Master of Biomedical Engineering Examination, 2018

(1st Year, 2nd Semester)

Advanced Biomedical Instrumentation

Time: Three hours **Full Marks: 100**

Answer **any five** questions

Q-1)	Distinguish between Frequency Division Multiplex System and Time Division Multiplex System used for the transmission and reception of biosignals. Include neat sketches to explain your answer	**20 Marks**
Q-2) (a)	Mention the safety systems of anaesthesia machine and explain the operation of each of the safety system.	**15 Marks**
Q-2) (b)	Explain briefly the principle of operation of "Auditory Evoked Potential" monitor.	**5 Marks**
Q-3) (a)	Describe Helium-Neon LASER and explain its operation. Draw energy level diagram of this LASER.	**15 Marks**
Q-3) (b)	Mention some of the applications of Helium-Neon LASER	**5 Marks**
Q-4) (a)	Draw an analog fibre optic driver circuit and explain its operation.	**10 Marks**
Q-4) (b)	Mention the desirable features of optical fibre	**4 Marks**
Q-4) (c)	Explain the term "Pulse Dispersion"	**6 Marks**
Q-5) (a)	How shock waves are produced and focused in an Extracorporeal shock wave Lithotripsy machine? Explain with neat sketches.	**15 Marks**
Q-5) (b)	Write short note on Betatron radiotherapy machine	**5 Marks**
Q-6) (a)	Explain the principle of operation of electrosurgery machine.	**5 Marks**

Q-6) (b) Explain with circuit diagram how radiofrequency power amplification is done in electrosurgery machine **15 Marks**

Q-7) (a) Explain how blood leak detector in haemodialysis machine work. Include sketches in your answer. **10 Marks**

Q-7) (b) Explain with neat sketches the principle of operation of Short-wave diathermy machine **10 Marks**

Q-8) A filter has the following transfer function **20 Marks**

$$H(Z) = \frac{1 - Z^{-2}}{(1 - 1.0605Z^{-1} + 0.5625Z^{-2})}$$

Find and plot its amplitude response