(b) What are Einstein's coefficients ? Derive the relation between them. 4

9. (a) Derive an expression for optical pumping power in lasers. 4

(b) Discuss in brief the principle of He-Ne laser with the help of energy level diagram. 4

Roll No. .....

91540

B. Sc. 2nd Sem. (Chemistry) (Hons.) (New Scheme) Examination – May, 2016

PHYSICS - II

(Optional)

Time : Three Hours] *[Maximum Marks : 40*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all selecting at least one question from each Section. Question No. 1 is *compulsory.*

1. (a) What is the effect of temperature on the conductivity of a semiconductor ?

(b) Explain valence and conduction band.

(c) Do the semiconductor obey Ohm's law as in conductors.

(d) What is a C.R.O. ?

(e) What is d. c. load line ?

(f) What is thermal run of a transistor ?

(g) Calculate the unit of energy density ?

(h) Is resonance condition essential for laser action ?

SECTION – I

2. (a) Explain Band theory of solids. Based on this theory distingwish between insulators, conductors and semiconductors. 4

(b) What is P-N Junction diode ? How this junction is formed practically ? Explain the formation of potential barrier in a P-N junction. 4

3. (a) What is π-Section filter ? Why it is so called ? Discuss its circuit and working mechanism. 4

(b) Explain Zenes diode as voltage regulator. 4

SECTION – II

4. (a) A transistor has a base current of 40μA and d. c. gain $\beta_{d.c.} = 100$ and collector current when emitter open (I_{CEO}) is $5\mu A$. Find its emitter current. 4

(b) Draw a block diagram of C. R. O. and explain the working of each part. 4

5. (a) A transistor having a voltage gain of 100 is to be used as an oscillator. What type of feedback is to be given to the input circuit and what is its feedback factor ? Find the frequency of oscillation if $\alpha = 0.1$ mH and C = 400 pF. 4

(b) Discuss the various categories of oscillators. 4

SECTION – III

6. (a) Sketch the graph between voltage gain and frequency in negative voltage feedback. 2

(b) What do you mean by coupling in amplifiers ? Give its advantages and disadvantages. 2, 4

7. (a) Describe in detail the working and characteristics of an emitters follower by drawing its circuit diagrams. 6

(b) What do you mean by transistor biasing ? 2

SECTION – IV

8. (a) What are the characteristics that distinguish laser from ordinary light source. 4