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School of Engineering and Technology
MID TERM EXAMINATIONS-II, JANUARY, 2022

B.Tech. Semester-I

ENGINEERING PHYSICS-I

BTEBE101

Time: 2 Hrs

MM: 20

Note: All questions are compulsory.

SECTION-A

Q1. Attempt any eight questions. Each question carries equal marks. [1x8]

- i. Explain spatial and temporal coherence of light.
- ii. Define polarized and unpolarized light.
- iii. Write full form and LASER.
- iv. The critical angle of light in a certain substance is 42° . What is the polarizing angle?
- v. If light of wavelength 660 nm has wave trains 20λ long, what are its coherence length and coherence time?
- vi. Discuss the phenomenon of polarization by reflection.
- vii. Describe the necessity of cooling system in ruby laser.
- viii. What is half wave plate? Also write its applications.
- ix. Write two basic differences between a hologram and photograph.

- x. Specify optically active and optically inactive solutions.
- xi. Write three differences between ruby laser and He-Ne laser.
- xii. Calculate the thickness of a quarter wave plate for light of wavelength 6000\AA (Given $\mu_o = 1.554$ and $\mu_E = 1.544$).

SECTION-B

Q2. Attempt all questions. Each question carries equal marks.

- i. Define optical rotation and specific rotation. How will you measure specific rotation of glucose solution using a biquartz device? [4]
- ii. Unpolarized light of intensity I_0 is incident upon two polarizing sheets whose transmission axes are at an angle of 35° with respect to each other. Find the intensity of the light emerging from the second sheet.

[2]

OR

- i. Describe how will you produce elliptically polarized light and distinguish it from partially polarized light. [4]
- ii. A 5% solution of cane sugar placed in a tube of length 40 cm causes the optical rotation of 20° . How much length of 10% solution of the same substance will cause 35° rotation. [2]

- Q3. Distinguish between spontaneous and stimulated emission. Obtain a relation for Einstein's coefficient A & B for spontaneous and stimulated emission. What are essential requirements for laser action? [6]**

OR

Describe construction and working of He-Ne laser. How is population inversion achieved in such a laser? [6]