3E1481

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B.Tech. (Sem. III) (Main/Back) Examination, February - 2010
Electrical Engineering
(3EE1 Power Electronics - I)

Time : **3** Hours] [Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt **five** questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. Nil **2.** Nil

1 (a) Explain the formation of depletion region in an open circuited P-N junction. 8

(b) Derive the expression for diffusion capacitance and show that diffusion capacitance is directly proportional to diode current I. 8

OR

1 (a) Draw the equivalent circuit and explain characteristics of varactor diode. 8

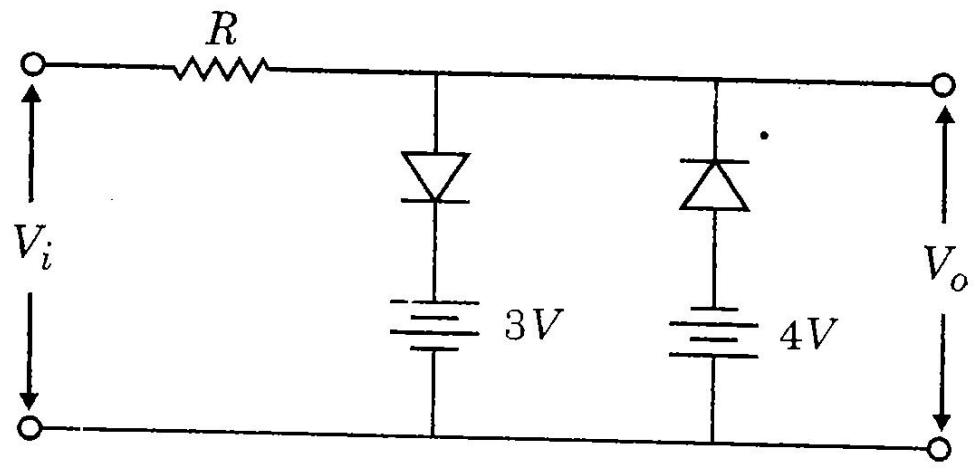
(b) Explain the operation of photo-diode and given its applications. 8

2 (a) Draw and explain Bridge-rectifier ckts. with waveforms. 8

(b) Prove that the maximum rectification efficiency of full-wave rectifier is 81.2%. 8

OR

2 (a) Sketch the output waveform of the following diode ckt. when $V_i = 5 \sin 200 \pi t$ is applied to input



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(b) Draw and explain the ckt. of a voltage doubler and voltage quadruples.

8

3 (a) For a pnp transistor biased in active region indicate and discuss the various electron and hole current component crossing the junction.

8

(b) Explain :

(i) Diode compensation for V_{BE}

(ii) Thermistor compensation.

8

OR

3 (a) Explain the phenomenon of base width modulation.

8

(b) Explain the function of a transistor as a switch.

8

4 (a) With the help of a neat diagram explain the voltage divider biasing method for JFET.

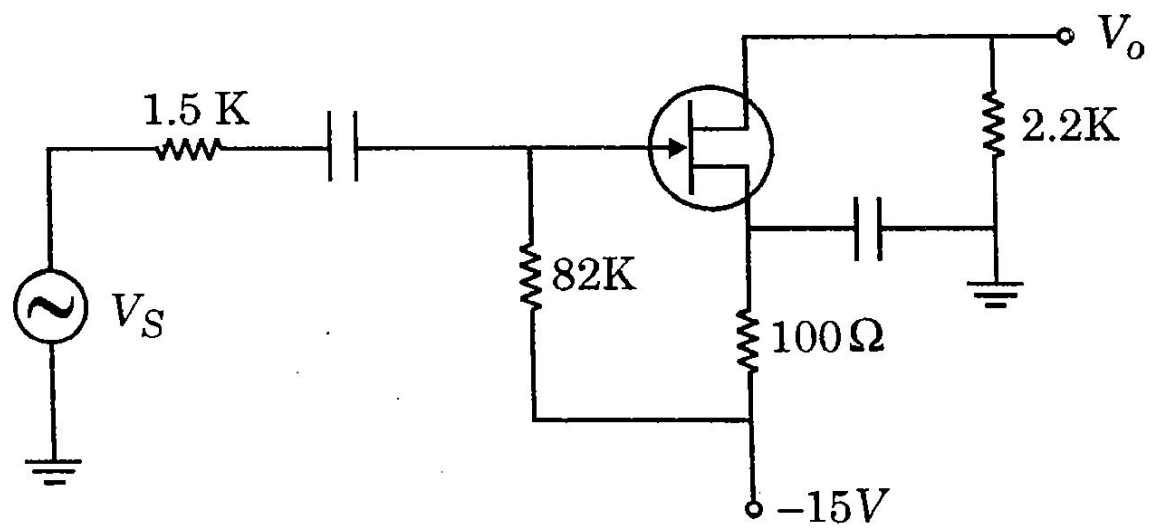
8

(b) The JFET shown has $I_{DSS} = 6\,mA$ and $V_p = -3V$. Calculate :

(i) I_{DSQ}

(ii) V_{DSQ}

(iii) V_{GSQ}



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OR

4 (a) Explain the construction characteristics of a N-channel enhancement MOSFET.

8

(b) Explain the working of FET as a voltage variable resistor (VVR).

8

5 (a) Deduce expressions for A_v, A_i, R_i, R_0, A_{vs} and A_{IS} in a CE BJT amplifier in terms of h-parameters.

10

(b) State and explain Miller's theorem.

6

OR

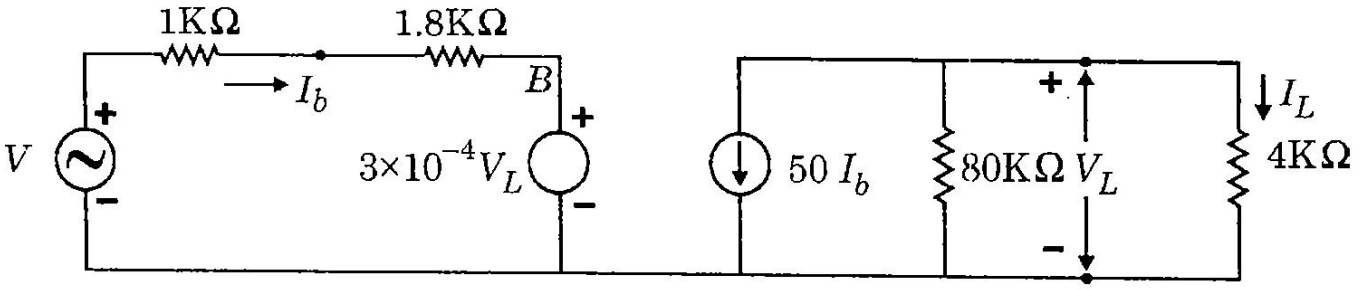
5 (a) Write short notes on :

(i) Bootstraping

(ii) Darlington Emitter follower.

8

(b) In the fig shown, calculate current gain and voltage gain.



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