

**Part A (2x5=10 marks)**  
(Answer all the questions)

1	What are the factors affecting the acoustic quality of a building	C
2	How are sound waves classified?	C
3	Name the methods by which ultrasonic waves are produce.	C
4	Calculate the number of photons from green light of mercury ( $\lambda = 4961 \text{ \AA}$ ) requires to do one joule of work.	C
5	Define metastable state.	C

**Part B - (2 x 16 = 32 marks), (1 x 8 = 8 marks)**  
(Answer all the questions)

Q.No		C
11 A	What is Piezo electric effect? Explain how the ultrasonics waves can be produced using Piezo electric crystal and write any four applications of ultrasonics.	C
OR		
11 B	Describe the working of Ultrasonic flaw detector for Non- Destructive Testing. Mention its advantages and disadvantages.	C

12 A

What is molecular gas laser? With neat sketch, explain the construction and working of CO<sub>2</sub> laser using energy level diagram.

OR

12 B

i) Distinguish between Spontaneous emission and stimulated emission.  
ii) For atomic transitions, derive Einstein relation and hence deduce the expressions for the ratio of spontaneous emission rate to the stimulated emission rate.

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Write in detail about the factors affecting architectural acoustics and their remedies.