

R09

Code No: 09A30203

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year I Semester Examinations, November/December-2013

Electronic Devices and Circuits

(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) Explain the formation of depletion region in an open circuited pn junction with neat sketches.  
b) The voltage across a silicon diode at room temperature of 300°K is 0.7V when 2mA current flows through it. If the voltage increases to 0.75V, calculate the diode current. [8+7]
- 2.a) Draw the circuit diagram of a Full wave bridge rectifier. Explain the operation of circuit with relevant waveforms.  
b) A Full wave single phase rectifier makes use of 2 diodes, the internal forward resistance of each is considered to be constant and equal to 30Ω. The load resistance is 1KΩ. The transformer secondary voltage is 200-0-200V(rms). Calculate [7+8]  
i) DC load current ii) DC output voltage  
iii) Peak Inverse Voltage of each diode iv) RMS voltage across each diode.
- 3.a) What is Early Effect? How does it modify the V-I characteristics of a BJT?  
b) The reverse leakage current of the transistor, when connected in CB configuration is 0.2μA, while it is 18μA when the same transistor is connected in CE configuration. Calculate α and β of the transistor. [9+6]
- 4.a) Derive the condition for Thermal Stability in a BJT.  
b) What is meant by Q point of a BJT? What is its significance? [7+8]
- 5.a) Write a short note on Miller's Theorem.  
b) A CB amplifier is driven by a voltage source of internal resistance  $R_s = 1K\Omega$ . The load impedance is 1KΩ. The transistor parameters are  $h_{ib} = 22\Omega$ ,  $h_{fb} = -0.98$ ,  $h_{rb} = 2.9 \times 10^{-4}$ ,  $h_{ob} = 0.5\mu A/V$ . Compute  $A_i$ ,  $A_v$ ,  $R_i$ ,  $R_o$  of the amplifier. [7+8]
- 6.a) Explain construction and working of an n channel JFET with neat diagram and symbol.  
b) Define the parameters of JFET and derive the relation between them. [7+8]
- 7.a) With the help of neat diagram Explain the voltage divider biasing method for FET.  
b) Compare important characteristics of JFET and MOSFET [9+6]
- 8.a) Draw the basic structure of Varactor diode and Explain its operation.  
b) Explain the V-I characteristics of a Tunnel Diode. [7+8]

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