M.Sc. (Physics) Third Semester

MSc231012–Elective–I–Lasers, Fibre Optics and Applications Paper–XII

P. Pages : 1 **GUG/W/18/2312**

Time : Three Hours * 1 8 0 6 * Max. Marks : 80

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1. Either :

a) Discuss Gaussian beam and its properties. **8**

b) Explain mode selection. **8**

OR

e) Explain longitudinal and transverse modes of laser cavity. **8**

f) Discuss two stable minor optical resonators. **8**

2. Either :

a) Describe the working of four level laser system. **8**

b) Discuss mode locking, pulse shortening operations. **8**

OR

e) Describe construction and working of Nd – YAG laser. **8**

f) Explain construction and working of Ruby laser. **8**

3. Either :

a) Explain Carbon dioxide laser in detail. **8**

b) Discuss Dye laser. **8**

OR

e) Discuss Nitrogen lasers with energy diagram. **8**

f) Discuss high power laser system and its applications. **8**

4. Either :

a) Explain Laser Fluorescence. **8**

b) Discuss Ultra High Resolution Spectroscopy with lasers and its applications. **8**

OR

e) Discuss Raman Scattering and its use in pollution studies. **8**

f) Explain non – linear interaction of light with matter. **8**

5. Attempt all the following questions.

a) Explain gain in regenerative laser cavity. **4**

b) Write a short note on Spectral narrowing and stabilization. **4**

c) Explain various industrial applications of laser. **4**

d) Discuss Laser induced multiphoton process. **4**

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