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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **20OP2032** | **Duration** | **3hrs** |
| **Course Title** | **GLAUCOMA** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the factors influencing the mechanism of aqueous humor drain in the eye. | CO1 | A | 17 |
|  | b. | List the functions of the aqueous humor in the eye. | CO1 | R | 3 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the principles of gonioscopy, including the anatomy of angle structures, visualization techniques, and its role in assessing and classifying angle configurations in glaucoma evaluation. | CO1 | A | 17 |
|  | b. | Differentiate between direct and indirect gonioscopy. | CO1 | U | 3 |
|  |  |  |  |  |  |
| 3. | a. | Analyze the differences in pathophysiology, clinical presentation, and management strategies between primary open-angle glaucoma (POAG) and normal-tension glaucoma (NTG). | CO2 | An | 17 |
|  | b. | Discuss the treatment for primary open-angle glaucoma briefly. | CO2 | U | 3 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Analyze the pathophysiology of secondary open-angle glaucoma by identifying the underlying conditions or factors contributing to increased intraocular pressure (IOP) and optic nerve damage. | CO2 | An | 17 |
|  | b. | List the common causes of secondary open-angle glaucoma. | CO2 | R | 3 |
|  |  |  |  |  |  |
| 5. | a. | Describe the etiology of primary angle closure glaucoma (PACG), including the anatomical factors that predispose individuals to angle closure. | CO3 | R | 17 |
|  | b. | Apply medical treatment principles for an acute angle-closure attack in primary angle closure glaucoma (PACG). | CO3 | A | 3 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Recall the impact of systemic conditions like diabetes mellitus and hypertension on the development and progression of secondary open-angle glaucoma. | CO4 | R | 17 |
|  | b. | Interpret the effectiveness of medications, laser therapy, and surgical interventions in managing secondary open-angle glaucoma by comparing their outcomes, complications, efficacy, safety, and cost-effectiveness. | CO4 | An | 3 |
|  |  |  |  |  |  |
| 7. | a. | Explain the pathophysiology of developmental glaucoma, with a focus on congenital glaucoma. | CO5 | U | 17 |
|  | b. | Examine the key clinical features that differentiate congenital glaucoma from other forms of childhood glaucoma. | CO5 | An | 3 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Summarize the different juvenile glaucoma syndromes, including Axenfeld-Rieger syndrome, Peters anomaly, and aniridia-associated glaucoma. | CO5 | U | 17 |
|  | b. | Apply the principles of treatment for juvenile glaucoma syndromes to develop a management plan for a 15-year-old patient diagnosed with Axenfeld-Rieger syndrome and glaucoma. | CO5 | A | 3 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Assess a comprehensive medical management plan for a patient diagnosed with primary open-angle glaucoma. | CO6 | E | 17 |
|  | b. | Critique the potential interactions between glaucoma medications and systemic medications commonly used by elderly patients. | CO6 | E | 3 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Understand the basics of glaucoma. |
| CO2 | Attain clear knowledge on the clinical examination of glaucoma. |
| CO3 | Interpret and diagnosis the different types of glaucoma. |
| CO4 | Articulate the medical characterization of angle closure glaucoma. |
| CO5 | Detect developmental abnormality of angle of anterior chamber leading to high intraocular pressure. |
| CO6 | Adapt the proper medical treatment to normalize and control the intraocular pressure and to prevent loss of visual acuity. |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **20OP2033** | **Duration** | **3hrs** |
| **Course Title** | **PEDIATRIC OPTOMETRY AND GERIATRIC OPTOMETRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Establish the stages of normal prenatal eye development and their significance in embryology. | CO1 | A | 17 |
|  | b. | State the impact of mutations on structural abnormalities in the developing eye. | CO1 | R | 3 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Apply knowledge of genetic and environmental factors to assess their roles in influencing prenatal eye development. | CO1 | A | 17 |
|  | b. | Describe the prenatal factors that influence normal eye development. | CO1 | U | 3 |
|  |  |  |  |  |  |
| 3. | a. | Deduce the impact of vitreous and fundus abnormalities on pediatric ocular health. | CO2 | An | 17 |
|  | b. | Summarize the structural defects of the cornea, sclera, and anterior chamber due to prenatal and postnatal factors. | CO2 | U | 3 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Examine the underlying causes of common oculomotor system disorders in children and assess their functional implications. | CO2 | An | 17 |
|  | b. | List the congenital and developmental anomalies of the uveal tract and lens. | CO2 | R | 3 |
