

**328353(28)**

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BE (3<sup>rd</sup> Semester)

Examination, April - May, 2017

[New Scheme]

**Electronic Devices and Circuits**

*Time Allowed* : 3 hours

*Maximum Marks* : 80

*Minimum Pass Marks* : 28

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- Note :** (i) Part (a) of each question is compulsory.  
Attempt any **two** parts from (b), (c) and (d).  
(ii) The figures in the right-hand margin indicate marks.
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1. (a) Define mass action law. [2]
- (b) Obtain a suitable expression of potential variation in graded junction and explain it by charge density variation diagram. [7]
- (c) Discuss the potential, electric field and charge density inside depletion layer of *p-n* junction. [7]

- (d) For  $n$ -type of semiconductor, prove that the hole concentration is

$$p = \frac{n_i^2}{N_D}$$

where  $p$  = hole concentration

$N_D$  = donor ion concentration .

$n_i$  = intrinsic concentration [7]

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2. (a) What do you understand by load line ? [2]  
 (b) Dynamic resistance of a diode is reduced with the increase in temperature. Justify. [7]  
 (c) How does Zener diode work so as to be used in voltage regulator circuit ? [7]  
 (d) Discuss the effects of temperature on diode current and voltage. [7]
3. (a) Define operating point in a transistor. [2]  
 (b) Explain the condition to avoid thermal runaway in BJT. [7]  
 (c) How does transistor work as switch ? Explain. [7]  
 (d) How is bias compensation method different from biasing technique? Explain with suitable example. csvtuonline.com [7]
4. (a) FET is voltage controlled device. Justify. [2]

- (b) Field effect transistor (FET) is used as VVR (voltage variable resistor). Explain the operation of FET as VVR. [7]  
 (c) Write the drawbacks of self-bias used in FET. csvtuonline.com [7]  
 (d) Draw small signal model of JFET and explain the various parameters used in the model. [7]
5. (a) How is MOSFET different from FET ? [2]  
 (b) Explain the characteristics of depletion-type MOSFET. [7]  
 (c) Write a short note on CMOS devices. [7]  
 (d) How does fixed-bias provide stability in MOSFET? Explain with the help of suitable diagrams. [7]

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