(Please write your ...

MINOR - II EXAMINATION
(April-2016)

	Subject: Applied Physics-II
Subject Code: BAS-104	**Maximum Marks : 30**
Time : 1 ½ Hours	

Note: Q. 1 is compulsory. Attempt any two questions from the rest.

(2x5=10)

Q1

(a) How and why is a Tunnel diode different from an ordinary p-n junction diode? Draw and explain the I-V characteristics of a tunnel diode, labeling each region of the curve.

(b) Draw a cube and sketch the planes whose Miller indices are (0 1 0) and (1 1 1).

(c) Draw a well-labeled diagram of scintillation counter.

(d) Explain nuclear fission and nuclear fusion. How does the binding energy curve account for fission and fusion?

(e) How is avalanche breakdown different from zener breakdown?

(5,5)

Q2

(a) (i) Give the band structure of intrinsic, n-type and p-type semiconductor showing position of Fermi level.
(ii) The intrinsic carrier concentration of a semiconductor is $10^{20}/m^3$. Find the concentration of holes when it is doped with arsenic atoms so that there are 10^{21} arsenic atoms per m^3, assuming that all donor atoms are ionized.

(b) Define Fermi Energy Level. Derive the position of Fermi level for an intrinsic semiconductor at T= 0K.

(5,5)

Q3

(a) Write the expression for binding energy per nucleon using the liquid drop model explaining the contribution of each term in it.

(b) Describe the concept of binding energy.
The binding energy of $^{35}_{17}Cl$ nucleus is 298 MeV. Find the mass of the nucleus given that mass of proton is 1.007276 amu and that of neutron is 1.008665 amu.
1 amu= 931.5 MeV

(5,5)

Q4

(a) Describe the principle and operation of a semiconductor laser. How does it differ from a light-emitting diode?

(b) Determine the range of input voltage that will maintain the following zener diode in breakdown state. V_z= 10V (zener voltage), maximum zener current= 20mA, series resistance,R= 330 ohm, load resistance= 1kΩ