



B.E DEGREE EXAMINATIONS: NOV/DEC 2023
(Regulation 2018)
Third Semester
ELECTRONICS AND COMMUNICATION ENGINEERING
U18ECI3202: Electron Devices and Circuits

COURSE OUTCOMES

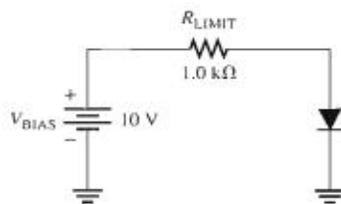
- CO1:** Analyze the characteristics of semiconductor devices.
CO2: Design and analyze amplifier circuits.
CO3: Explore and verify the frequency response characteristics of amplifier.
CO4: Apply and verify the concepts of Power amplifiers and tuned amplifiers.
CO5: Apply the concepts of devices to design DC power supplies.

Time: Three Hours**Maximum Marks: 100****Answer all the Questions:-****PART A (10 x 2 = 20 Marks)****(Answer not more than 40 words)**

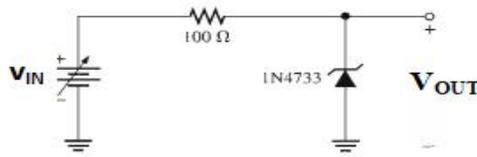
- | | | |
|---|-----|-------------------|
| 1. What happens to the barrier potential when the temperature increases? | CO1 | [K ₄] |
| 2. How is the capacitance of a varactor diode controlled? | CO1 | [K ₄] |
| 3. Why is the base current in a transistor so much less than the collector current? | CO2 | [K ₄] |
| 4. Determine the β_{DC} when a transistor has an I_C 25 mA and an I_B 200 μ A. | CO2 | [K ₂] |
| 5. Identify the factors affecting h-parameters? | CO3 | [K ₂] |
| 6. Why common drain amplifier is called source follower? | CO3 | [K ₃] |
| 7. Differentiate between single and stagger tuned amplifier. | CO4 | [K ₃] |
| 8. Why transformers are used in power amplifier? | CO4 | [K ₃] |
| 9. Using a DC and AC voltmeter to measure the output signal from a filter circuit to obtain readings of 25 V dc and 1.5 V rms. Calculate the ripple of the filter output voltage. | CO5 | [K ₃] |
| 10. Identify the difference between a shunt regulator and series regulator? | CO5 | [K ₂] |

Answer any FIVE Questions:-**PART B (5 x 16 = 80 Marks)****(Answer not more than 400 words)**

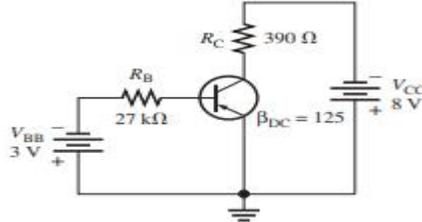
11. a) Determine the forward voltage and forward current for the diode shown in figure 8 CO1 [K₄]
for each models .Also find voltage across the limiting resistor in each case.
Assume $r_d' = 10 \Omega$ at the determined value of forward current.



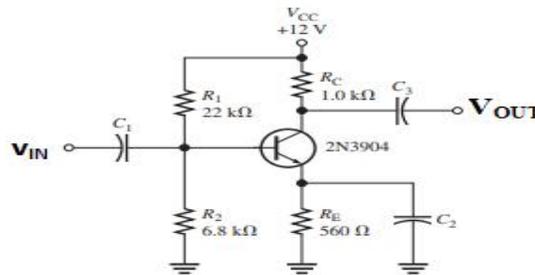
- b) Determine the minimum and the maximum input voltages that can be regulated 8 CO1 [K₄]
by the zener diode as shown in the diagram. Assume $V_Z = 5.1V$ at $I_{ZT} = 49 mA$,
 $Z_Z = 7\Omega$ at I_{ZT} and power dissipation is 1W.



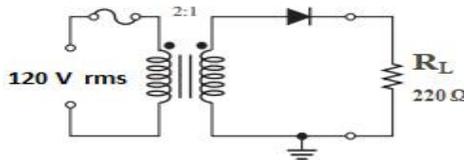
12. a) Find V_{CE} , V_{BE} , and V_{CB} for the circuit given below. 10 CO2 [K4]



- b) Determine the value of the collector resistor in an NPN transistor amplifier with $\beta_{DC} = 250$, $V_{BB} = 2.5$ V, $V_{CC} = 9$ V, $V_{CE} = 4$ V, and $R_B = 100$ k Ω . 6 CO2 [K4]
13. a) Explain Voltage-Divider Bias circuit and discuss the loading effects of Voltage-Divider Bias. 16 CO2 [K2]
14. a) Find a minimum value for the emitter bypass capacitor, C_2 , for the given circuit if the amplifier must operate over a frequency range from 200 Hz to 10 kHz. 6 CO3 [K3]



- b) Explain the analysis of common drain amplifier of a FET at high frequencies: 10 CO3 [K2]
15. a) With neat diagram explain Class B Push-Pull amplifier and derive its maximum efficiency. 10 CO4 [K2]
- b) What is tuned amplifier? With a neat diagram explain the operation of double tuned amplifier. 6 CO4 [K2]
16. a) Determine the peak and average power delivered to R_L in the given circuit. 8 CO5 [K3]



- b) The figure represents a voltage regulator circuit using a Zener diode. The breakdown voltage of the Zener diode is 6V and the load resistance is $R_L = 4$ k Ω . The series resistance of the circuit is $R_i = 1$ k Ω . If the battery voltage V_B varies from 8V to 16V, what are the minimum and maximum values of the current through Zener diode? 8 CO5 [K3]

