Diploma / Integrated B.Tech 2nd Semester Examination
June, 2014
PHYSICS-II (Main)
Subject Code:  AHL-002
Time Allowed: 03 hours. Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1(a) State and prove Gauss theorem. [5]
(b) What do you mean by average life of atoms? Derive the expression for it. [5]
(c) What is the difference between intrinsic and extrinsic semiconductor? Explain with examples. [5]
(d) What is Ohm’s law? Explain with necessary circuit diagram. [5]

SECTION-A

2 (a) What is parallel plate capacitor? Derive an expression for the capacitance of parallel plate capacitor. [10]
(b) State and prove Gauss theorem. Using Gauss theorem derive an expression for the electric field due to a point charge. [10]

3(a) Define resistance. Explain the factors on which resistance depends? What is the effect of temperature on the resistance of pure metals? What resistance must be placed in parallel with 12 Ω to obtain a combined resistance of 4 Ω? [10]
(b) What is Wheatstone bridge? How will you determine unknown resistance with it? [10]

4(a) Explain the properties of alpha, beta and gamma rays. [10]
(b) What are the fundamental laws of radioactivity? Explain activity of radioactive substances. What is artificial radioactivity? Explain how can it be produced. [10]

SECTION-B

5(a) How is p-n junction formed? What do you mean by forward and reverse biasing of p-n junction? Explain its V-I characteristics. [10]
(b) What is a rectifier? Explain half wave rectifier with the help of a circuit diagram. Draw the input and output waveforms. [10]

6(a) What is Ruby laser? Explain its working with diagram. [10]
(b) What are optical fibres? How does signal propagates through optical fibres? What are the advantages of optical fibres over the copper cables? Give applications of optical fibres. [10]

7(a) What is escape velocity? Obtain an expression for the escape velocity of a planet. [10]
(b) What are satellites? How many types of satellites are there? Explain essential conditions for geostationary satellite. [10]