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. [CO1]
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). [CO1]
3. Discuss the principles and applications of Zener diodes, including their characteristics and usage for voltage regulation. [CO1]
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. [CO2]
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. [CO2]
6. Analyze the Bipolar Junction Transistor (BJT) as an amplifier, covering the estimation of voltage gain, current gain, input resistance, and output resistance. [CO2]
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. [CO3]
8. Explore different feedback topologies, including voltage series, current series, voltage shunt, and current shunt configurations. [CO3]
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. [CO3]
10. What is the Barkhausen criterion, and how does it relate to the stability of oscillators? [CO4]
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. [CO4]
12. Explain the qualitative aspects of CRYSTAL oscillators. How do they differ from other types of oscillators? [CO4]
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. [CO5]
14. explain the principles behind adder/subtractor, integrator, differentiator, and comparator circuits using OPAMP. [CO5]
15. Provide a concise overview of various circuits involving OP-AMPs, including zero-crossing detectors, square and triangular wave generators, peak detectors. [CO5]