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G – 1400

Reg. No. :

Name :

Sixth Semester B.Sc. Degree Examination, April 2019
First Degree Programme Under CBCSS
Physics
Core Course – XI
PY 1643 – CLASSICAL AND MODERN OPTICS
(2013 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **a** word or **one** or **two** sentences. **Each** question carries **one** mark. **(10×1=10 Marks)**

1. What is double refraction ?
2. What is meant by a metastable state ?
3. What do you mean by diffraction of light ?
4. Write the full form of LASER.
5. What is Dichroism ?
6. What are coherent sources ?
7. Mention two application of polaroids.
8. Write an example of perfect coherency.
9. What is attenuation ?
10. Define numerical aperture.

P.T.O.



SECTION - B

Answer **any eight** questions, **not** exceeding a paragraph. **Each** question carries **two** marks. (8×2=16 Marks)

11. Distinguish between polarised and unpolarised light.
12. Explain how amplification occurs in stimulated emission.
13. What is Fraunhofer diffraction ?
14. Why Newton's rings are circular ?
15. Two independent sources of light cannot be coherent. Why ?
16. Difference between dextro and leavo rotatory substances.
17. Explain critical angle and acceptance angle.
18. How is Nicol prism used as an analyser ?
19. Distinguish between uniaxial and biaxial crystals.
20. What are the main components of a LASER ?
21. State the conditions under which two waves can produce interference pattern.
22. What is a retardation plate ? Give examples.

SECTION - C

Answer **any six** questions. **Each** question carries **four** marks. (6×4=24 Marks)

23. Explain resolving power of grating.
24. Discuss some of the important applications of holography.
25. Briefly explain the elementary theory of dispersion.
26. Explain absorption, spontaneous emission and stimulated emission of radiation with neat diagrams.
27. State the differences between diffraction and interference.



28. State and explain Malu' law.
29. Distinguish between ordinary ray and extra ordinary ray in double refraction.
30. Calculate the fractional index change for a given optical fibre if the refractive indices of the core and the cladding are 1.563 and 1.498 respectively.
31. Discuss on the energy levels of ruby laser.

SECTION – D

Answer **any two** questions. **Each** question carries **fifteen** marks. (2×15=30 Marks)

32. With necessary theory give the experiment to determine the wavelength of a monochromatic source of light by the Newton' rings method.
 33. Describe the phenomenon of birefringence. With neat diagrams, discuss Huygens's theory of double refraction through uniaxial crystals.
 34. What are Einstein's coefficients ? Show that the probabilities of stimulated emission and stimulated absorption are the same.
 35. What are (i) single mode and multimode (ii) Step index and graded index fibers ? Explain in detail the difference in structure between monomode step index and multimode graded index fibers.
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