



End Term Examination (December 2019)

School: School of Engineering

Program: B.Tech Biomedical Engineering

Course: Medical Imaging System

Course Code: BME402

Semester: VII

Max Marks: 40

Duration (mins): 90

Q. 1 Answer ALL questions

(Each question carries 2 marks)

[10]

- The ratio of primary to secondary turns of an x-ray transformer is 1:1000. If an input AC waveform has a peak voltage of 50V, what is the peak voltage induced in the secondary side.
- Calculate the wavelengths for an ultrasound beam of 2 MHz, 5 MHz and 10 MHz, travels from soft tissues into fat ?
- Given $f_1=5$ MHz, $v=35$ m/sec, $\theta =45$ degree. Calculate the Doppler frequency shift.
- Calculate the remaining intensity of a 100 mw ultrasound pulse that loses 30 dB while traveling through tissue.
- Calculate the CT number with attenuation co-efficient $\mu(x,y)=2.35$.

Q. 2 Answer ALL questions

(Each question carries 2 marks)

[20]

Explain the following in one sentence:

- Heel effect
- PACS
- Output phosphor in fluoroscopy
- Conversion factor in fluoroscopy
- Mammography target anode
- Hounsfield units
- Comparison between third generation and fourth generation CT

- h) Detector pitch in CT
- i) Optical coherence thermography
- j) Biomedical application of thermal imaging

Q. 3 Answer any ONE question.

(Each question carries 10 marks)

- a) Explain the generation of characteristics x-ray spectrum. Mention different electron binding energies of common x-ray tube target materials.
- b) Explain the generations of Computed tomography (CT). Give an analytical comparison.
- c) State the difference between ultrasound and Doppler ultrasound. Explain the working principle of Doppler ultrasound.
