Register Number……

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2012

Eighth Semester

MECHATRONICS ENGINEERING

U07MH801: Medical Mechatronics

Time: Three Hours **Maximum Marks: 100**

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. Under equilibrium condition the potential difference across the membrane is positive
   a) potential inside and negative potential outside
   b) Negative potential inside and positive potential outside
   c) Positive potential inside and positive potential outside
   d) Negative potential inside and negative potential outside
2. The bio potential available from the skin is measured using
   a) chemical electrode b) depth electrode c) surface electrode d) micro electrode
3. The prblems exists at the time of recording bio-potentials are
   a) amplitude variation b) voltage drift c) Noise and dc drift d) current drift
4. Pressure transducer for measuring pressure is from
   a) Inductive transducer b) Strain gauge or capacitive transducer
   c) Resistive transducer d) Fiber optic sensor
5. To prevent accidental internal cardiac shock _____ are used
   a) differential amplifier b) isolation amplifier
   c) instrumentation amplifier d) chopper amplifier
6. In biotelemetry, the type of modulation employed is
   a) Amplitude modulation b) Frequency modulation
   c) Pulse modulation d) Phase modulation
7. Ultrasonic blood flow meter is based on the principle of
   a)Transmission b) Conductivity c) Induction d) Transit time
8. Pacemaker pulses ranges from …….. pulses/min
   a) 25-155 b) 10-250 c) 72 d) 1000

9. The application of an electrical shock to resynchronize the heart is called

a)Fibrilator b) Stenosis c) Counter shock d) Arrhythmia

10. Justify the following statement. “Heart Lung Machine” can be used for a longer time for a patient.

a) Yes

b) No

c) It depends upon the condition of the patient

d) When there is no power failure, the statement is true

PART B (10 x2 =20 Marks)

11. What are resting and action potential, bioelectric potential?
12. Define systole and diastole.
13. What are the sources of bio electric potentials?
14. Give examples for bio sensors.
15. What are the uses of biotelemetry?
16. What are the advantages of storage oscilloscope?
17. How the blood pressure is measured by ultrasonic method?
18. What is the difference between electrical macro shock and micro shock?
19. Define sampling theorem.
20. Differentiate time domain and frequency domain analysis?

PART C (5 x 14 =70 Marks)

21. a) With a neat block diagram, explain the working of ECG recorder.

(OR)

b) (i) Explain in detail about polarization, repolarization and depolarization**.** (7)

(ii) Discuss in detail about action potential and resting potential. (7)

22. a) (i) Write short notes on transducer selection for bio-medical instrumentation. (7)

(ii) Explain in detail about inductive transducers? (7)

(OR)

b) Explain about bio and nano sensors.

23. a) Explain the various types of amplifiers listed below, with a neat circuit diagram.

(i) differential amplifier

(ii) chopper amplifier

(iii) isolation amplifier

(OR)

b) Explain in detail about storage oscilloscopes.

24. a) (i) Explain with a neat diagram, the working principle of D.C. defibrillator. (7)

(ii) Describe an ultrasonic blood flow meter used in the measurement of velocity of blood flowing in the blood vessels. (7)

(OR)

b) How is magnetic resonance imaging system, useful in the medical field and explain the operation of this system with relevant sketches.

25. a) Explain the role of computer in biomedical diagnostic instrumentation.

(OR)

b) Discuss about ECG Analysis using time domain techniques.

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