy, Cycloplegic refraction, Subjective Refraction, Principle and fogging, Fixed astigmatic dial(Clock dial), Combination of fixed and rotator dial (Fan and block test), J.C.C, Duochrome test, Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging, Binocular refraction-Variou techniques, Effective Power & Magnification, Ocular refraction vs. Spectacle refraction, Spectacle magnification vs. Relative spectacle, Magnification, Axial vs. Refractive ammetropia, Knapp's law, Ocular accommodation vs. Spectacle accommodation, Retinal image blur-Depth of focus and depth of field

OPTOMETRIC INSTRUMENTATION & CLINICAL EXAMINATION

Visual acuity charts- Distance and near vision contrast sensitivity chart, Construction, Design, Principle, Sensitivity & specificity, Instruments for refraction: Retinoscope (Spot Vs Streak), Autorefractometer, Photorefractor, Instruments for corneal evaluation: Placido's disc, Keratometer, Topographer, Lensometer, Optometer, Badal & Non-badal principle, Lens gauge and clock; Slit lamp Biomicroscope, Observation & Illumination system, Illumination techniques, Filters, Ultrasonography (A-Scan & Pachymeter): Principle, Procedures, Excimer laser systems: Principle, Types; History Taking, Visual Acuity Assessment (Distance & Near), Extraocular Motility, Cover tests, Modified krimsky & Hirschberg test, HVID, Pupillary Distance & Corneal sensitivity, Pupil Evaluation, Color vision Assessment, Confrontation fields, Binocular

vision status - Stereopsis, WFDT, Amplitude of accommodation, NPC, NRA/PRA, Maddox rod phoria, Slit Lamp Biomicroscopy - Illumination techniques (revision), Corneal & conjunctival staining, Van – Herick technique, Eversion of the upper eye lid, Drugs used in routine clinical practice: Topical anesthetics, Cycloplegics & mydriatics, Dyes & Lubricating drops & Instillation of eye drops, Schirmer test, TBUT, Tear meniscus height & NIBUT, Amsler test /Visual Field, Tonometry : Digital pressure & GAT, Direct Ophthalmoscopy & Fundus Biomicroscopy, Color vision charts: Ishihara chart & Farnsworth D-15 test, Instrumentation, Procedure & interpretation, Exophthalmometry: Types, Principle; Tonometer, Goldmann Applanation Tonometer, Schiottz tonometer, Instrumentation, clinical procedure, Newer developments in Tonometry, Gonioscope, Instrumentation, Principle and types, Assessment of visual field: History and development of perimeters, Humphrey Visual Field Analyser, Henson Perimeter, Fundus Biomicroscopy (+78D & +90D), Optical principle, Clinical procedure, Documentation, Ophthalmoscopes, Direct & Indirect Instrumentation, Optical principle, Clinical procedure, Documentation, Electrophysiology (ERG, VEP & EOG), Overview & recent developments of other Posterior segment diagnostic equipments (FFA, B-Scan, OCT)

OPTOMETRIC & DISPENSING OPTICS

Spectacle Lenses I: Introduction to spectacle lenses, Definition, units, terminology, Forms of lenses, spectacle tools, Spherical, Cylindrical and sphero-cylindrical lenses, Properties of crossed cylinders, Transposition of sphero-cylindrical lenses and crossed, Cylinders, Toric lenses, Toric transposition, Methods of writing prescriptions, Axis Direction of astigmatic lenses, Obliquely crossed cylinders, Spherometer Sag Formulae, Lens measure, Vertex distance and vertex power

Tilt induced power, Ophthalmic Prisms: Definition of prisms, Units of prism power, Refraction through prisms, Sign convention, Thickness difference and Base apex notations, Dividing, Compounding and Resolving prisms, Rotary prisms and effective prism power in near vision, Prismatic effect, decentration, Prentice Rule, Prismatic effect of spherical lenses, sphero-cylinders, and plano cylinders, Differential prismatic effects, Ophthalmic uses of prisms, Aberrations in Ophthalmic Lenses, Spectacle Lenses – II: Manufacture of glass, Lens materials, Lens surfacing, Principle of surface generation and glass cements, Terminology used in Lens workshop, Lens properties, Lens quality, Faults in lens material, Faults on lens surface, Methods of Inspecting the quality of lenses, Safety standards for ophthalmic lenses (FDA, ANSI, ISI), Spectacle Frames: Types and parts, Classification of spectacle frames-material, weight, temple, position, Coloration, Frame construction, Frame selection, Size, shape, mounting and field of view of ophthalmic lenses, Tinted & Protective Lenses: Characteristics of tinted lenses, Absorptive Glasses, Polarizing Filters, Photochromic & Reflecting filters/ lenses, Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses, MR series, Multifocal Lenses: Introduction, history and development, types, Bifocal lenses, Trifocal & Progressive addition lenses, Reflection from spectacle lens surface & lens coatings, Reflection from spectacle lenses - ghost images – Reflections in bifocals at the dividing line, Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating, Miscellaneous Spectacle, Iseikonic lenses, Spectacle magnifiers, Recumbent prisms, Fresnel prism and lenses, Lenticular & Aspherical lenses, High Refractive index glasses, Components of spectacle prescription & interpretation, transposition, Add and near power relation, Frame selection - based on spectacle prescription, professional requirements, age group, face shape, Measuring Inter-Pupillary distance (IPD) for distance & near, bifocal height, Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments- facial wrap, pantoscopic tilt, Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements), Neutralization - Hand & Lensometer, axis marking, prism marking, Faults in spectacles (lens fitting, frame fitting patients complaints, description, detection and correction), Final checking & dispensing of spectacles to customers, counseling on wearing & maintenance of spectacles, Accessories - Bands, chains, boxes, slevets, cleaners, screwdriver kit, Spectacle repairs - tools, methods, soldering riveting, frame adjustments, Special types of spectacle frames, Monocles, Ptois crutches, Industrial safety glasses, Welding glasses, Frame availability in Indian market, Common FAQ's by customers

