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

CLASS: BTECH/IMSC
BRANCH: CIVIL/CHEM.ENGG./CHEM & POLY/BT/MECH/PROD/FT

SEMESTER : I
SESSION : MO/19

TIME: 3 HOURS

SUBJECT: PH113 PHYSICS

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. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Develop the condition for maxima and minima due to interference in non-parallel film. [5]
Q.1(b) Two plane glass surfaces in contact along one edge are separated at the opposite edge by a thin wire. If 20 fringes are observed between those edges in sodium light for normal incidence, what is the thickness of the wire? [5]

Q.2(a) Define Gauss law. Develop its differential form from the integral form. [5]
Q.2(b) Develop boundary conditions for $\vec{E}$ and $\vec{D}$ separated by two dielectric media of different permittivity. [5]

Q.3(a) Develop Einstein's mass energy relation. [5]
Q.3(b) Find the relativistic formula for addition of velocities and also show that the speed of light is constant. [5]

Q.4(a) What is speed of a particle whose de-Broglie wavelength and Compton wavelength are equal? [5]
Q.4(b) Explain Davison-Germer experiment. [5]

Q.5(a) Elaborate the working of He-Ne laser with suitable energy level diagram. [5]
Q.5(b) Determine the relation between Einstein's co-efficient for spontaneous and stimulated emission. [5]

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