POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year: 2020
Programme: BCA | Full Marks: 70
Course: Fundamentals of Electrical and Electronics | Pass Marks: 31.5
Time: 2 hrs.

Candidates are required to answer in their own words as far as practicable. The figures in the margin indicate full marks.

Group 'A': Attempt all questions (5×10=50)

1. If you need to control the flow of electric current, which electric component would you prefer? If three capacitors are connected with a battery in such a way that their heads are connected together and tails are connected together, how can you obtain the equivalent capacitance? Obtain the expression for equivalent capacitance with necessary diagram.
2. Compare and contrast Thevenin's and Norton's theorem. Draw a network with some resistors and a voltage source, demonstrate how the network is solved by following the steps as explained by these theorems.
3. If you need electrons as majority charge carriers, which type of semiconductor do you choose? Describe with necessary diagram. Explain the conductivity of the semiconductor where electrons are the majority charge carriers.
4. Differentiate between diffusion and drift current. How is potential barrier developed in PN junction diode? Discuss how the potential barrier is virtually eliminated and current flows through the junction. Also mention how Zener diode is different from normal diode?
5. Analyze the differences and similarities in construction and working principle of JFET and MOSFET? Explain in details with neat diagram.

OR

Highlight on characteristics of ideal operational amplifier. If you require to produce an output voltage which is amplified but180^{o} out of phase with respect to input voltage, which type of op-amp (inverting or non-inverting) do you prefer? Discuss with necessary diagram.

Group 'B': Problem-solving/case studies (20)

6. Bipolar junction transistor is constructed by forming two PN junction between P and N-type materials. Three terminals are provided from each emitter and collector and base. How these three terminals are connected as input and output. How these junctions are biased upon apply of voltage? Name the configurations of BJTs. Derive the relation between current gain of these different configurations.