|  |  |  |  |  |  |
| 5. | a. | List the effectiveness of remedial strategies for strabismus and nystagmus in pediatric patients. | CO3 | R | 17 |
|  | b. | Apply the principles of prescribing low-vision aids to enhance visual performance in children with significant refractive errors. | CO3 | A | 3 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Recall the key differences between myopia and pseudo-myopia and their implications for treatment. | CO4 | R | 17 |
|  | b. | Analyze the effectiveness of compensatory and remedial treatment options for hyperopia, astigmatism, and anisometropia. | CO4 | An | 3 |
|  |  |  |  |  |  |
| 7. | a. | Infer the optical and refractive changes in elderly individuals and their role in presbyopia development. | CO5 | U | 17 |
|  | b. | Compare two significant geriatric optometry principles and recommend one suitable vision care strategy for aging individuals with multiple ocular conditions. | CO5 | An | 3 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Interpret the structural and physiological changes that occur in the aging eye and their impact on vision. | CO5 | U | 17 |
|  | b. | Determine the impact of macular disorders and vascular diseases on visual function in the elderly. | CO5 | A | 3 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Assess the effectiveness of various ophthalmic dispensing strategies in addressing the visual challenges faced by elderly patients. Discuss how these strategies can improve visual function and quality of life. | CO6 | E | 17 |
|  | b. | Evaluate the key factors that influence the suitability of contact lenses for elderly individuals. | CO6 | E | 3 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the principal theories of childhood and visual development |
| CO2 | Analyse a thorough pediatric history which encompasses the relevant developmental, visual, medical and educational issues |
| CO3 | Attain clear knowledge on the accommodative-vergence system to assess the pediatric eye disorders |
| CO4 | Analyse the techniques for examining visual function of children of all ages and an understanding varied management concepts of pediatric vision disorders |
| CO5 | Identify and investigate the age related changes in the eyes |
| CO6 | Demonstrate dispensing contact lens, low vision aids and referral to the surgeon |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **20OP2034** | **Duration** | **3hrs** |
| **Course Title** | **CONTACT LENS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | **Analyze** the anatomy and physiology of the cornea and **illustrate** with a labeled diagram. | CO1 | AN | 10 |
|  | b. | **Explain** the significance of preliminary evaluation before contact lens fitting. | CO1 | AN | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | **Classify** different types of contact lenses and **evaluate** their advantages and disadvantages. | CO1 | U | 10 |
|  | b. | **Describe** the key terms used in relation to the properties of contact lens materials. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | **Define** keratometry and **examine** its applications in contact lens fitting. | CO2 | U | 10 |
|  | b. | **Analyze** the indications and contraindications of contact lens usage. | CO2 | AN | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | **Demonstrate** the procedure of slit-lamp biomicroscopy and **justify** its use in contact lens fitting. | CO2 | AN | 10 |
|  | b. | **Illustrate** the correct techniques for insertion and removal of soft contact lenses. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | **Analyze** the selection criteria and **evaluate** the trial lens fitting process for soft contact lenses. | CO3 | AN | 15 |
|  | b. | **Differentiate** between Low DK and High DK materials in contact lenses. | CO3 | E | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | **Compare and contrast** the selection criteria and **assess** the trial lens fitting process in RGP lenses. | CO4 | E | 10 |
|  | b. | **Examine** different contact lens philosophies used for keratoconus patients. | CO4 | E | 10 |
|  |  |  |  |  |  |
| 7. | a. | **Assess** the evaluation process for Toric contact lenses and e**xplain** the patient selection and fitting considerations, | CO4 | E | 10 |
|  | b. | **Discuss** the therapeutic uses of contact lenses and **justify** their indications. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | **Describe** the instruments used in contact lens practice and **illustrate** their applications. | CO5 | U | 10 |
|  | b. | **Evaluate** different contact lens solutions by **analyzing** their properties and uses. | CO5 | E | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | **Analyze** the complications associated with contact lens use and **explain** their impact on ocular health. | CO6 | AN | 10 |
