

Term End Examination - May 2013

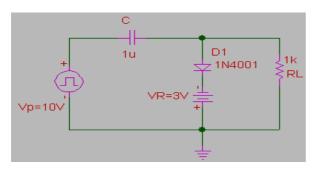
Course : EEE103 - Electronics Slot: B2+TB2

Class NBR : 3997 / 3989 / 3992 / 3994

Time : Three Hours Max.Marks:100

PART – A (8 X 5 = 40 Marks) Answer <u>ALL</u> Questions

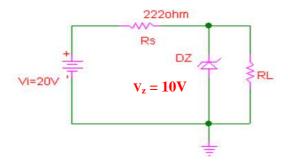
- 1. A germanium diode displays a forward voltage of 0.3V at 15mA current at room temperature 300° K. Assume η =1.
 - a) Find the reverse saturation current
 - b) Find the bias voltage needed for $I_D=1mA$ and $I_D=100mA$.
- 2. Find the output signal for the given circuit if Vp=10V.



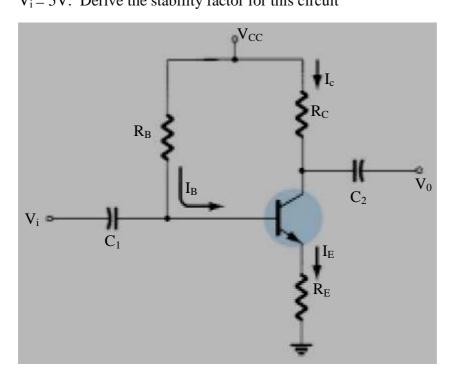
- 3. What is Thermal runaway and how to protect the transistor from it?
- 4. Compare FET and BJT with respect to various features.
- 5. Explain the characteristics and features of UJT.
- 6. Write a short note on Photo diode.
- 7. The common mode input to a certain differential amplifier, having differential gain of 125 is 4 sin 200πt V. Determine the common mode output if CMRR is 60 dB.
- 8. Design an differentiator circuit using OP-Amp and derive the output expression of the differentiator.

PART - B (6 X 10 = 60 Marks)Answer any <u>SIX</u> Questions

- 9. a) An a.c. supply of 230V is applied to a half-wave rectifier circuit through a [5] transformer of turn ratio 10:1. Determine (i) I_m , I_{dc} and I_{rms} (ii) d.c. power output (iii) a.c. power input (iv) efficiency of rectification. Assume the diode has a forward resistance of 20Ω and load resistance is $1 \text{ k}\Omega$.
 - b) Determine I_L , $I_Z \& I$ if R_L =380 Ω for the given Zener diode circuit.



- 10. a) Explain the construction and characteristics of Varactor Diode.
 - b) Explain about any two bias compensation method for BJT.
- 11. Determine the operating point of the circuit shown in below figure. Assume that $\beta = 100 \ V_{BE(on)} = 0.7 \ V, \ R_B = 20 \ k\Omega, \ R_C = 0.4 \ k\Omega, \ R_E = 0.6 \ k\Omega, \ V_{CC} = 10 V \ and$ $V_i = 5 V. \ Derive the stability factor for this circuit$



12. For the voltage divider bias circuit having component value of V_{cc} =10 V, R_1 =8 k Ω , R_2 = 2 k Ω , R_C = 4.7 k Ω , R_e = 1.2 k Ω . Find out the quiescent point. Find the change in I_c

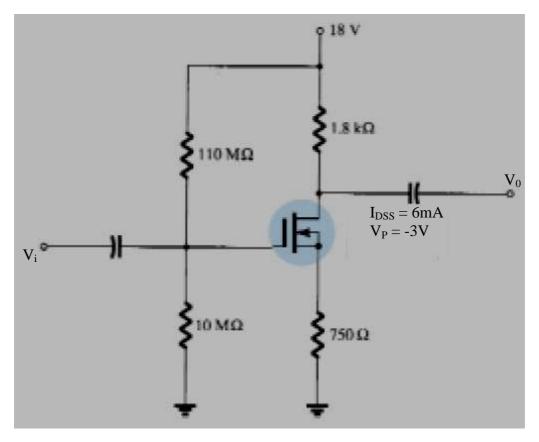
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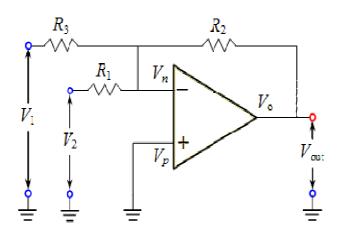
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when β changes from 100 to 300. Explain what you infer from the result.

- 13. Describe the operation and characteristics of n- channel JFET.
- 14. The N- Channel MOSFET operates in Depletion Region as shown below. Given $I_{DSS}=6mA \text{ and } V_P=-3V. \ R_1=110 \ M\Omega, \ R_2=10 \ M\Omega, \ R_C=1.8 \ k\Omega, \ R_E=750 \ \Omega \text{ and } V_{DD}=18 \ V. \ Determine:$
 - a) I_{DQ} and V_{GSQ}
 - $b) \ V_{DS}$



- 15. Explain PN junction Laser with suitable diagram.
- 16. a) Consider the following schematic diagram.



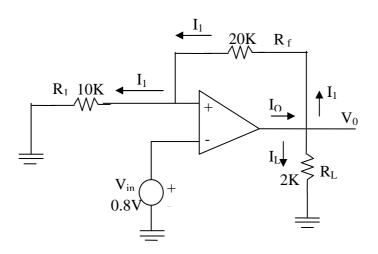
All three resistors are of value 20 k Ω . If $V_1 = 1.5$ V, and $V_2 = 2.5$ V, what is V_{out} (in volts)?

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- b) For a noninverting amplifier shown in the figure below, calculate
 - i. A_{CL}
 - ii. V_0
 - iii. $I_{\text{\tiny L}}$
 - iv. I_0



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