

[LF 0212]

AUGUST 2014

Sub.Code :2512

**B.Sc. NEURO ELECTROPHYSIOLOGY
SECOND YEAR
PAPER II – ELECTRONICS**

Q.P. Code : 802512

Time: Three hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3x10=30)

1. Explain about Operational Amplifier and Its applications.
2. Explain about all Universal Gates with Truth table and Boolean Expression.
3. What are the sources of Bio electric Signals? Explain each one.

II. Write notes on:

(8x5=40)

1. Define Resistance, Capacitance and Impedance
2. What is Semiconductor and its types?
3. Explain about P Type & N Type Transistor.
4. What is a Half wave Rectifier? Explain.
5. Write about Shock hazards from Electrical equipments.
6. What are the types of protection in medical Equipments?
7. What are the sources of biomedical Signals?
8. What is a transducer and types of transducers in biomedical applications?

III. Short Answers on:

(10x3=30)

1. Define Power, Power factor.
2. Draw the symbol and colour code representation of Resistor.
3. Define Kirchoff's Voltage Law.
4. Explain transistor as an amplifier.
5. Convert the decimal number 111 to Hexadecimal.
6. Boolean Expression for EXOR, NOT.
7. What is a Action Potential?
8. What is Passive Transducer?
9. What is a Pen Amplifier in EEG?
10. What is CRO?

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Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. What do you understand by depletion region at PN junction? What is the effect of forward and reverse biasing of PN junction on the depletion region? Explain with necessary diagrams.
2. Draw the circuit diagram of a FWR a) With centre tap connection and b) Bridge connection and explain its operation.
3. Explain the working of EEG with a neat block diagram.

II. Write notes on:

(8 x 5 = 40)

1. Explain in detail about insulator, semiconductor, and conductor with Energy band diagrams.
2. Define a Transistor. Why transistor is considered as current control device? Explain.
3. Explain about low pass and high pass filter with neat diagrams.
4. What is transformer? Explain its working principle.
5. What is bio potential? Explain about bio potential electrodes.
6. Describe the principles of Electromyography (EMG).
7. What is meant by calibration? Give reasons why calibration is important for medical equipment.
8. How are medical equipment classified according to their application?

III. Short Answers on:

(10 x 3 = 30)

1. What are the classifications of material based on their conductivity?
2. What is a filter? Name the types of filters.
3. Define Kirchoff's Current Law.
4. Define DC and AC with wave form
5. Draw three resistors (R1, R2, and R3) in serial and parallel combination.
6. Define CMRR.
7. Define Bio-electricity
8. Define Amplifier.
9. Give expansion for EEG, ECG, and EMG.
10. What are the classifications of medical equipment based on electrical safety?

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Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain with a neat diagram of the operation and characteristics of half wave rectifier.
2. With a neat sketch explain the construction and working of CRO.
3. How the medical electronic equipment is classified based on electrical safety.

II. Write notes on:

(8 x 5 = 40)

1. Illustrate the operational characteristics of differential amplifier.
2. Derive the V-I Relationship of resistor, inductor and capacitor elements.
3. Define filter and mention its types.
4. Draw a neat sketch of EMG.
5. Explain any one type of analog to digital convertor.
6. Elaborate the different types of transducer.
7. List the various symbols, colour coding, controls and their meanings pertaining to medical equipment.
8. Explain the calibration methodology for medical equipment.

III. Short Answers on:

(10 x 3 = 30)

1. Define insulator and its types.
2. State ohm's law.
3. What is the need of voltage regulator?
4. What are the errors encountered in PMMC instruments?
5. Define Transducer.
6. State the role of computers in Neurology.
7. Write the difference between high pass and low pass filter.
8. Explain the principle behind transformer.
9. How the medical equipments are certified?
10. Write the various control codes and their meaning in medical equipments.

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Time: Three Hours**Maximum : 100 Marks****Answer All questions****I. Elaborate on:****(3 x 10 = 30)**

1. With neat sketch explain the operation and the characteristics of PN-Junction diode.
2. Draw the circuit diagram of PMMC instrument and elaborate its operating principle with the errors.
3. State the need of calibration in medical electronic equipments and its importance. Explain.