|  | b. | **Summarize** the key aspects of the following contact lens modalities:   * Benefits and risks of extended wear contact lenses. * Characteristics of daily continuous wear lenses. * Types of disposable contact lenses and their usage. * Role of frequent replacement contact lenses in maintaining ocular health. | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Understand the history and basics of contact lenses. |
| **CO2** | List the important properties of contact lenses. |
| **CO3** | Predict the contact lens design for various kinds of patients. |
| **CO4** | Recognize various type of contact lens fitting |
| **CO5** | Hypothesize the contact lens care procedures for the awareness of the patients |
| **CO6** | Demonstrate the instrumentation in contact lens practices. |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **20OP2035** | **Duration** | **3hrs** |
| **Course Title** | **OCCUPATIONAL OPTOMETRY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | **Differentiate** between World Health Organization and International Labor Organization in terms of their objectives and contributions to occupational health | CO1 | An | 10 |
|  | b. | **Evaluate** the significance of occupational health, hygiene, and safety in ensuring a productive workplace. | CO1 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | **Summarize** the key activities of International Labor Organization in occupational safety. | CO2 | U | 10 |
|  | b. | **Explain** the role of the National Institute of Occupational Health and the National Safety Council in workplace safety regulations. | CO1 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | **Describe** the key provisions of the Factories Act related to workplace safety. | CO2 | U | 10 |
|  | b. | **Analyze** occupational diseases caused by physical and chemical agents and suggest suitable preventive measures. | CO2 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | **Explain** the Employees’ State Insurance Act and its impact on occupational health benefits | CO2 | A | 10 |
|  | b. | Criticize the provisions and impact of the Workmen’s Compensation Act. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | **Apply** the principles of workplace ergonomics in the context of lighting, vision, and color perception. | CO3 | A | 10 |
|  | b. | **Evaluate** the causes of workplace accidents and propose strategies for their prevention | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | **Explain** the concept of hazard identification and risk assessment with real-world examples. | CO3 | A | 10 |
|  | b. | Explain the strategic plan for hazard prevention and control in an industrial setting. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the following radiations and its effect on eyes.   1. Electromagnetic radiation 2. Ionizing/non-ionizing radiation 3. Infrared radiation 4. Ultra violet radiation 5. Microwave radiation | CO4 | U | 10 |
|  | b. | **Justify** the necessity of periodic medical monitoring in high-risk occupations. | CO4 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | **Infer** the primary causes of chemical injuries and propose preventive measures. | CO5 | U | 10 |
|  | b. | Explain mechanical injury, its causes and prevention. | CO5 | U | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the visual testing standards and optometry work up for occupational job. | CO6 | U | 10 |
|  | b. | Describe the visual standards for each occupation listed below.   1. Air pilots 2. Police 3. Navy 4. Astronaut 5. Drivers | CO6 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the occupational health |
| CO2 | Identify the visual requirements in various jobs. |
| CO3 | Illustrate the effects of physical, chemical and biological hazards on eye and vision |
| CO4 | Analyze occupational causes of visual and eye problems. |
| CO5 | Prescribe suitable corrective lenses and eye protective wear to the patients. |
| CO6 | Formulate visual requirements and standards for different jobs. |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **20OP2036** | **Duration** | **3hrs** |
| **Course Title** | **SYSTEMATIC DISEASES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the Renin-Angiotensin-Aldosterone System with a neat diagram. | CO1 | U | 10 |
|  | b. | Explain the optometrist’s role in the diagnosis and treatment of hypertensive patients. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. |  | Interpret the optometrist’s role in diagnosing different stages of diabetic retinopathy. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Discuss the causes, symptoms and treatment for **Rheumatic fever.** | CO2 | U | 10 |
|  | b. | Write a note on Sydenham’s Chorea. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Discuss the clinical features of retinoblastoma. | CO2 | U | 10 |
|  | b. | Explain in detail at least five different types of cancer based on their locations in the human body. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 5. | a. | With a neat diagram, explain the anatomy of the thyroid gland and the role of the pyramidal lobe in eye-related issues. | CO3 | An | 10 |
