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Question Paper Code : 31327

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electronics and Communication Engineering

EC 2021/EC 601/EC 1001/10144 ECE 11 — MEDICAL ELECTRONICS

(Regulation 2008/2010)

(Common to PTEC 2021 – Medical Electronics for B.E. (Part-Time) Seventh Semester – ECE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the requirements of a biological amplifier?
2. Draw the waveform of a typical PCG signal and label its components.
3. If systolic and diastolic blood pressures are given as 110 mmHg and 82 mmHg, calculate mean arterial pressure.
4. Mention the basic principle behind electrochemical pH determination.
5. List the two types of multiplexing involved in multichannel wireless telemetry.
6. What is meant by a demand pacemaker?
7. State the components of ionizing radiation.
8. Specify the need for SPECT.
9. Bring out the need for patient plate in surgical diathermy.
10. What are the precautions necessary to avoid microshock?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the events that generate Half cell potential across an electrode-electrolyte interface. Also, draw electrical equivalent circuit of the interface. (12)

(ii) Mention any one method of half cell potential cancellation. (4)

Or

(b) With neat diagrams, explain the schematic diagram of EEG machine. Also, show the recording method of unipolar and bipolar EEGs. (16)

12. (a) Illustrate the procedure of a modern spirometry test conduction. Discuss the clinical implications of flow-volume graph. (16)

Or

(b) Show the application of ultrasonic waves in measuring

(i) Blood flow. (8)

(ii) Blood pressure. (8)

13. (a) With a neat block diagram, show the operation of a combined single channel telemetry system for ECG signal and respiration rate. (16)

Or

(b) Explain in detail the design requirements of an ECG telemetry receiver. Also, mention the role of IF amplifier in the receiver. Use suitable illustration. (16)

14. (a) With the aid of suitable diagrams, explain the construction and operation of LINAC used in radiotherapy. Also, mention the safety precautions to be followed in radiotherapy. (16)

Or

(b) With suitable illustration, explain the functional aspects of X-Ray machine. Discuss the role of each part of the circuit. (16)

15. (a) A bloodless surgery is being planned using laser. Find which type of laser would be suitable to achieve this. Discuss on the process involved in the laser production and application. (16)

Or

(b) (i) What are the hazardous effects of gross shock? (4)

(ii) Draw a block diagram showing the components of a leakage current meter. Explain how chassis leakage current can be measured. (12)