Dr-PKP

Reg. No. | | | | | | | | | |

प्रज्ञान ब्रह्म

Manipal
INSPIRED BY LIFE

Department of Sciences

(A constituent unit of Manipal University, Manipal-576 104)

IV MSc End Semester Examination -MAY 2016

SUBJECT: OPTO ELECTRONICS- II (PHY 706.4)

Time: 3 Hr **Max. Marks: 50**

Answer any FIVE FULL questions. Each question carries 10 marks

Answer all the sub questions of a main question in a continuous sequence.

Write specific and precise answers.

Write question number within the margin. Draw neat sketches wherever necessary

1A. Using the Maxwell's equations derive an expression for wave propagation in a nonlinear optical media. **7 Marks**

1B. Explain self focusing process in nonlinear optics. **3 Marks**

2A. What is four wave mixing? With a neat diagram explain the measurement of $\chi(3)$, by degenerate four wave mixing (DFWM) technique using Backward –wave geometry. **10 Marks**

3A. What is pockels effect? Discuss the electro-optic effect of KDP crystals in the transverse mode. **10 Marks**

4A. Explain the working of p-n detector (p-n photodiode) with a neat energy-band diagram and arrive at the I-V equation of the photodiode under illumination. **8 Marks**

4B. When a reverse bias is applied to a germanium pn-junction, the reverse saturation current at room temperature is 0.30mA. Find the current through the diode when a forward bias of 0.15V is applied at room temperature. Assume ideal behavior for the germanium diode. **2Marks**

5A. Write a short note on

i) Mach-Zehnder interferometer modulator and switch. **6 Marks**

ii) Quantum confined lasers **4Marks**

6A. Discuss briefly the Generation of Femtosecond Laser Pulses via Mode Locking. **8 Marks.**

6B. Calculate the peak power of the pulse emitted from a femto-second laser with the 2×10^6 of modes locked together (Given: Po= 10mW). **2Marks**

Good Luck