II. Write notes on:**(8 x 5 = 40)**

1. Explain the calibration methodology for medical equipment.
2. Explain the operation and characteristics of full wave rectifier.
3. With a neat diagram explain the NPN transistor characteristics and mention its area of application.
4. Draw and label the diagram of EEG.
5. Write a note on CRO.
6. Illustrate the operational characteristics of differential amplifier.
7. How the medical electronic equipment is classified based on medical safety and explain.
8. Elaborate neatly the safety measures in medical equipment.

III. Short Answers on:**(10 x 3 = 30)**

1. Define transistors and its applications.
2. Define capacitor and its applications.
3. State the need of filters.
4. Define Calibration.
5. Explain the concept of polarization in Bio potential electrode.
6. State the need of recording devices in neurology.
7. Write the difference between high pass and band pass filter.
8. Classify the types of transformers based on the application.
9. Define standards in medical equipments.
10. How the equipments are classified based on electrical safety?

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Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Derive the characteristics of PNP, NPN transistor with corresponding waveform.
2. Draw and label the CRO with necessary explanation.
3. Explain the diagnostic types of equipments with a neat sketch.

II. Write notes on:

(8 x 5 = 40)

1. Elaborate the different types of transducer.
2. Write a note on CRO.
3. Draw the block diagram of voltage regulator and explain.
4. Draw and label the EMG.
5. Explain any one type of Analog to digital convertor.
6. Briefly explain the hazards in medical equipment.
7. Elaborate the certification of medical equipment.
8. Briefly explain the therapeutic type of medical equipments.

III. Short Answers on:

(10 x 3 = 30)

1. Draw the energy band diagram of semi conductors.
2. State the Kirchoff's Law.
3. Draw the reverse bias characteristics of PN-Junction diode.
4. Explain the concept of Polarization in Bio potential electrode.
5. State the difference between band pass filter and low pass filter.
6. List the types of Transducer.
7. What are the dos and don'ts for the usage of medical equipments?
8. Write the various control codes and their meaning in medical equipments.
9. Define valence and conduction band.
10. Explain the certification of medical equipments.

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Time: Three Hours

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Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain the working of the EEG machine (please use appropriate diagrams).
2. Describe what is calibration in biomedical equipment, give examples why is calibration important?
3. What are filters in biomedical equipment? Describe the different kinds of filters and give examples of their use.

II. Write notes on:

(8 x 5 = 40)

1. Application of diodes.
2. Physiological effect of electrical current, shock hazards from electrical equipment, methods of accident prevention.
3. What is a transistor? Explain with an example of usage in biomedical equipment.
4. Importance of capacitor in EEG filter.
5. Explain working principle of NPN transistor.
6. Working principle of transformer.
7. Evoked potential instrumentation.
8. Volume conduction and its importance in EEG.

III. Short Answers on:

(10 x 3 = 30)

1. Principle of Fourier analysis.
2. Bio potential electrodes.
3. Amplifier noise.
4. Phase shift.
5. Rectifier.
6. Bipolar concentric needles.
7. Notch filter.
8. Transducer.
9. Ohm's law.
10. Capacitance.

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Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. What are biological potentials? What are the common sources? Name the tests used for testing them.
2. Physiological effect of electrical current, shock hazards from electrical equipment, methods of accident prevention.
3. What is a transistor? Explain with an example of usage in biomedical equipment.

II. Write notes on:

(8 x 5 = 40)

1. Circuit laws.
2. Principles of averaging.
3. Differences between coaxial and bipolar concentric needles.
4. Draw the block diagram of EMG and explain.
5. Transducer used in bio-medical applications.
6. Operating systems in computers.
7. Semi-conductors.
8. Volume conduction.

III. Short Answers on:

(10 x 3 = 30)

1. Resistance.
2. Low frequency filters.
3. Integrated circuit.
4. Insulator.
5. A dipole and its electric field.
6. Ohm's law.
7. ERG.
8. Conductivity.
9. Power supply unit.
10. 50 Hz noise.
