

Code: 9A04301

B.Tech II Year I Semester (R09) Regular and Supplementary Examinations, November 2012

**ELECTRONIC DEVICES & CIRCUITS**

(Common to EIE, E.Con.E, ECE, ECC, CSS, IT, CSE, EEE and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) Explain about Forward bias and Reverse bias in the case of a p-n junction diode.  
(b) Draw the band diagram of PN junction under open circuit conditions and explain.
- 2 (a) Calculate the value of capacitance to use in a capacitor filter connected to a full wave rectifier operating at a standard aircraft power frequency of 400 Hz, if the ripple factor is 10% for a load of 500  $\Omega$ .  
(b) Explain the working of the Half wave rectifier circuit using signal waveforms at various points in the circuit.
- 3 (a) Explain the input and output characteristics of a transistor in CB configuration.  
(b) Calculate the collector current and emitter current for a transistor with  $\alpha_{dc} = 0.99$  and  $I_{CBO} = 50 \mu A$  when the base current is 20  $\mu A$ .
- 4 (a) Explain the criteria for fixing operating point.  
(b) List out the different types of biasing methods.
- 5 (a) Discuss FET small signal low frequency model.  
(b) Sketch the cross section of an NMOS enhancement transistor and briefly explain.
- 6 (a) Draw the circuit diagram of common source JFET amplifier and derive the expressions for input resistance and output resistance.  
(b) How should the gate-source junction of a JFET be biased? Explain how the potential applied to this junction controls the drain current.
- 7 (a) Derive the input impedance, output impedance, voltage gain, current gain in CC configuration using approximate model.  
(b) A CE amplifier is drawn by a voltage source of internal resistance  $r_s = 1000 \Omega$ . The h-parameters are  $h_{ie} = 1 K\Omega$ ,  $h_{re} = 2 \times 10^{-4}$ ,  $h_{fe} = 50$ ,  $h_{oe} = 25 \mu A/V$ . Calculate the current gain, voltage gain and output resistance using exact analysis.
- 8 (a) Draw the two transistor version of an SCR and explain its firing characteristics with this circuit.  
(b) Write a brief note on light dependent resistor.

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