CONTACT LENS

Review of Anatomy & Physiology: Tear Film, Cornea, Lids & Conjunctiva, Optics of Contact Lenses, Contact lens material properties-Physiological, Physical & Optical, Contact lens materials-Soft, RGP & silicone hydrogel, FDA Classification, Manufacturing techniques - Soft CL, Indications & Contra Indications for CL fitting, Soft CL Designs & Terminologies, Pre fitting Examinations: Work-up sheet, Steps, Procedure & Documentation, Soft CL Fitting: Selection of trial Lens, Fitting Philosophies, Steep, Flat & Optimum fitting characteristics, Finalizing lens Parameters, Toric lenses: Design, Stabilization techniques, Fitting & lens finalization, Dispensing & Handling instructions: Insertion & Removal techniques, Do's & Don'ts, Hygiene & Compliance, Contact lens wear modalities & replacement schedules, Care & Maintenance - Soft CL: Lens solutions- Components & their functions (MPS), CL case - maintenance, Hydrogen peroxide care system , Rewetting agents, Lubricating agents & Enzymatic cleaners, Follow-up visit examinations, CL Deposits, Soft CL complications, Recent updates in contact lens industry: Introduction, RGP Vs Soft, Correction of corneal irregularity using RGP lenses, Indications of RGP fit, Lens Design – RGP: Front surface design, Back surface design, Terminologies, Materials & Manufacturing: RGP materials & Properties - comparison with Soft CL, RGP manufacturing techniques, RGP lens fitting: Overview of pre-fitting examinations, Trial lens selection, Steep, flat & Optimum fitting characteristics, Static &

Dynamic fitting, Finalizing lens parameters, Ordering RGP lenses - writing a prescription to the laboratory, Parameter Verification - RGP lens: Checking & verifying received CL, Modifications possible with RGP lenses, Handling Instructions: Insertion & Removal techniques, Care & Maintenance of RGP lens, RGP lens care: RGP solutions, Components & their functions, Intensive cleaners, Follow-up visit examinations, Complications of RGP lenses, Speciality Fitting, Keratoconus & Irregular Cornea, Aphakia, Pediatric, Post Refractive surgery, Therapeutic lenses - Indications & Fitting considerations, Prosthetic & Cosmetic lenses, Bifocal & Multifocal contact lenses - An overview, Updates on contact lens research

BINOCULAR VISION & PEDIATRIC OPTOMETRY

Brief anatomy of relevant structures: Brief anatomy of orbit, Anatomy of cranial nerves of relevance with applied aspects, Anatomy of EOM, LPS and intrinsic muscles in detail, Physiology of EOM in detail, Binocular Vision and space perception

