Subject code: PC222EC Semester: 1st

Subject name: Analog Electronics ACY: 2020-2021

**Assignment Questions**

1. Explain the characteristics of a P-N junction in a diode, focusing on how it contributes to the rectifying properties of the diode. Discuss the V-I (voltage-current) characteristics and highlight the significance of the forward and reverse bias regions.
2. Explore the applications of diodes as rectifiers. Describe how diodes are used in rectification processes to convert alternating current (AC) to direct current (DC).
3. Discuss the principles and applications of Zener diodes, including their characteristics and usage for voltage regulation.
4. Explain the V-I characteristics of a Bipolar Junction Transistor (BJT) and the I-V characteristics of a Junction Field-Effect Transistor (JFET). Compare and contrast these characteristics, highlighting the key differences between the two types of transistors.
5. Discuss various configurations of transistors, such as Common Emitter/Source (CE/CS), Common Base/Gate (CB/CG), and Common Collector/Drain (CC/CD), and outline their distinctive features.
6. Analyze the Bipolar Junction Transistor (BJT) as an amplifier, covering the estimation of voltage gain, current gain, input resistance, and output resistance.
7. Define the concept of feedback in electronic circuits, distinguishing between positive and negative feedback. Discuss the fundamental principles of each type and provide examples of their applications in electronic systems.
8. Explore different feedback topologies, including voltage series, current series, voltage shunt, and current shunt configurations.
9. Provide a qualitative treatment of the concept of stability in feedback systems. Explain the factors that contribute to the stability of a feedback system and how stability considerations influence the design and operation of electronic circuits.
10. What is the Barkhausen criterion, and how does it relate to the stability of oscillators?
11. Discuss the various classes of operation in power amplifiers, namely Class A, B, and AB. Provide a qualitative treatment of their power efficiency and distortion characteristics.
12. Explain the qualitative aspects of CRYSTAL oscillators. How do they differ from other types of oscillators?
13. Explain the block diagram of an operational amplifier (OP-AMP) and discuss the characteristics of an ideal OP-AMP. Provide a brief overview of both DC and AC characteristics.
14. explain the principles behind adder/subtractor, integrator, differentiator, and comparator circuits using OPAMP.
15. Provide a concise overview of various circuits involving OP-AMPs, including zero-crossing detectors, square and triangular wave generators, peak detectors.