DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UNIVERSITY OF BARISAL

Final Examination

Course Title: Electronic Devices and Circuits

Course Code: EEE-2105

2nd Year 1st Semester

Session: 2023-24 (Admission Session 2022-23)

Time: 3 hour **Marks:** 60

Answer any five Questions from the followings.

1. a) The electrons in the outer most orbit of an atom are known as valence electrons. How these electrons determine the electrical properties of a material? [4]

   b) Describe different types of voltage sources with appropriate examples, figures and equations. [4]

   c) A lead acid battery fitted in a truck develops 24 V and has an internal resistance of 0.01 Ω. It is used to supply current to head lights etc. If the total load is equal to 100 watts, find: [4]

      i. Voltage drop in internal resistance

      ii. Terminal voltage

2. a) Electrical conductivity of a semiconductor changes with the variations of temperature. Discuss the effect of temperature on semiconductor. Explain how hole current is formed. [5]

   b) Explain how p-type semiconductor is formed? Elaborate the concept of majority and minority carriers in n-type and p-type semiconductor. [4]

   c) When Zener diode is good to use? Explain. [3]

3. What are different types of rectifiers? Discuss principle of operations of all the rectifiers. Also compare among them. [12]

4. a) Explain the working principle of a photo-diode. [4]

   b) With appropriate figures, describe the characteristics of photo-diodes. [4]

   c) What do you know about tunneling effect of a Tunnel Diode? Explain V-I characteristics of a tunnel diode. [4]

5. a) Considering advantages and disadvantages, compare transistors with vacuum tubes [4]

   b) Explain two important applications of CB amplifiers. [4]

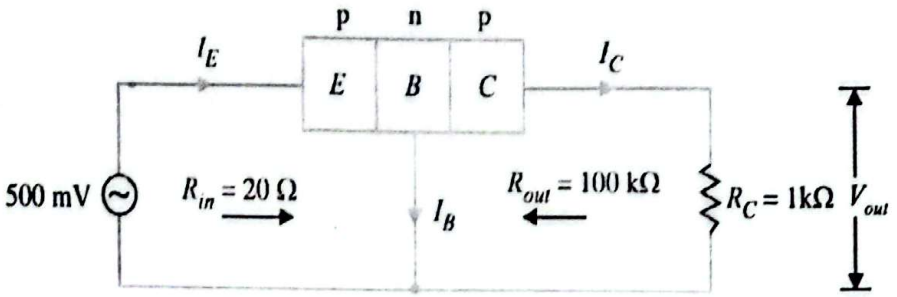
   c) Write short notes on transistor load line analysis and operating point. [4]

6. a) Explain the working principle of a npn transistor. [4]

   b) How transistor can be used as an amplifier? Explain with appropriate diagrams. [4]

   c) A common base transistor amplifier has an input resistance of 20 Ω and output resistance of 100 [4]

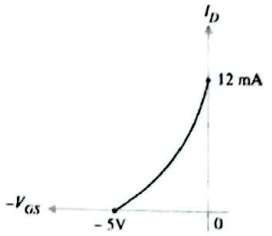
kΩ. The collector load is 1 kΩ. if a signal of 500mV is applied between emitter and base, find the voltage amplification. Assume α_{ac} to be nearly 1.



7. a) JFETs offer several advantages over BJTs, including higher input impedance, lower noise, better thermal stability, simpler biasing, and potentially faster switching speeds. Keeping these points in mind, show JFET as an amplifier. [3]

b) Mention atleast nine salient features of JFET. [3]

c) From the following transfer characteristic curve of a JFET find the equation for drain current. [2]



d) A JFET has certain parameters to determine its performance in a circuit. Explain main parameters with examples. [4]

8. a) What are different types of MOSFETs? Explain their construction. [4]

b) Describe different mode of operations of D-MOSFET circuits. [4]

c) Explain the operation of a common-source D-MOSFET Amplifier. [4]

28/07/25