

(b) Why Ruby laser is known as pulsed laser? 2

(c) Give the basic differences between Ruby and He-Ne laser. 4

9. (a) Out of spontaneous and stimulated emission, which one predominates in optical region at room temperature? 4

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

(c) Calculate the units of Einstein's coefficients A and B. 2

(d) What do you mean by purity of a spectral line? 2

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**B. Sc. 2nd Sem. (Mathematics) (Hons.) Old
& New Examination – May, 2016**

PHYSICS - II OPT (ii)

Paper : BHM-126

Time : Three Hours]

[Maximum Marks : 60

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 from each Section. Question No. 1 is compulsory.

1. (a) Sketch the Reverse Biased diagram of a P-N-Junction diode. 2 Each

(b) What is the main difference between zener and avalanche breakdown?

(c) Sketch the diagram of a Regulated Power Supply.

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(d) Write four basic component of a Cathode Ray tube.

(e) Out of spontaneous and stimulated emission which one predominates in optical region at room temp. ?

(f) What do you mean by threshold condition for laser oscillations ?

SECTION - I

2. (a) What is aquadag coating in a CRO ? Explain its role. 2, 2

(b) Describe with the help of a circuit diagram the input and output characteristics of a C-E transistor. 2, 6

3. (a) Explain the working of zener diode as voltage regulator. 6

(b) Explain the principle, construction and working of photo diode. 6

4. (a) What are filters ? Explain the action of L-filter in a full wave rectifier. 6

(b) What do you mean by rectifier efficiency, calculate its value of a full wave rectifier ? 6

SECTION - II

5. (a) An amplifier has a gain of 1000 without feedback. This gain is reduced to 50 with negative feedback. Find the feedback fraction of the amplifier. 4

(b) Discuss the effect of negative feedback on amplifier characteristics. 8

6. Draw an emitter follower circuit. Justify that it is a common-collector amplifier circuit. Explain its working. 3, 4, 5

7. (a) Discuss the basic principle of an oscillator. Draw the circuit diagram and explain the working of a Hartley oscillator. 2, 2, 4

(b) A Hartley oscillator has inductances of $50\mu\text{H}$ and $200\mu\text{H}$ and a capacitor of 100 pF in the tank circuit. If the mutual inductance is $25\mu\text{H}$, find the resonant frequency. 4

SECTION - III

8. (a) What do you mean by four level lasers ? What is the requirement for these lasers ? 6