BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH
BRANCH: CS/IT/ECE/EEE

SEMESTER : II
SESSION : SP/2022

SUBJECT: PH113 PHYSICS

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Show that the diameters of Newton's dark rings are proportional to the square roots of natural numbers. (BTII)(CO1) [5]

Q.1(b) Develop the intensity distribution due to interference in wedge shaped film using oblique incidence. (BTVI)(CO1) [5]

Q.2(a) Show how polarization relates the electric field E and electric displacement D. (BTII)(CO2) [5]

Q.2(b) If the charge on a proton is $1.6 \times 10^{-19}c$, find the electrostatic potential and potential energy at a distance of 1 Å from the proton. (BTI)(CO2). [5]

Q.3(a) Show the relation $x^2 - c^2t^2$ is invariant under Lorentz transformation. (BTII)(CO3) [5]

Q.3(b) Develop Einstein's mass energy relation. (BTIII)(CO3) [5]

Q.4(a) Explain Compton effect. Find an expression for Compton wavelength. (BTI)(CO4) [5]

Q.4(b) Develop the time independent form of Schrödinger's wave equation. (BTVI)(CO4) [5]

Q.5(a) Explain the working principle of Ruby laser with suitable energy level diagram. (BTV)(CO5) [5]

Q.5(b) Determine the relation between Einstein's co-efficient for spontaneous and stimulated emission. (BTI)(CO5) [5]

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