|  | b. | Interpret the reasons for thyroid disease with details on its symptoms. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. |  | Discuss on the general aspects of Tuberculosis in detail. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 7. |  | Explain in detail malaria and its ocular manifestations. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. |  | Discuss in detail the causes, symptoms, and treatment of toxoplasmosis. | CO4 | U | 20 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the immune system and its role, including the inflammatory response. | CO5 | A | 15 |
|  | b. | Write a brief note on the five types of white blood cells (WBCs). | CO6 | A | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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| CO1 | Describe the common systematic conditions. |
| CO2 | Classify the various systematic diseases and the respective clinical examinations. |
| CO3 | Perform the clinical diagnosis of diverse systematic diseases. |
| CO4 | Acquaint with the first aid knowledge and management options. |
| CO5 | Analyse the Ocular findings of the systemic conditions. |
| CO6 | Design the report on malnutrition and immunology. |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **23PH1001** | **Duration** | **3hrs** |
| **Course Title** | **APPLIED PHYSICS FOR AEROSPACE ENGINEERING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | List the main components of a laser. | | CO1 | R | 1 |
| 2. | Name any two types of gas lasers used in aerospace applications. | | CO1 | R | 1 |
| 3. | Name the formula used to calculate numerical aperture. | | CO2 | R | 1 |
| 4. | State the principle of light propagation in optical fibers. | | CO2 | R | 1 |
| 5. | Differentiate between aeroacoustics and room acoustics. | | CO3 | U | 1 |
| 6. | Name one method used to reduce reverberation time. | | CO3 | R | 1 |
| 7. | State the advantages of phased array ultrasonic testing in aviation field. | | CO4 | R | 1 |
| 8. | List two advantages of laser ultrasonic inspection systems. | | CO4 | R | 1 |
| 9. | Define Curie temperature. | | CO5 | R | 1 |
| 10. | State the shape of planetary orbits according to Kepler’s first law. | | CO6 | R | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Classify the 3 main components of a laser and briefly explain their functions. | | CO1 | U | 3 |
| 12. | Compare dispersion and diffraction with neat diagram. | | CO2 | U | 3 |
| 13. | Classify sound waves based on the frequency of propagation. | | CO3 | U | 3 |
| 14. | Explain the pulse-echo method used in ultrasonic testing and describe how it detects flaws in aerospace components. | | CO4 | U | 3 |
| 15. | Describe Weiss theory of ferromagnetism and describe its role in explaining the alignment of magnetic domains. | | CO5 | U | 3 |
| 16. | Explain the universal law of gravitation and describe how it governs the motion of celestial bodies. | | CO6 | U | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. | a. | Illustrate the working principle of a CO₂ laser with a sketch of experimental setup, energy levels and energy transfer mechanism. | CO1 | A | 10 |
|  | b. | Explain liquid lasers with two examples, highlighting its applications in aviation industry. | CO1 | A | 2 |
|  |  |  |  |  |  |
| 18. | a. | Classify the types of optical fibers based on the modes and analyze their impact on signal transmission time, quantity and quality of data transferred. | CO2 | U | 8 |
|  | b. | Summarize the concept of total internal reflection and define the conditions required for achieving critical angle in an optical medium. | CO2 | U | 4 |
|  |  |  |  |  |  |
| 19. |  | The rectangular cockpit of a commercial aircraft has dimensions of 4 m × 3 m × 2.5 m (L × B × H). Pilots have reported difficulty in communication due to excessive reverberation caused by reflective surfaces inside the cockpit. The interior walls have a sound absorption coefficient of 0.07, while the ceiling has a coefficient of 0.30.  To enhance communication clarity, noise-absorbing panels with an absorption coefficient of 0.40 are planned to be installed on the floor.  Evaluate  1. The current reverberation time inside the cockpit.  2. The new reverberation time after installing the noise-absorbing panels.  3. The impact of reduced reverberation on pilot communication. | CO3 | An | 12 |
|  |  |  |  |  |  |
| 20. | a. | Explain the working of the magnetostriction method with a diagram. Also explain the generation of ultrasonic waves using this technique. | CO4 | A | 8 |
|  | b. | Explain piezoelectric effect and explain how it is used to generate ultrasonic waves. | CO4 | A | 4 |
|  |  |  |  |  |  |
| 21. |  | Deduce the relationship between orbital magnetic moment and angular momentum, and explain its importance in magnetic materials. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 22. |  | Illustrate Kepler’s three laws in predicting planetary motion and orbital characteristics with neat diagrams. | CO6 | U | 12 |