Definition, Mechanism & Development: Theories of BSV, Grades & Tests of BSV, Binocular fusion, rivalry, Summation, Visual direction & Corresponding points, Longitudinal Horopter, Panum's space & Physiological diplopia, Egocentric localization, Sensory adaptations to obstacles in BSV, Neural aspects of binocular vision, Visual distance & Monocular clues, Stereopsis, Aniseikonia, Synaptophore, Sensory Adaptations: ARC : Mechanism and common tests, Amblyopia- Definition, classification, clinical characteristics, diagnosis and treatment, Eccentric fixation, Near vision complex : Accommodation, Definition , mechanism & Types, Methods of measurement, Anomalies of accommodation-aetiology clinical features and management of each, Near Vision Complex: Convergence, Definition, mechanism, Types & components, Methods of measurement, Anomalies of convergence – aetiology, clinical features and management of each AC/A ratio - determination and clinical significance, Introduction to vision therapy, Introduction, The development of Eye & Vision, Revision - Ocular anatomy & physiology, Embryology, History taking in Pediatric subjects, Birth history (Prenatal, Perinatal & Postnatal), Ocular & family history, Genetics, Assessment of visual acuity, In infants, preschool & school going kids, Suitable visual acuity charts in each category, Documentation, Development & assessment of Binocular vision status, Extra ocular motility , Saccades & pursuits, Accommodative - Vergence system, Stereopsis, Bruckner test, Assessment of Refractive status, Mohindra retinoscopy, Cycloplegic Refraction & agents – Revision, Management of refractive error: Guidelines for correcting refractive errors in Pediatric age groups, Compensatory treatment and remedial therapy for: Myopia, Pseudomyopia, Hyperopia, Astigmatism Anisometropia & Amblyopia, Pediatric eye disorders & Management : Congenital Cataract, Congenital Glaucoma, Anterior Segment Dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism, ROP & Retinoblastoma, Spectacle dispensing for children, Pediatric Contact Lenses, Low Vision management in Children, Case analysis, Classification of neuromuscular anomalies of the eyes, Qualitative & quantitative diagnosis of strabismus, History, Examination and tests, Diagnosis & Management, Pseudo strabismus, Classification & etiology, clinical characteristics, tests & managements of Comitant esodeviations and exodeviations, A-V Phenomenon, Cyclovertical squints-DVD,DHD and cyclodeviations, Paralytic strabismus, Paralysis of individual extra ocular muscles, Clinical characteristics, diagnostic tests and management, Special forms of strabismus, Duane's retraction syndrome, Brown's syndrome, Strabismus Fixus, Fibrosis of Extra Ocular Muscles, Grave's endocrine Ophthalmopathy, Cyclic Heterotropia, Fractures of the orbital wall, Myasthenia gravis, Chronic progressive external Ophthalmoplegia, Nystagmus

Types, Etiology, Clinical characteristics & Treatment, Management of strabismus, Non surgical - Optical, Pharmacological & Orthoptics, Surgical management

OCULAR DISEASES

Lids & Adnexa, Applied Anatomy, Congenital anomalies: Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos, Oedema of the eyelids, Inflammatory disorders: Blepharitis, External, Hordeolum, Chalazion, Internal hordeolum, Anomalies in the position of the lashes and Lid, Margin: Trichiasis, Ectropion, Entropion Symblepharon, Blepharophimosis, Lagophthalmos Blepharospasm & Ptosis, Tumors: Papillomas, Xanthelasma, Haemangioma, Basal cell carcinoma, Squamous cell carcinoma sebaceous gland melanoma, Lacrimal System: Applied Anatomy & Physiology, Tear Film, The Dry Eye (Sjogren's Syndrome), The watering eye (Etiology, clinical evaluation), Dacryocystitis, Dacryoadenitis, Conjunctiva: Applied Anatomy & Physiology, Inflammations of conjunctiva: Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Degenerative conditions: Pinguecula, Pterygium, Concretions, Symptomatic conditions: Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration, Cysts and Tumors, Optics: Myopia, Hypermetropia, Astigmatism, Anisometropia, Aniseikonia, Lens: Applied Anatomy and Physiology, Classification of cataract, Congenital and Developmental cataract, Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational & Toxic), Morphological: Capsular, Subcapsular, Cortical Supranuclear, Nuclear & Polar, Management of cataract (Non surgical and surgical measures; preoperative evaluation, Types of surgeries), Complications of cataract surgery, Subluxation & Dislocation, coloboma, Lenticonus, Microspherophakia, Cornea & Sclera, Applied Anatomy and Physiology, Episcleritis & Scleritis, Congenital Anomalies: Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea, Inflammations of the cornea: Topographical, Classifications: Ulcerative keratitis and Non ulcerative, Etiological classifications: Infective, Allergic Traumatic, Idiopathic, Degenerations : classifications, Arcus senilis,

Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid, Marginal degeneration, Dystrophies : Reis Buckler dystrophy, Recurrent, corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy, Keratoconus, Keratoglobus, Corneal oedema, Corneal opacity, Corneal, Vascularization, Keratoplasty, Uveal Tract: Applied Anatomy, Classification of uveitis, Etiology & Pathology, Anterior Uveitis, Posterior Uveitis, Intermediate, Uveitis, Endophthalmitis, Panophthalmitis, Tumors of uveal tract (Melanoma), Clinical examination of Uveitis

LOW VISION

Definition, Epidemiology & Classification, Common causes of Low Vision – Corneal, Refractive media & Retina, Psychological factors; psychosocial impact of low vision, Pre-clinical evaluation of low vision patients - prognostic & History taking in Low vision (Attending in Low vision care clinic & history taking), Clinical evaluation of low vision patient, Basics of magnification & Methods of magnification in low vision, Types of low vision aids - optical aids, non-optical aids & electronic devices. (Determining the type of telescope & its magnification - Direct comparison method & calculation method, Determining the change in field of view with different magnification and different eye to lens distances with telescopes & magnifiers), Choice of tests & aids in various pathological conditions, Selection of low vision aids ,instructions & training, dispensing & prescribing aspects (Inducing visual impairment and prescribing, magnification, Determining reading speed with different types of low vision aids with same magnification, Determining reading speed with a low vision aid of different magnifications), Pediatric low vision care, Visual rehabilitation & counseling, Legal aspects of low vision in India

♣ Best of Luck ♣

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