GANPAT UNIVERSITY

B. TECH SEM. VII BIOMEDICAL & INSTRUMENTATION ENGINEERING

CBCS REGULAR EXAMINATION NOV-DEC 2016

2BM704: LASER & FIBER OPTICS IN MEDICINE

Time: 3 Hours   Total Marks: 70

Instruction: 1 Write the answer of each section in separate answer sheet

2 Figure to the right indicates full marks

3 Assume suitable data if necessary

Section – I

Que. – 1		12
(a)	What does LASER stand for? Define: absorption, spontaneous emission, stimulated emission	(06)
(b)	Explain difference between ordinary light source and laser light.	(06)

OR

Que. – 1		12
(a)	Describe construction and working of laser.	(06)
(b)	Write a short note on Ruby laser with its advantages, disadvantages and application.	(06)

Que. – 2		11
(a)	Draw and Explain Energy level diagram of Nd:Yag laser.	(05)
(b)	Explain CO_2 laser with its advantages, disadvantages and applications.	(06)

OR

Que. – 2		11
(a)	Draw and explain four level energy diagram.	(05)
(b)	Describe the construction and working of He:Ne laser.	(06)

Que. – 3	Do as directed:	12
(a)	Explain ANSI Laser Safety Standard	(04)
(b)	Explain Therapeutic & diagnostic application of laser & fiber optics in Dermatology	(04)
(c)	Describe how laser light is produced in semiconductor laser?	(04)

Section – II

Que. – 4		12
(a)	Write the importance reflectance. Explain reflection and refraction with neat diagram.	(06)

(b) The velocity of light in the core of step index fiber is 2.01×10^8 m/sec (06) and the critical angle of core-cladding interface is 80°. Determine the numerical aperture and acceptance angle for the fiber in air assuming that it has a core diameter suitable for consideration in ray analysis.

OR

Que. – 4   **12**

(a) Define: Acceptance angle, numerical Aperture, Mode of optical fiber. (03)

(b) Enlist basic laws of geometric optics for reflection and transmission. (03)

(c) Explain light emitter performance characteristics for optical fiber (06) communication.

Que. – 5   **11**

(a) Write the name of the two main mechanism of attenuation in an optic (06) fiber & explain each briefly.

(b) Explain with neat diagram multimode step index fiber. (05)

OR

Que. – 5   **11**

(a) Explain PIN Photodiode and Avalanche Photodiode with neat diagram. (06)

(b) Explain with neat diagram multi mode graded index fiber. (05)

Que. – 6 Do as directed: (Any 3)   **12**

(a) Explain application of Laser in ophthalmology. (04)

(b) What are the laser protective Eye ware requirements (04)

(c) Write a short note on Endoscopy. (04)

(d) Write the short note on fiber optic cable. (04)

END OF PAPER