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Continuous Assessment Test -II, October 2016

Programme	: B. Tech	Semester	: Fall 2016-2017
Course Title	: Engineering Physics	Course Code	: PHY1001
School	: School of Advanced Sciences – Department of Physics	Slot	: C2+TC2
Duration	: 1 Hour 30 minutes	Max. Marks	: 50

Answer all questions (10 x 5 = 50)

1. A He-Ne laser in our physics lab emits monofrequency radiation. Is the statement is true or false? Justify your answer with reason.

2. Name a practical three level and four level solid state laser active medium. Compare their quantum efficiencies and evaluate best of them.

3. What was the necessity to invoke stimulated emission by Einstein? Explain with suitable mathematical equations and description, if available.

4. In an optical cavity of length 20 cm with mirror 1 (reflection coefficient = 1) and mirror 2 (reflection coefficient = 0.92) and absorption coefficient 0.5 holds an active medium. If the medium has one round trip grain is 50, estimate the gain coefficient of it.

5. Two monochromatic laser (wavelength = 633 nm) sources are separated by 2 cm apart. Find out the transverse coherence length at 5 m from the sources along the wave propagation direction.

6. Why lasing is not possible in He atom? Why pulsed laser is not possible in He-Ne active medium?

7. Why flash lamps are not employed in He-Ne and CO_2 active medium excitation and electric discharge in Nd:YAG and Rhodamine B active medium excitation?

8. In 18xx, Maxwell found a flaw in which electromagnetic equation? Write the correction to it, made by him.

9. Using appropriate fundamental theorems in vector calculus, derive microscopic Maxwell's equations from macroscopic equations, with every detail.

10. Write wave equations for energy carrying electric field, magnetic field, oscillating string and moving electron with velocity v.