Code No: 53009 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year I Semester Examinations, December-2014
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ICE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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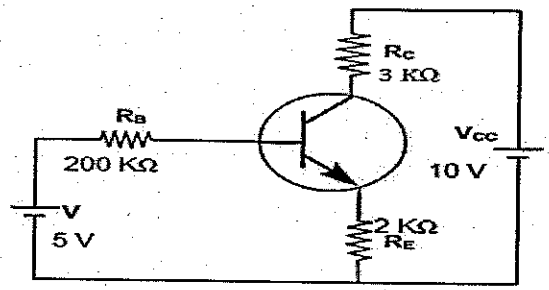
1.a) What are the types of breakdown mechanisms in a diode? Explain the reverse bias characteristics of Zener diode.
b) Derive the expression for transition capacitance of a diode.

2.a) Design an L-section filter and obtain its expression for ripple factor.
b) A fullwave rectifier circuit uses two silicon diodes with a forward resistance of 20 Ω each. A DC voltmeter connected across the load of 1KΩ reads 55.4 Volts. Calculate
i) I_{rms}
ii) Average voltage across each diode
iii) Ripple factor
iv) Transformer secondary voltage rating.

3.a) Obtain a generalized transistor equation for collector current when emitter junction is forward biased and collector junction is reverse biased.
b) Find the transistor currents in the circuit as shown in Figure. A silicon transistor with β = 100 and Ico = 20 nA is under consideration.



4.a) Draw the circuit diagram of a self bias circuit and explain how to determine the value of R_1 and R_2.
b) An NPN transistor having β = 50 is used in Common Emitter circuit with V_{CC} = 10 V, R_C = 2 K Ω. The bias is obtained by connecting 100 Ω resistor from collector to base. Find the quiescent point and stability factor S.

5.a) Draw the BJT hybrid models for CE, CB, CC configurations.
b) Compare CE, CB and CC amplifier Configurations.

6.a) Obtain the small signal model of JFET. What are the parameters of FET? Give their relationship.

b) Compare BJT and JFET.

7.a) Explain how FET can be used as a voltage variable resistor?

b) Determine the operating point for the self bias circuit of n-channel JFET given V_{DD} = 15 V, R_D = 500 Ω, R_S = 1 KΩ, R_1 = 12 KΩ, R_2 = 4 KΩ, I_{DSS} = 8 mA, V_P = -4V.

8.a) Explain the principle of operation of Tunnel diode. Also explain the construction, principle of operation of a Photo diode.

b) Explain the principle and operation of Silicon Controlled Rectifier.

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