POKHARA UNIVERSITY

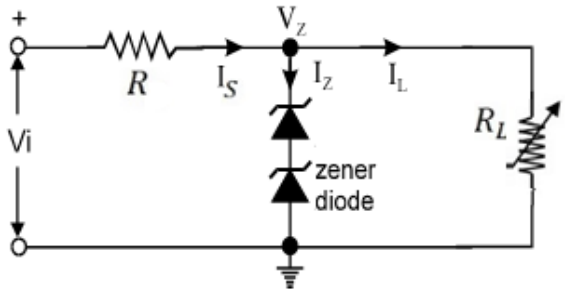
Level: Bachelor	Semester: Spring	Year: 2020
Program: BE		Full Marks: 70
Course: Electronics Devices and Circuits		Pass Marks: 31.5
		Time: **2** hrs.

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

Attempt all the questions.

Section - A: (5×10=50)

1 Why PN diode doesn't conduct in reverse biased condition? A zener regulator consist of two Zener diode with 6 V Zener voltage each, with variable load resistance from 200 to 1 KΩ. In the circuit below V_{in} = (*x+15)* V and R_s= (*y*+100) Ω Find 2+2+2+2+2



i) The maximum and minimum in the Load current.
ii) The maximum and minimum power dissipated in the diode.
iii) Minimum value of load resistance to ensure that Zener diode is ON.
iv) Draw the VI characteristic curve of Zener diode and show the required value according to the above solution.

Note: *"x" and "y"* represents the last digit of PU registration number and last digit of your exam roll number, respectively.

OR

"Transition capacitance is inversely proportional to the square root of the applied reverse voltage" Justify the above statement. How do you illustrate that non-linear devices doesn't follow the principle of superposition. 5+5

2 Mention importance of r_e model and *h*-model in BJT? Find out input resistance, input stage resistance, output stage resistance, voltage gain, current gain, overall voltage gain and overall current for a given circuit shown with R_1 = 100 Ω, R_1 = (*x* +10) KΩ, R_2 = (*x*+5) KΩ, R_c = x KΩ, R_E = (x+2) KΩ, R_L = (x+3) KΩ, β = 100, r_e = 20 Ω, V_{cc} = (y+10) V, source resistance 100 Ω. 4+4+2

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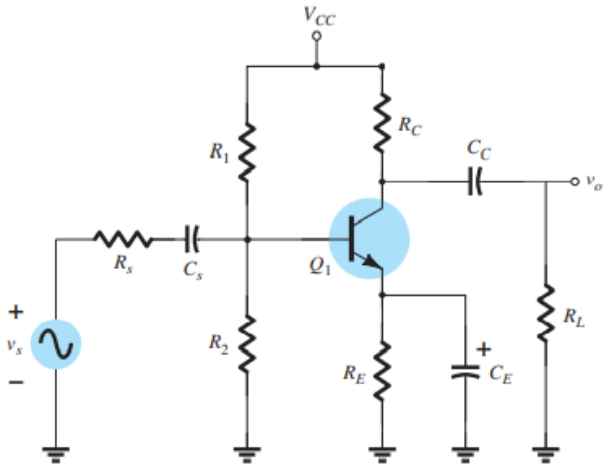

3	Explain thermal instability and thermal runaway. Compare different type of configuration best on stability factor. Justify which configuration is best on the basis of stability factor with appropriate circuit and derivation.	2+4+4
4	Describe the importance of negative feedback with few practical applications and justify the statement "negative feedback reduces the voltage gain but provide better stability.	5+5
5	Differentiate JFET with MOSFET based on its construction and working principle. Where is CE configuration of BJT in cascading and why. Also prove that trans-conductance of JFET is directly proportional to drain-source saturation current.	4+2+4

Section - B: (1×20=20)

6	Being as a engineer, you are given a task to design a 18 V battery charger. Draw and explain the block diagram, circuit and waveform for above purpose design based upon your understanding of chapter 3.	20