Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **B.TECH**
BSCP1206

3rd Semester Regular / Back Examination 2015-16
PHYSICS - II
BRANCH: BIOTECH,MM,MME
Time: 3 Hours
Max Marks: 70
Q.CODE: T386

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: **(2 x 10)**

a) What are the basic Components of a Nuclear accelerator?
b) What are the disadvantages of Van de graff accelerator?
c) Give the principle of Cyclotron?
d) What is the Betatron Condition?
e) Give a few applications of radio-isotopes used in radiation processing of materials?
f) What are Quantum dots?
g) Define Bragg's law for crystal diffraction and write Bragg's condition.
h) What are the applications of superconductors?
i) In a step index optical fiber the refractive indices of the core and cladding are 1.54 and 1.52 respectively. Calculate the numerical aperture of the fiber?
j) What is the Frenkel's defect?

Q2 **a)** Describe with principle, the construction and working of a Tandem accelerator? **(5)**
b) Deduce the kinetic energy of an ion accelerated in a Cyclotron and write the Cyclotron resonance condition. **(5)**

Q3 **a)** What is the principle of a drift tube Linear accelerator ? Derive the expression for length of tubes and show that they are in the ratio of $1:\sqrt{2}:\sqrt{3}:\ldots..:\sqrt{n}$. **(5)**
b) In the 140 Mev betatron, the radius of the stable electron orbit is 56cm. Calculate (a) magnitude of the magnetic Induction at the orbit for this energy, and (b) The frequency of the electric field ? **(5)**

Q4 Describe Kronig-Penney model of solids. Explain how KP model predicts the presence of energy gaps in crystal? **(10)**

Q5 **a)** Derive London's equation in Superconductivity? **(5)**
b) Calculate the critical magnetic field for tin at 1.58 K and 2.48K from the given data : For tin Tc= 3.72k and Bc =30.5 x 10^{-3} Tesla at zero K. . **(5)**

Q6 **a)** What are Carbon Nanotubes? Describe the electrical and magnetic properties of Carbon nano tubes? **(5)**

b) What is Millers Indices? A crystal plane cuts the crystallographic axes at 3,4 and 5 units respectively. Find with necessary steps for its Miller Indices? **(5)**

Q7 **a)** Discuss the construction and working at Ruby laser ? **(5)**

b) Discuss with principle, the construction and working of a Light Emitting Diode? **(5)**

Q8 Write short notes on any two: **(5 x 2)**

a) Advantages of optical fiber communication system

b) Defects in crystals.

c) Reciprocal lattice

d) P- type and N-type semiconductors.