Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – May 2025
II Semester

Class : I P.G. **Time: 3 Hours**
Major : Chemistry **Max. Marks: 100**

23MPHI01 LASER and its day – to – day Applications

Course Outcomes:
CO1:Explain the process involved in LASER action.
CO2:Describe unique properties of LASER.
CO3:Discuss the importance of LASER in medicine
CO4:Recognise the applications of LASER in Textiles.
CO5:Explain the uses of LASER in industries

Part A **10 x 1 = 10**

Choose the Correct Answer

1. The process of population inversion is to increase the number of atoms in the CO1K2
   a. excited state b. ground state c. intermediate state d. excited state and ground state

2. Laser beam has the following property CO1K2
   a. coherence b. monochromatic c. directional d. all the above

3. Nd:YAG laser is a CO2K2
   a. two level laser b. three level laser c. four level laser d. five level laser

4. What is the wavelength of the light emitted by a carbon dioxide Laser? CO2K1
   a. 9.4 μm b. 10.6 μm c.11.4 μm d. 12.5 μm

5. Which laser is most commonly used in Dermatology? CO3K1
   a. CO_2 laser b. Diode laser c. Nd:YAG laser d. Excimer laser

6. Which laser is typically used for soft tissue surgery, such as removing tumors or cutting through tissue with minimal bleeding? CO3K1
   a. CO_2 laser b. Argon laser c. Diode laser d. Excimer laser

7. Which type of laser is most commonly used for cutting textiles like fabrics and synthetic materials? CO4K1
   a. Excimer laser b. Nd:YAG laser c. Diode laser d. CO_2 laser

8. In textiles, what is the primary use of laser sealing? CO4K1
   a. To cut fabric pieces b. To create decorative patterns on fabric
   c. To bond or seal fabric edges d. To add colour to textiles

9. Which laser type is commonly used in industrial laser welding applications? CO5K1
   a. CO_2 laser b. Nd:YAG laser c. Fiber laser d. Diode laser

10. What is the primary function of a laser range finder in industrial applications? CO5K1
    a. To measure the temperature of materials
    b. To measure distances and create 3D aps of environments
    c. To cut and weld metals
    d. To focus laser beams in laser machining

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. Mention the important characteristics of Lasers and explain. CO1K2

(or)

11.b. Write a note on the different parts and their functions of a laser. CO1K2

12.a. What are the two different coherences in lasers? Give a note on the factors influencing intensity in lasers. CO2K2

(or)

12.b. Describe the working of ruby laser, with a neat diagram. CO2K2

13.a. Explain how lasers are used in ophthalmology. CO3K3

(or)

13.b. Write short notes on the types of Lasers in surgery. CO3K3

14.a. List out the advantages of fabric cutting. CO4K1

(or)

14.b. What are Laser seals? Mention few of their applications. CO4K1

15.a. List out the main differences between laser welding and laser drilling. CO5K2

(or)

15.b. What are the different components of a range finder? CO5K2

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Explain about electromagnetic radiation and distinguish between spontaneous and stimulated emissions. CO1K3

(or)

16.b. Describe the process of laser action using energy level diagram. CO1K3

17.a. Discuss the principle and working of Nd: YAG laser. CO2K3

(or)

17.b. Explain the working of CO_2 laser. CO2K3

18.a. What are the different lasers used in Dermatology? Mention their common applications. CO3K3

(or)

18.b. Discuss in detail the application of lasers in Endoscopy. CO3K3

19.a. Elaborate laser engraving and cleaning. Give their types and common applications. CO4K3

(or)

19.b. What is Laser safety? What are the safety measures taken during material processing? List out its key principles. CO4K3

20.a. Explain the various factors that affect laser cutting performance. List out the advantages and limitations of laser cutting. CO5K3

(or)

20.b. Give a detailed account on the laser communication in the area of undersea and astronomy. CO5K3

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