KUMARAGURU college of technology
character is life

Register Number:……..

B.E DEGREE EXAMINATIONS: MAY2015

(Regulation 2009)

Fifth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE122**:** Medical Electronics

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. EMG and ECG Signals originate from_____ respectively.
   a) SA node and Motor units
   b) Muscle contraction and Motor units
   c) Gila Cells and SA node
   d) Motor units and SA node
2. Bioelectric potential generated related to eye are
   a) EOG and ECG
   b) EMG and ERG
   c) EOG and ERG
   d) EEG and EOG
3. It is known that the mean velocity of the blood flow in the Aorta is about 10.5mm is about 40 cm/s. The ultrasonic velocity in the blood is 1550 m/s. When an ultrasound sound of frequency of 3MHz, what is the order of magnitude of Doppler shift in frequency?
   a) Since the frequency is so high there is no reflected beam of ultrasonic's
   b) 40 Hz
   c) 1550 Hz
   d) More than 3000 Hz
4. The average value of Systole and diastolic pressures of normal adult are
   a) 140mm Hg/70 mm Hg
   b) 80mm Hg/120 mm Hg
   c) 120mm Hg/80 mm Hg
   d) 100mm Hg/60 mm Hg
5. In DC Defibrillator, a pulse with a duration of about 5ms is generated by means of a
   a) Astable Multivibrator
   b) Capacitor DisCharge
   c) Monostable Multivibrator
   d) Bistable Multivibrator
6. The element used in X-Ray tube as an anode is _____, because it has
   a) Silver, Low Melting Point
   b) Copper, High conductivity
   c) Tungsten, High Boiling point
   d) Tungsten, High Melting Point
7. Movement of organs can be observed in

a) Thermography b) Fluoroscopy

c) Radiography d) Endoscopy

8. The detailed X ray image of the slices of the body is obtained by means of

a) PET b) CT

c) SPECT d) MRI

9. Fulguration is a surgical diathermy technique to remove

Tissue Extremities

Internal organ Tumor

10. Ground faults can be avoided by using

a) 3 pin plug system b) pure DC alone

c) pure AC alone d) 2 pin plug system

PART B (10 x 2 = 20 Marks)

11. Mention various bioelectric potentials.
12. List out the requirements and types of bio-amplifiers.
13. Define Tidal Volume (TV) and Vital capacity (VC).
14. Define cardiac output and state the principle behind the indicator dilution method for its measurement.
15. Give your own words about single channel and multi channel telemetry systems.
16. What is an asynchronous pacemaker?
17. Differentiate between radiography and fluoroscopy.
18. What is the use of scintillators?
19. Distinguish between macro shock and micro shock.
20. Recall the applications of lasers in medical field.

PART C (5 x 14 = 70 Marks)

21. a) (i) How do you measure the eye pressure and eye ball movements? (8)

(ii) Discuss the development of action potential. (6)

(OR)

b) Discuss the different lead configuration used in ECG. (8)

Explain the bio-electric potentials related to central nervous systems. (6)

22. a) (i) Explain the principle of any one type ultrasonic blood flow meter (8)

(ii) In the case of ultrasonic blood flow meter, using transit time method, the timer in that flow meter gives the difference between upstream and downstream transit (6)

times as 1.7 nanoseconds and the angle between the direction of the flow and the central axis of the ultrasonic beam is about 150. The perpendicular distance between the transmitting and receiving transducers situate in the blood vessel is about 2 cm. The ultrasonic velocity in blood is 1500 m/s. Determine the velocity of the blood flow in that vessel.

(OR)

b) (i) Explain the functioning of an automatic blood cell counter with the block diagram.

(ii) Explain the principle and working of Flame photometer with suitable diagrams.

23. a) (i) Discuss in detail the working principle of demand pacemaker with a diagram. (8)

(ii) What do you understand about fibrillation? How do you correct it? Calculate the energy stored in a 16 microfarad capacitor of a defibrillator that is charged to a potential of 5000 V dc. (6)

(OR)

b) (i) Tell the different elements involved in the biotelemetry. Outline the telemetry system for the transmission of ECG and EEG. (8)

(ii) For what measurements can a Spirometer be used? What basic lung volumes and capacities cannot be measured with a Spirometer? Why? A person has a total lung capacity of 5.95 liters. If the volume of air in the lungs at the end of maximal expiration is 1.19 liters, what is his vital capacity? (6)

24. a) i List out the properties and applications of X-Rays. (8)

ii What is meant by half-life in radioisotopes? Name any four radioisotopes and their use in medical field. (6)

(OR)

b) Explain computer axial tomography with neat diagram. Give the mathematical computation involved in the image reconstruction.

25. a) (i) Discuss the different types of commonly available endoscopes and their Diagnostic applications? (8)

(ii) What are the techniques involved in electro surgery techniques using diathermy units? (6)

(OR)

b) (i) Explain the HE-NE laser and the general applications of laser in medicine (8)

(ii) Explain with block diagram the infrared thermograph technique and its merits and demerits. (6)

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