|  |  |  |  |  |  |
| 23. |  | Describe the applications of fiber optics in the aviation industry and explain their advantages in communication and sensing systems. | CO2 | U | 12 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Explain the working of a semiconductor laser by illustrating the schematic diagram, its energy bands, population inversion, and spontaneous and stimulated emission. | CO1 | U | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

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|  | **COURSE OUTCOMES** |
| **CO1** | Comprehend the basic working principle of lasers and optical fiber technology. |
| **CO2** | Investigate the structural integrity of materials using acoustical phenomena. |
| **CO3** | Apply the non-destructive testing methods using ultrasound waves. |
| **CO4** | Analyze the importance of novel magnetic materials in aerospace systems. |
| **CO5** | Examine the various solar system models, earth’s immediate cosmic neighborhood and other constituents of solar system. |
| **CO6** | Propose a suitable technique and material for Aerospace Industry. |

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**END SEMESTER EXAMINATION – MAY / JUNE 2025**

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| **Course Code** | **24PH2002** | **Duration** | **3hrs** |
| **Course Title** | **INTRODUCTION TO ASTRONOMY AND SPACE SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **M** |
| **PART – A (10 X 1 = 10 MARKS)** | | | | | |
| 1. | Define the term ‘meteorite’. | | CO1 | R | 1 |
| 2. | Infer a key character of Kuiper Belt that is situated in the orbit of Pluto, the dwarf planet. | | CO1 | U | 1 |
| 3. | Define the term ‘parsec’. | | CO2 | R | 1 |
| 4. | Explain how solar flares are formed briefly. | | CO2 | U | 1 |
| 5. | Identify a key property of a grand design spiral galaxy. | | CO3 | R | 1 |
| 6. | Give an example of a starburst galaxy. | | CO3 | U | 1 |
| 7. | List two force carrier particles that mediate the fundamental forces. | | CO4 | R | 1 |
| 8. | Define the term ‘Dark Energy’. | | CO4 | U | 1 |
| 9. | State the significance of gravitational wave astronomy. | | CO5 | R | 1 |
| 10. | Infer two key contributions of the Hubble Space Telescope. | | CO5 | U | 1 |
| **PART – B (6 X 3 = 18 MARKS)** | | | | | |
| 11. | Explain Newton’s Law of Universal Gravitation. | | CO1 | U | 3 |
| 12. | Describe the absolute scale of magnitude of a star. | | CO2 | A | 3 |
| 13. | Explain the standard candle method of finding the distance between galaxies. | | CO3 | U | 3 |
| 14. | Determine the four fundamental forces of nature. | | CO4 | A | 3 |
| 15. | Infer the term ‘active optics’. | | CO5 | U | 3 |
| 16. | Explain the importance of Chandrayan 3 mission. | | CO6 | A | 3 |
| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)** | | | | | |
| 17. |  | Explain the three planetary laws propounded by Johannes Kepler to explain the motion of planets in the solar system. | CO1 | A | 12 |
|  |  |  |  |  |  |
| 18. |  | Analyze in detail, the evolution of a star having the same mass as that of the sun, the star in the center of the solar system with a neat sketch. | CO2 | An | 12 |
|  |  |  |  |  |  |
| 19. |  | Explain the Hubble Classification Scheme of galaxies with a neat diagram. | CO3 | A | 12 |
|  |  |  |  |  |  |
| 20. |  | Analyze the formation of the universe as expounded by the standard big bang model. | CO4 | An | 12 |
|  |  |  |  |  |  |
| 21. |  | Analyze in detail the powers of a telescope and how they play a significant part in obtaining images from deep space. | CO5 | An | 12 |
|  |  |  |  |  |  |
| 22. | a. | Define how the sun and the planets revolving around the sun are formed from a nebula. | CO1 | R | 6 |
|  | b. | State how black holes are formed from the life and death of a massive star. | CO2 | R | 6 |
|  |  |  |  |  |  |
| 23. | a. | Differentiate between an open star cluster and a globular star cluster. | CO3 | U | 6 |
|  | b. | Explain the fate of the universe as given by the Big Rip Theory. | CO4 | U | 6 |
| **COMPULSORY QUESTION** | | | | | |
| 24. |  | Evaluate the scientific contributions of Indian Space Research Organization through various missions it has launched for the betterment of our nation. | CO6 | E | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL **M** – MARKS ALLOTTED

|  |  |
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|  | **COURSE OUTCOMES** |
| **CO1** | Understand the various constituents of the solar system like comets and asteroids. |
| **CO2** | Articulate the details of the Sun, and evolution of different stars. |
| **CO3** | Analyze the shape and size of the Milky Way galaxy and other types of galaxies. |
| **CO4** | Appraise the big bang theory, and theories related to death of the universe. |
| **CO5** | Demonstrate the modern-day telescope technology. |
| **CO6** | Appreciate the modern day space technologies to solve human problems. |