Rajiv Gandhi University of Health Sciences, Karnataka

II Year Bachelor in Prosthetics and Orthotics Degree Examination – OCT-2019

Time: Three Hours **Max. Marks: 100 Marks**

Fundamentals of Electricity and Electronics

Q.P. CODE: 2820

(QP contains two pages)

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

ESSAYS TYPE (answer any Two) **2 x 10 = 20 Marks**

1. What are Transducers? List out the transducers for Temperature, Pressure, Light and Sound. Explain the working principle of any ONE of them.
2. Bring out the salient differences in characteristics between an ideal OPAMP and a real OPAMP. With the help of a circuit schematic, explain the application of OPAMP as a differential amplifier in Electromyography.
3. Explain the working principle of a Transistor? With the help of suitable circuit diagrams, discuss the three operating regions of a Transistor.

SHORT ESSAYS TYPE (answer any Ten) **10 X 5 = 50 Marks**

4. Bring out the salient differences between Indicating, Recording and Integrating Instruments.
5. What is meant by Reactance? Briefly explain the inductive and capacitive reactances and their behavior to changing frequencies.
6. Explain the construction, principle of operation and typical applications of Linear Variable Differential Transformer (LVDT).
7. What do you understand by Turns Ratio in a Transformer? Explain the relationship between the different turns ratio.
8. What are Myoelectric prostheses? Explain their working principle and advantages as compared to non-electric prostheses.
9. Explain briefly the different systems of units. List out the base quantities, names and symbols used in the SI system of units.
10. What is a Voltage divider circuit? Briefly explain its typical application in feedback circuits.
11. Using appropriate diagrams compare the reverse bias characteristics of a Diode with a Zener Diode.
12. Explain how AND and OR gate can be derived using NOR gates.
13. What are the different methods of Earthing? Using a schematic diagram, explain Pipe Earthing.
14. What is a p-n junction? Explain how a p-n junction is formed. Where are these p-n junctions used?
15. What is a Resistor? Briefly discuss the THREE main types of Resistors and their construction.

SHORT ANSWERS TYPE (answer any Ten) **10 x 3 = 30 Marks**

16. List out the differences between an MCB and an ELCB.
17. What is a semiconductor? Compare the atomic structure of a semiconductor with a conductor.
18. State and explain Kirchhoff's laws.
19. Write the colour codes for the following resistance values in **5-BAND** format:
    8.2 MΩ, 5% Tolerance
    60 Ω, 2% Tolerance
    4.7 kΩ, 1% Tolerance.
20. What are the precautions that are to be taken while placing a Surface Electrode?
21. Discuss the differences between Conductor, Semi-Conductor and Insulator with typical examples.

Rajiv Gandhi University of Health Sciences, Karnataka

22. Briefly discuss the various hazards associated with Electrical Energy.
23. Which is the instrument used to measure electrical Power? Draw the connection diagram of this instrument.
24. What is Negative Feedback in amplifiers? Discuss the advantages of Negative Feedback.
25. Draw the circuit diagram for a common emitter configuration.
26. Explain the concept of operation of an Oscillator?
27. What are Analog to Digital Converters? Where are they used in EMG?

*****